

TOKYO SUMMIT-9

INTERNATIONAL INNOVATIVE STUDIES & CONTEMPORARY SCIENTIFIC RESEARCH CONGRESS

October 10-11, 2024

Tokyo / Japan

EDITORS

Rodrigue Lézin ALLEMBE

Dr. Sazada Siddiqui

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PROCEEDINGS BOOK

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CONGRESS ID

CONGRESS TITLE

TOKYO 9th INTERNATIONAL INNOVATIVE STUDIES & CONTEMPORARY SCIENTIFIC RESEARCH CONGRESS

DATE AND PLACE

October 10-11, 2024 / Tokyo - Japan

ORGANIZATION

IKSAD INSTITUTE

EDITORS

Rodrigue Lézin ALLEMBE

Dr. Sazada Siddiqui

PARTICIPANTS COUNTRY (33 countries)

UK, IRELAND, POLAND, TÜRKİYE, AZERBAIJAN, NORTH CYPRUS, NIGERIA, INDIA, IRAN, IRAQ, MOROCCO, CONGO, ALBANIA, ALGERIA, ROMANIA, SERBIA, HUNGARY, BRAZIL, CHINA, MALAYSIA, INDONESIA, BENIN, SAUDI ARABIA, PAKISTAN, TAIWAN, UGANDA, VIETNAM, GEORGIA, UZBEKISTAN

Total Accepted Article: 195

Total Rejected Papers: 53

Accepted Article (Türkiye): 94

Accepted Article (Other Countries): 101

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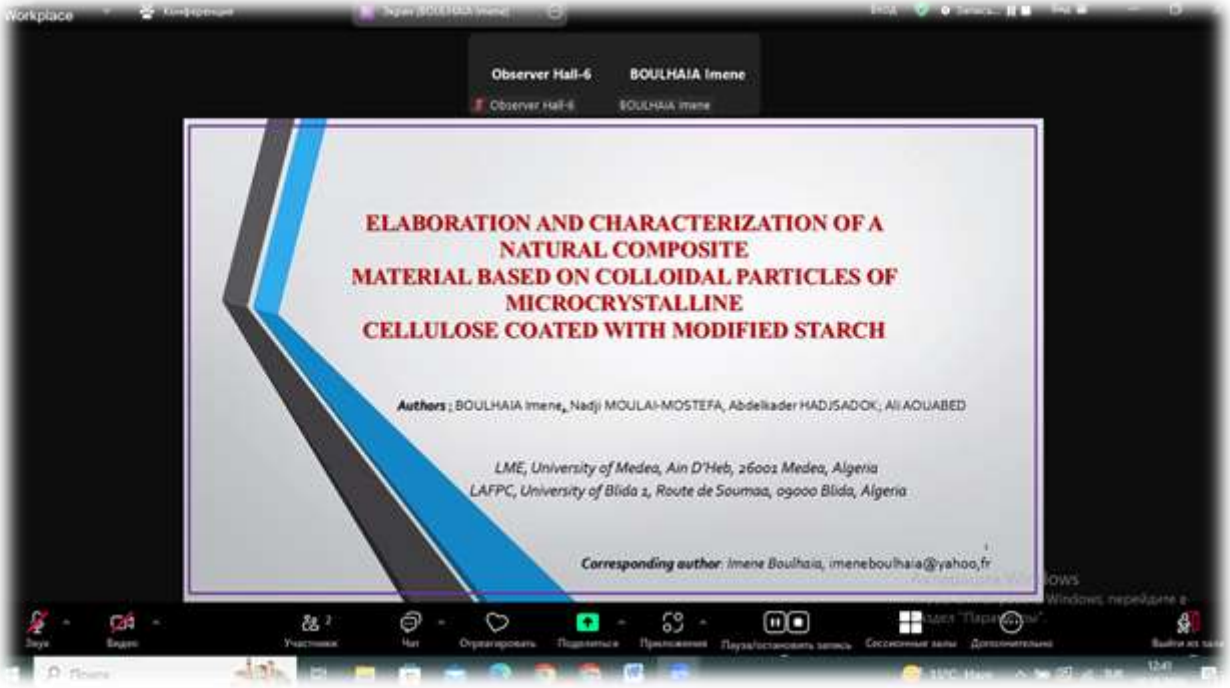




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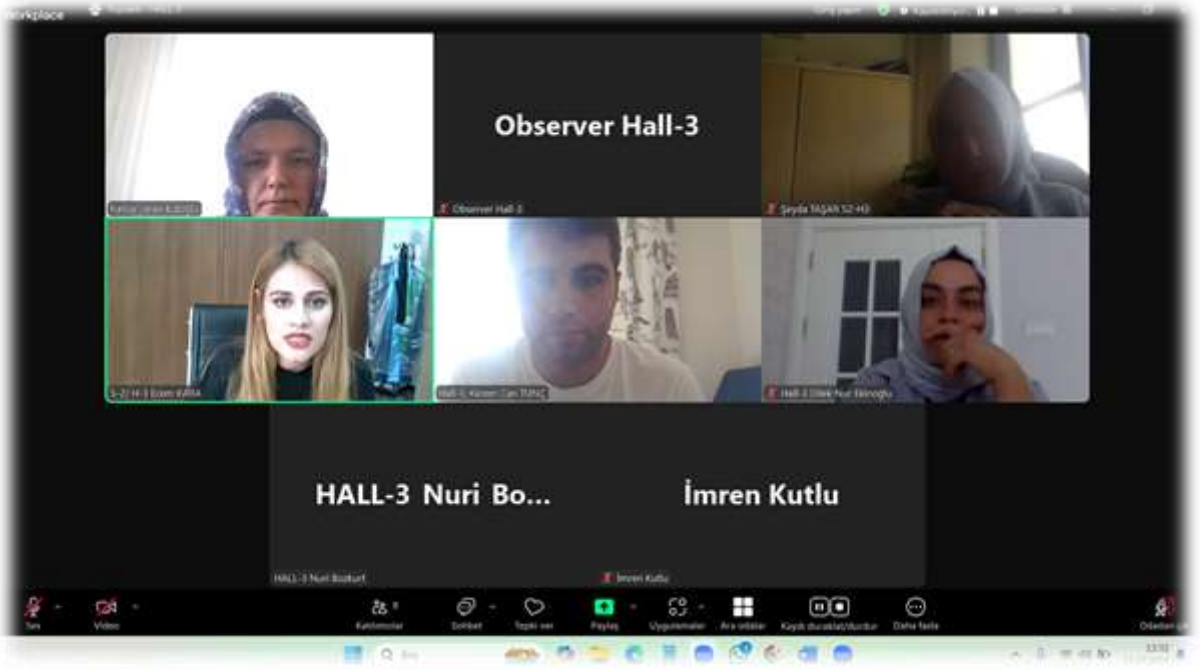




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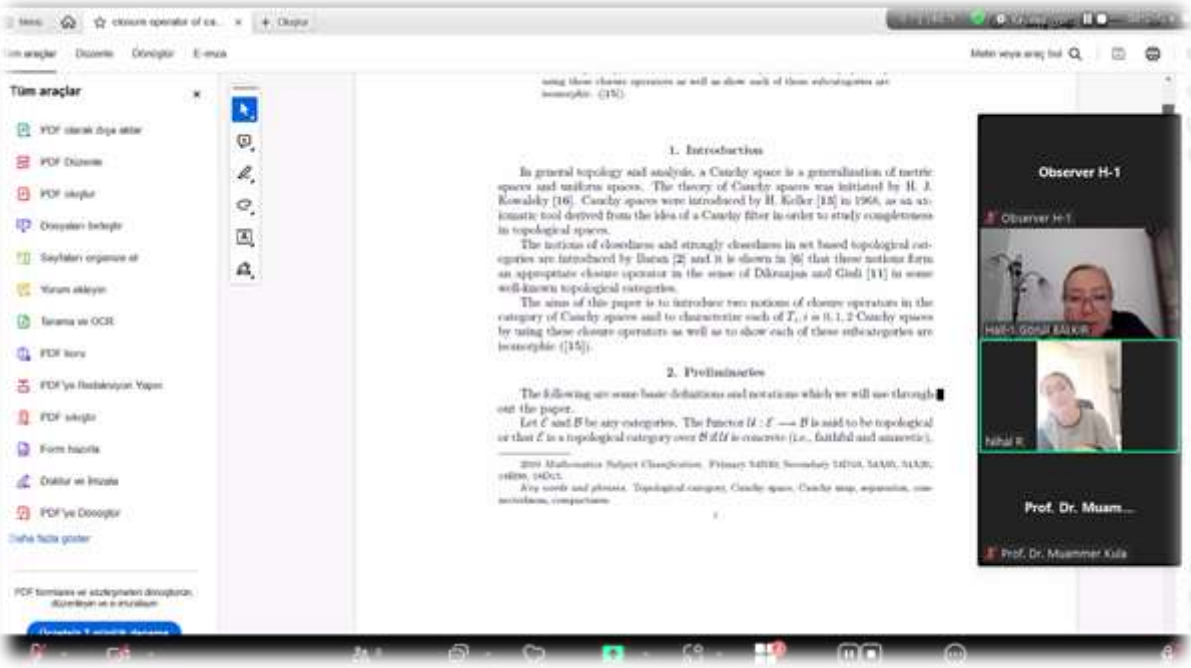
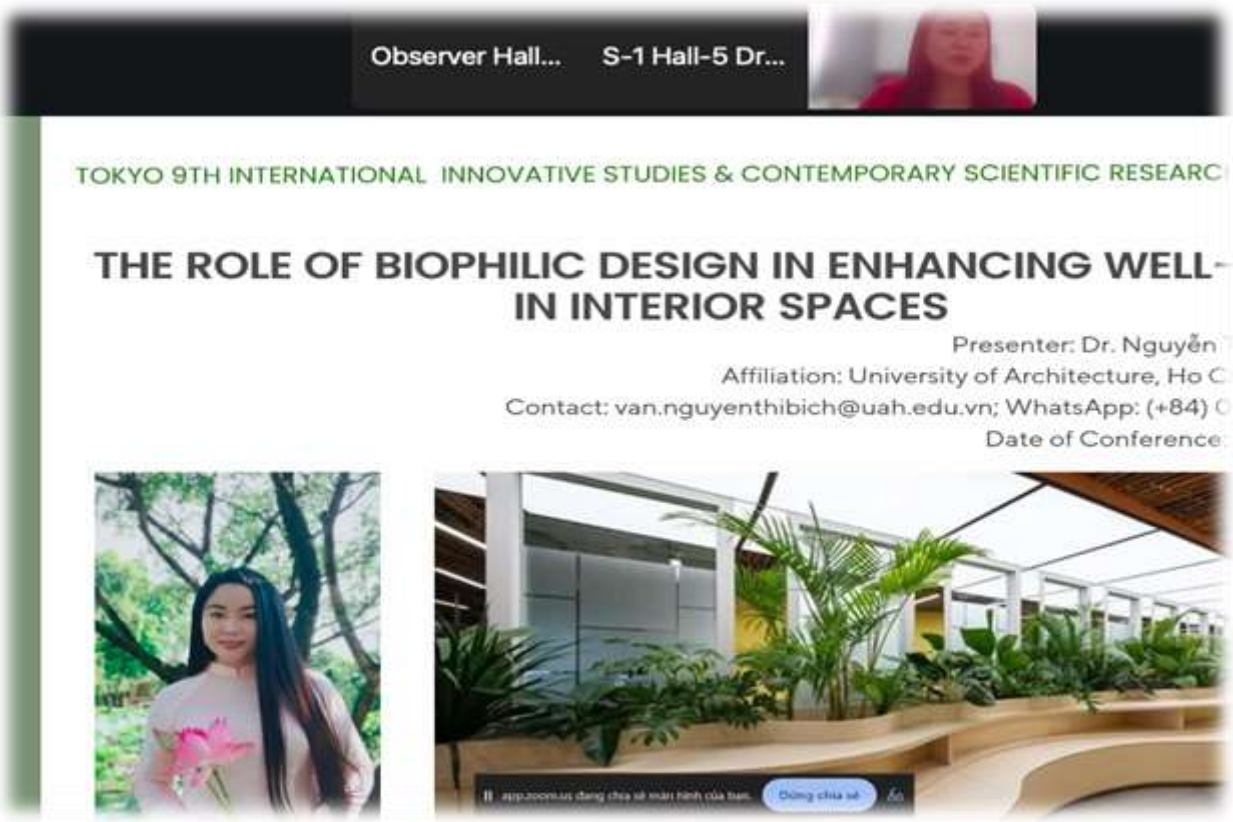


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TOKYO SUMMIT - IX

TOKYO

9th INTERNATIONAL INNOVATIVE STUDIES & CONTEMPORARY SCIENTIFIC RESEARCH CONGRESS

October 10-11, 2024 / Tokyo - Japan



CONGRESS PROGRAM

Meeting ID: 858 1117 0419

Passcode: 987654

Link: https://us02web.zoom.us/j/85811170419?pwd=fMFAB783FYny3ehAbViHlSIZsj4ode.1

Participant Countries (34): UK, Ireland, Poland, Türkiye, Azerbaijan, North Cyprus, Nigeria, India, Iran, Iraq, Morocco, Congo, Albania, Algeria, Romania, Serbia, Hungary, Brazil, China, Malaysia, Indonesia, Benin, Saudi Arabia, Pakistan, Taiwan, Uganda, Vietnam, Georgia, Uzbekistan, Kazakhstan

ÖNEMLİ, DİKKATLE OKUYUNUZ LÜTFEN / IMPORTANT, PLEASE READ CAREFULLY

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- Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildiriler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
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- Tüm kongre katılımcıları canlı bağlanarak tüm oturumları dinleyebilir.
- Moderatör – oturumdaki sunum ve bilimsel tartışma (soru-cevap) kısmından sorumludur.

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exp. Hall-1, Suzy NAKAMURA



10.10.2024 | SESSION-1 | HALL-1

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Asst. Prof. Dr. Kenan ÖZEL

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Celal KISTAK Ali TAŞKIRAN Nevin CELİK	*Firat University, Türkiye Sirnak University, Türkiye*	EXPLORING THE DESIGN STAGES AND HEAT CALCULATIONS OF FRIGORIFIC VEHICLES FOR EFFECTIVE FOOD PRESERVATION
Assist. Prof. Dr. Mutlu OKCU	*Ardahan University, Türkiye*	THE EFFECT OF FUEL LIBRARY ON THE EMISSION AND PERFORMANCE OF A GDI ENGINE: A NUMERICAL APPROACH
İrfan YOLCULAR Celal KISTAK Ali TAŞKIRAN Nevin CELİK	*Nit Orme R&D Department Türkiye Firat University, Türkiye Sirnak University, Türkiye Firat University, Türkiye*	NUMERICAL INVESTIGATION OF CHEMOSIL USAGE IN TEXTILE MACHINES
Asst. Prof. Bulent PİSKİN	*Duzce University, Türkiye*	A NEW CULTIVATOR CONCEPT; CULTIVATOR DESIGN WITH FERTILISER POURING DEVICE, PRESSURE ROLLER, TAPPER AND ROTATING CIRCULAR TILLERS
Ph.D Nazila Ragimova Almammadova Mehriban Kamenieva Nina Bibikov Mykyta	*Azerbaijan State Oil and Industry University Ukrainian State University of Railway Transport, Ukraine*	RESEARCH OF TECHNICAL MEASURES TO IMPROVE THE SAFETY OF THE FUNCTIONING OF THE MIDDLE LEVEL OF MICROPROCESSOR CENTRALIZATION OF SWITCHES AND SIGNALS, WHICH ALLOW TO INCREASE THE MAXIMUM TIME OF PERIODIC MONITORING OF THE SERVICEABILITY OF ELEMENTS
Ayşe İrem OZANSOY Res. Asst. Arif BENLİOĞLU Asst. Prof. Süleyman ÖZEN	*Bursa Technical University, Türkiye*	THE MECHANICAL PROPERTIES OF FIBER REINFORCED MORTARS CONTAINING AIR ENTRAINING ADMIXTURES
Asst. Prof. Dr. Kenan ÖZEL Prof. Dr. Abdullah YILDIZ	*Ankara University, Türkiye Ankara Yıldırım Beyazıt University, Türkiye*	NUMERICAL INVESTIGATIONS ON IZO/SnO_2 /$FASnI_3$ /CdTe/Ag PEROVSKITE SOLAR CELLS
Asst. Prof. Dr. Kenan ÖZEL Prof. Dr. Abdullah YILDIZ	*Ankara University, Türkiye Ankara Yıldırım Beyazıt University, Türkiye*	HIGHLY STABLE $MASnBr_3$ BASED PEROVSKITE SOLAR CELLS



10.10.2024 | SESSION-1 | HALL-2

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Prof. Dr. Ahmet Niyazi ÖZKER

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Walid SHIRPOR Dr. Olwyn PIGGOTT Dr. Saeid TAKARLI	*Kings College LONDON, UK National University of Ireland, Ireland*	THE ROLE OF MEDICINE IN THE ECONOMY OF A COUNTRY
Sintayehu Lolemo Dr. Hemal Pandya	*Gujarat University, India*	CUSTOMER E-SATISFACTION AS A MEDIATOR BETWEEN E-SERVICE QUALITY, BRAND IMAGE, AND E-LOYALTY: INSIGHTS FROM ETHIOPIAN DIGITAL BANKING
Muhammad Said	*Syarif Hidayatullah State Islamic University, Indonesia*	CASH WAQF LINKED SUKUK IN THE DEVELOPMENT OF RENEWABLE ENERGY IN NUSA TENGGARA TIMUR: CHALLENGES AND POTENTIAL
Aida Makas Prof. Dr. Sanela Pasic	*Sarajevo School of Science and Technology, Bosnia and Herzegovina*	THE GOVERNANCE, RISK AND COMPLIANCE PRATICIES IN BOSNIA AND HERZEGOVINA CORPORATE SECTOR
Prof. Dr. Ahmet Niyazi ÖZKER	*Bandirma Onyedi Eylul University, Türkiye*	DETOURS FROM MONETARY POLICY IN TURKEY AND THE EXTERNAL BUFFERS IN REDUCING RISK PREMIUMS
Assoc. Prof. Dr. Meltem GÜRÜNLÜ	*Istanbul Arel University, Türkiye*	DO BUSINESS GROUP AFFILIATES TEND TO USE MORE DEBT THAN STAND-ALONE COMPANIES?
Assoc. Prof. Dr. Meltem GÜRÜNLÜ	*Istanbul Arel University, Türkiye*	ARE FINANCIAL MARKETS EFFICIENT? A CRITIQUE FROM THE BEHAVIORAL FINANCE PERSPECTIVE
Assoc. Prof. Dr. Güller ŞAHİN Asst. Prof. Dr. Fatih Volkan AYYILDIZ	*Kütahya Sağlık Bilimleri University, Türkiye Ardahan University, Türkiye*	ASSESSMENT OF WIND POWER IN GERMANY'S ENERGY TRANSFORMATION WITH SWOT ANALYSIS
Valeria SZEPLAKI	*University of Public Service, Hungary*	LATEST PUBLIC GOVTECH DEVELOPMENTS IN THE PRIVATE INSURANCE SECTOR - COMPARISON BETWEEN EUROPE (EU) and ASIA (JAPAN)
Hamza Korkmaz	*Yeditepe University, Türkiye*	CIRCULAR ECONOMY POLICIES IN ENGLAND AND ROMANIA



10.10.2024 | SESSION-1 | HALL-3

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Khimmataliev Dustnazar Omonovic

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Mehdi shalchi tousi	*Ahle Beyte internatinal University, Iran*	OPTIMUM DESIGN OF REINFORCED CONCRETE CANTILEVER WOA OPTIMIZATION ALGORITHM
Adamu Muhammad Awwal **Dr. Ahmed Tukur Aliyu** **Dr. Eutace M Dogo**	*Federal University of Technology, Nigeria*	DYNAMIC SPECTRUM AND POWER ALLOCATION FRAMEWORK (DYSPAF) FOR FULL DUPLEX BACKHAUL 5G NETWORKS
Abdullahi Yakubu Wabi **Dr. Aliyu Ahmed** **Dr. Aliyu Ahmed**	*Federal University of Technology, Nigeria*	AN ADAPTIVE MAC PROTOCOL (DQ-MAC) FOR EFFICIENT DYNAMIC SPECTRUM ACCESS IN COGNITIVE RADIO NETWORKS
Gabriel Gumut **Engr. Dr. Buhari Ugbede Umar** **Engr. Dr. Ibrahim Mohammed Abdullahi** **Engr. Lukman Adewale Ajao** **Olayemi Mikail Olaniyi** **Samuel Adeniyi**	*Federal University of Technology, Nigeria* *National Open University of Nigeria Abuja, Nigeria*	A REAL-TIME SECURE-BASED OIL AND GAS SUPPLY CHAIN MANAGEMENT USING BLOCKCHAIN
Daniel Moses Ewenike **Engr. Prof. Caroline Omoanatse Alenoghena** **Engr. Dr. Umar Suleiman Dauda** **Samuel Adeniyi**	*Federal University of Technology, Nigeria*	OPTIMIZING HANDOVER MECHANISMS BETWEEN LIFI AND WIFI NETWORKS: TECHNIQUES AND PERFORMANCE ANALYSIS
Assoc. Prof. Dr. Suzan URGAN **Assoc. Prof. Dr. Pınar ERDOĞAN**	*19 Mayıs University, Türkiye* *Karamanoğlu Mehmetbey, Türkiye*	CYBER ATTACKS AND CYBER SECURITY IN DIGITAL ORGANIZATIONS
Dr. Hasan GÖKBAŞ	*Bitlis Eren University, Türkiye*	A NEW MEMBER OF THE PELL SEQUENCES: THE PESUDO-PELL SEQUENCE
İbrahim DİPÇİK **Assoc. Prof. Dr. Farid HUSEYNOV**	*Gebze Technical University, Türkiye*	THE EFFECT OF SOCIAL MEDIA ON INDIVIDUALS' WILLINGNESS TO HELP IN DISASTER SITUATIONS: A MACHINE LEARNING ANALYSIS



10.10.2024 | SESSION-1 | HALL-4

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Khimmataliev Dustnazar Omonovich

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Raxmanova Dilfuza Uchkunovna	*Chirchik State Pedagogical University, Uzbekistan*	PSYCHOLOGICAL DETERMINANTS OF OPTIMIZATION OF STUDENTS' INTELLECTUAL ACTIVITY
Khimmataliev Dustnazar Omonovich Buriyeva Kibrio Ergashevna	*Chirchik State Pedagogical University, Uzbekistan*	THE STUDY OF THE RELATIONSHIP BETWEEN STRESS AND A SENSE OF OPTIMISM IN STUDENTS
Prof. Kodirova Feruzakhon Usmanovna Ernazarova Zulfiya Samadov Bobir	*Chirchik State Pedagogical University, Uzbekistan*	ENHANCING THE INCLUSIVE PREPAREDNESS OF SOCIALLY-ORIENTED STUDENTS IN AN EDUCATIONAL CLUSTER ENVIRONMENT USING A COMPETENCY-BASED APPROACH
Khimmataliev Dustnazar Omonovich Omonova Nilufar Parda qizi	*Chirchik State Pedagogical University, Uzbekistan*	THE STATUS OF EDUCATORS IN THE EAST, VIEWS OF OUR THINKERS ABOUT THE COMPETENCE OF PEDAGOGUES
Ikrom Qodirov Ergasheva Mohinur Norboboyeva Jasmin	*Chirchik State Pedagogical University, Uzbekistan*	INNOVATIVE PROFESSIONAL ACTIVITY IN STARTING A TEACHING CAREER INDEPENDENTLY
Usarov Jabbor Eshbekovich Meyliyeva Mutabar Sayfullayevna	*Chirchik State Pedagogical University, Uzbekistan*	METHODOLOGICAL ASPECTS OF PEDAGOGICAL ETHICS OF SCHOOLCHILDREN
Toshtemirova Saodat Abdurashidovna	*Chirchik State Pedagogical University, Uzbekistan*	HISTORY OF TOLERANCE: STEP-BY-STEP DEVELOPMENT
Prof. Kodirova Feruzakhon Usmanovna Ernazarova Zulfiya Samadov Bobir	*Chirchik State Pedagogical University, Uzbekistan*	ENHANCING THE INCLUSIVE PREPAREDNESS OF SOCIALLY-ORIENTED STUDENTS IN AN EDUCATIONAL CLUSTER ENVIRONMENT USING A COMPETENCY-BASED APPROACH



10.10.2024 | SESSION-1 | HALL-5

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Dr. NGUYEN THI BICH VAN

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Fatima Haroun	*The Hashemite University, Jordan*	USING PHOTOGRAMMETRY FOR DIGITAL DOCUMENTATION OF HERITAGE SITES AND OBJECTS IN JORDAN
Prof. Dr. Maria Novella CAMPAGNOLI	*University of Rome Tor Vergata, Italy*	TURKEY CICIM WEAVINGS
Pratibha, Ph.D.	*Kishanlal Public College, India*	NARRATIVES AND LITERARY IMAGERY: THE CROSSROADS AND CROSS-POLLINATION OF ART AND LITERATURE
PhD. Blerina Shkurti Masha	*"Luarasi" University, Albania*	GENDER EQUALITY AND THE IMPACT ON DOMESTIC VIOLENCE
Dr. Shabnam GOLKARIAN	*Near East University, Northern Cyprus*	LIGHT IN ARCHITECTURE: AN ANALYSIS BASED ON RUMI'S POETRY
Marina Metreveli	*International Center for Caucasus Tourism, Georgia*	SYNERGY BETWEEN SCIENTIFIC AND RURAL TOURISM FOR INNOVATIVE RESEARCH ON CULTURAL HERITAGE
Dr. NGUYEN THI BICH VAN	*University of Architecture Hochiminh City, Vietnam*	CULTURAL INFLUENCE ON GREEN INTERIOR DESIGN: A CASE STUDY OF VIETNAM-JAPAN EXCHANGE
Dr. NGUYEN THI BICH VAN	*University of Architecture Hochiminh City, Vietnam*	THE ROLE OF BIOPHILIC DESIGN IN ENHANCING WELL-BEING IN INTERIOR SPACES
Marina Metreveli	*International Center for Caucasus Tourism, Georgia*	SYNERGY BETWEEN SCIENTIFIC AND RURAL TOURISM FOR INNOVATIVE RESEARCH ON CULTURAL HERITAGE
Lecturer, PhD Irina-Ana DROBOT	*Technical University of Civil Engineering Bucharest, Romania*	AN ANALYSIS OF A HAIKU POEM BY ROMANIAN POET SERBAN CODRIN



10.10.2024 | SESSION-1 | HALL-6

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Dr. srinivasan

AUTHOR(S)	ORGANISATION	TOPIC TITLE
A. Dinesh babu E.Velmurugan MD.Shanur Rahman Dr. srinivasan	*BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH, INDIA*	ANTICANCER DRUG DISCOVERY BASED ON NATURAL PRODUCTS: FROM COMPUTATIONAL APPROACHES TO CLINICAL STUDIES
Okoro, M. F Usip, L. P. E. Asuquo, A. E. Yaro, C. Nwori, C. J. Archibong, I. J Adams, E. D. Bassey, Eyibio Ekpo, I. M.	*University of Uyo, Nigeria Mobile Production Nigeria Limited, Nigeria Federal University of Technology Ikot Abasi AKS, Nigeria*	PERCEPTION AND PUBLIC HEALTH IMPACT OF LANDSCAPING OF THE CENTER FOR WETLAND, UNIVERSITY OF UYO, UYO, NIGERIA
Zinatu S. H. Obaroh I. O Kanya D. Y Muhammad, A	*Kebbi State University of Science and Technology, Nigeria Kampala International University, Uganda Federal University of Agriculture Zuru, Nigeria*	GROWTH PERFORMANCE AND PROXIMATE COMPOSITION OF CLARIAS GARIEPINUS FED WITH COMMERCIAL AND LOCALLY FORMULATED DIET
IMENE BOULHAIA NADJI MOULAI-MOSTEFA ABDELKADER HADJSADOK ALI AOUABED	*University of Blida 1, Algeria*	ELABORATION AND CHARACTERIZATION OF A NATURAL COMPOSITE MATERIAL BASED ON COLLOIDAL PARTICLES OF MICROCRYSTALLINE CELLULOSE COATED WITH MODIFIED STARCH
Fiza Asif Maryam liaquat Qamar Siddique Abdul Basit Maryam Zahid Sanila Rani	*Hajvery University, Pakistan*	EFFECTS OF DE-NOVO THERAPIES FOR THE TREATMENT OF ALOPECIA
D.SAADAOUI M. ELYAQOUTI D. Ben hmamou S. Lidaighbi K. Assalaou E. Arjdal I.CHOULLI A. Elhammoudy I. Abazine	*Agadir Ibn Zohr University, Morocco*	AN INNOVATIVE META-HEURISTIC APPROACH FOR PARAMETER IDENTIFICATION IN SOLAR PHOTOVOLTAIC MODELS



10.10.2024 | SESSION-2 | HALL-1

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Assoc. Prof. Dr. Aysun CAVUSOGLU

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Tuna KARAYTUĞ Prof. Dr. Burhan ARIKAN	*Çukurova University, Türkiye*	IMPROVEMENT OF NATURAL Bacillus sp. PROTEASE PRODUCER STRAIN BY RANDOM MUTAGENESIS AND CHARACTERIZATION OF ENZYME OBTAINED FROM THE MUTANT STRAIN AND ITS USABILITY IN DIFFERENT INDUSTRIAL FIELDS
Mısra CAVLAK Asst. Prof. Dr. Çetin YAĞCILAR Asst. Prof. Dr. Muazzez GÜRGAN ESER	*Tekirdağ Namık Kemal University, Türkiye*	PRODUCTION OF INFUSORIA FOR FISH LARVAE USING DIFFERENT NUTRIENT MEDIA
Yağmur ÖZKAN Asst. Prof. Dr. Çetin YAĞCILAR Asst. Prof. Dr. Muazzez GÜRGAN ESER	*Tekirdağ Namık Kemal University, Türkiye*	DETERMINATION OF THE CORRELATION BETWEEN THE BIOMASS CONCENTRATION AND THE CELL COUNT OF TWO DIFFERENT FRESHWATER MICROALGAE (ARTHROSPIRA PLATENSIS AND CHLORELLA SOROKINIANA)
Binnur BAYRAMOGLU Assoc. Prof. Dr. Aysun CAVUSOGLU	*Kocaeli University, Türkiye*	NEGATIVE EFFECTS OF SALT STRESS ON PHYSALIS PERUVIANA L. DURING GERMINATION STAGE IN PETRI TRIAL
Eser BORA Prof. Dr. Yusuf Ersoy YILDIRIM	*Ankara Üniversitesi, Fen Bilimleri Enstitüsü*	WHEAT YIELD PREDICTION IN TURKEY'S CENTRAL ANATOLIA REGION USING SPECTRAL VEGETATION INDICES
Tamer KÖSE Prof. Dr. Y. Ersoy YILDIRIM	*Ankara University, Türkiye*	WATER FOOTPRINT ASSESSMENT OF TOMATO PRODUCTION IN TÜRKİYE
TUĞÇE ÖZPERÇİN EBRU ERDOĞAN HANİFE GÜLEN TOM	*Belgin Oil, R&D Center, Türkiye*	EVALUATION OF THE THERMAL PROPERTIES OF BASE OILS USING THERMOGRAVIMETRIC ANALYSES
Assist. Prof. Dr. Hüsniye Merve DEMİRER Res. Assist. Ramazan DEMİRER Asst. Prof. Ayşe Mücella SOYDAN	*İstanbul Gelişim University, Türkiye*	THE IMPORTANCE OF THE HEALTHCARE TEAM IN SELF- MANAGEMENT OF THE DIABETIC INDIVIDUAL



10.10.2024 | SESSION-2 | HALL-2

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Klinik Psikolog Zeynep DOĞAN

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Shashi Mathur **Dr. Pratibha Singh**	*Manav Rachna International Institute of Research and Studies, India*	ANALYZE THE IMPACT OF BMI, CARBOHYDRATES, AND FAT ON COPD PATIENTS
PhD. Saloni Sharma **Prof. Dr. Pratibha Singh**	*Deemed to be University, India*	ASSESS THE NUTRITIONAL DEFICIENCIES OF WOMEN WITH CELIAC DISEASE
Deniz GERÇEKER	*Marmara University, Türkiye*	BIBLIOMETRIC ANALYSIS AND LITERATURE REVIEW OF THE FIELDS OF NUTRITION AND PSYCHOLOGY
Klinik Psikolog Zeynep DOĞAN	*Near East University, Northern Cyprus*	THE PREDICTIVE EFFECT OF CHİLDHOOD TRAUMAS ON SUICIDE, SELF-HARM, BODY PERCEPTION OF THE SELF-DESTRUCTIVE MALE CONVICTED AND IMPRISONED INDIVIDUALS
Asst. Prof. Süreyya BULUT **Res. Asst. Dr. Ebru BULUT**	*Aydın Adnan Menderes University, Türkiye*	THE EFFECT OF SUPINE POSITION TIME ON CHANGE IN INTERFACE PRESSURE IN INTENSIVE CARE UNITS PATIENTS
Asst. Prof. Dr. Kerim Kaan GÖKÜSTÜN	*Malatya Turgut Özal University, Türkiye*	ONE-CARBON METABOLISM, RELATED VITAMINS AND CANCER RELATIONSHIP
Arife TÜRKSEVER **Asst. Prof. Dr. Gamze GÖKE ARSLAN**	*Karamanoğlu Mehmetbey University, Türkiye*	COMFORT NEEDS AND NURSING CARE OF HOSPITALIZED CHILDREN
Swati **Dr. Madhvi Awasthi** **Dr. Nameet Jerath**	*Manav Rachna International Institute of Reseach and Studies (MRIIRS), India* *Indraprastha Apollo Hospital, India*	COMBATING SEPSIS: THE PIVOTAL ROLE OF OMEGA 3 FATTY ACIDS IN TREATMENT AND RECOVERY



10.10.2024 | SESSION-2 | HALL-3

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Assoc. Prof. Dr. Serap SARIBAŞ

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Assoc. Prof. Dr. Serap SARIBAŞ	*Karamanoğlu Mehmetbey University, Türkiye*	CRIME DRAMA LAW and JUSTICE: ALABAMA'S INNOCENT, GUILTNESS MOCKINGBIRDS
Assoc. Prof. Dr. Serap SARIBAŞ	*Karamanoğlu Mehmetbey University, Türkiye*	THE WOMAN WHO MAKES HER SCULPTURES TALK, CAMILLE CLAUDEL
Assoc. Dr. Zhanagul TURUMBETOVA	*Suleyman Demirel University, Türkiye*	COMMON MUSICAL INSTRUMENTS AND THEIR IMPORTANCE IN THE TRADITION OF KAZAKH AND TURKISH POETS
Assist. Prof. Dr. Zülküf KILIÇ	*Bingöl University, Türkiye*	CRITICISM OF RELIGIOUS COMMERCE IN DIVAN POET NÂ'İLÎ
Dr. Mehmet AYDIN	*İnönü University, Türkiye*	PROF.DR. EROL GÜNGÖR'S UNDERSTANDING OF PHILOSOPHY
Dr. Mehmet AYDIN	*İnönü University, Türkiye*	MORALITY IN NECİP FAZIL KISAKÜREK'S WORLD OF THOUGHT
Assoc. Prof. Dr. Busra OZDENIZCI KOSE **Sedat MARANGOZ** **Halil DİKİCİ** **Prof. Dr. Vedat COSKUN**	*Gebze Technical University, Türkiye* *Token Financial Technologies, Türkiye* *Istanbul Atlas University, Türkiye*	GUARDIAN: A REAL-TIME DATA ANALYTICS AND MONITORING SOLUTION FOR DISTRIBUTED POS NETWORKS
Asst. Prof. Erdal KILIÇ **Asst. Prof. Zekeriya ŞENTÜRK**	*M.S.Ü Kara Harp Okulu, Türkiye*	THE SIGNIFICANCE OF MARITIME TRANSPORTATION IN FOSTERING RELATIONS BETWEEN TWO NATIONS: THE EXAMPLE OF TURKEY AND JAPAN
Asst. Prof. Erdal KILIÇ **Asst. Prof. Zekeriya ŞENTÜRK**	*M.S.Ü Kara Harp Okulu, Türkiye*	THE IMPORTANCE OF TURKEY'S AIRPOWER ELEMENTS in MILITARY OPERATIONS SUPPORTING ITS BROTHER TURKISH STATES in the RECENT PAST WAS EXEMPLIFIED BY the 1974 CYPRUS PEACE OPERATION and the KARABAKH VICTORY



10.10.2024 | SESSION-2 | HALL-4

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Bahjat Hardan Sulaiman

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Bilal Shoukat Muhammad Yasin Naz Shazia Shukrullah Hammad Hussain Muhammad Shoaib	*University of Agriculture Faisalabad, Pakistan University of Science and Technology Beijing, China*	MICROWAVES ASSISTED DECONSTRUCTION OF HDPE WASTE INTO STRUCTURED CARBON AND HYDROGEN FUEL USING Al_2O_3 -$NiFe_2O_4$ COMPOSITE CATALYSTS
Ramireddy Sushmitha	*G. Pulla Reddy Engineering College, India*	A STUDY ON WASTE PLASTIC IN BITUMEN
ABARAGH Mouloud Elmostafa HROUR Jamal GUERROUM	*Sultan Moulay Slimane University, Morocco*	COULOMB EFFECT ON ELASTIC ELECTRON SCATTERING BY HYDROGEN ATOM AND HYDROGEN-LIKE IONS IN THEIR METASTABLE 2s STATE IN THE 511-770 keV ENERGY RANGE IN THE PRESENCE OF A LASER FIELD
Atban Rafea Abdo Ömer Yavuz BOZKURT	*The State Company for Textile Industries and Leather Cotton Factory, Iraq Gaziantep University, Türkiye*	THE INFLUENCES OF MULTI-WALLED CARBON NANO TUBES (MWCNT) ON THE IMPROVEMENT OF THE HYBRID KEVLAR/BASALT FIBER REINFORCED EPOXY BASED COMPOSITES' TENSILE PROPERTIES
Bahjat Hardan Sulaiman Ahmet Erkliğ	*University of Anbar, Iraq Gaziantep University, Türkiye*	EFFECT OF GRAPHENE NANOPLATES (GnPs) ON THE ENHANCEMENT OF TENSILE PROPERTIES OF THE HYBRID KEVLER/CARBON FIBER REINFORCED EPOXY BASED COMPOSITES
FILALI, Saloua NASSER, Abdelkader AZOUGAY, Abdellah	*Mohammed Premier University, Morocco*	OPTIMIZING THE MECHANICAL PERFORMANCE OF SUSTAINABLE CONCRETE USING BRICK POWDER AS A PARTIAL SAND REPLACEMENT
FILALI, Saloua NASSER, Abdelkader AZOUGAY, Abdellah	*Mohammed Premier University, Morocco*	INTEGRATING RECYCLED MARBLE POWDER DUST AS A PARTIAL CEMENT REPLACEMENT IN CONCRETE



10.10.2024 | SESSION-2 | HALL-5

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Dr. Sazada Siddiqui

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Sazada Siddiqui **Dr. Ohoud Ali Alghamdi**	*King Khalid University, K.S.A*	GENOTOXICITY CAUSED BY LEAD IN VIGNA MUNGO VAR. HD-94
Tahsin Muhtady **Most. Farida Parvin** **Md Mostakur Rahman** **Md Yeamin Hossain**	*Institute of Natural Resources Research and Development, Bangladesh* *University of Rajshahi, Bangladesh*	LIFE HISTORY TRAITS OF HILSHA (TENUALOSA ILISHA): NEEDED FOR SUSTAINABLE MANAGEMENT
Mohsin Fawad **Rashna Mirza**	*Quaid-I-Azam University, Pakistan*	STATISTICAL DESIGN AND OPTIMIZATION OF NANO-TRANSFERSOMES BASED CHITOSAN GEL FOR TRANSDERMAL DELIVERY OF CEFEPIME
Dikko, A. H. **D. N. Tsado** **Shuaibu I.**	*Federal University of Technology, Nigeria*	EFFECT OF LOCATION UNDER DIFFERENT RAINY SEASON INTERPHASE ON UDDER MORPHOMETRY, MILK YIELD AND COMPOSITION OF BUNAJI COWS IN SOUTHERN GUINEA SAVANNA, NIGERIA
Teodora KUKRIĆ **Dr. Boris POPOVIĆ**	*University of Novi Sad, Republic of Serbia*	THYMOL-BASED HYDROPHOBIC DEEP EUTECTIC SOLVENTS AS BIOFUNGICIDES
Teodora KUKRIĆ **Dr. Boris POPOVIĆ**	*University of Novi Sad, Republic of Serbia*	NATURAL DEEP EUTECTIC SOLVENTS AS BIOFUMIGANTS AGAINST Fusarium graminearum AND Monilinia fructicola
Kamal El fallah **Jamal Charafi** **Hicham Ouhakki** **Khadija El kharrim** **Driss Belghyti**	*University Ibn Tofail, Morocco* *National Institute of Agricultural Research, Morocco*	IMPACTS OF CLIMATE VARIABILITY ON POMEGRANATE HABITATS IN FES-MEKNES: A GIS AND MAXENT APPROACH
Dr. Sabrina Roguai	*Abbes Laghrour university, Algeria*	STRUCTRAL AND OPTICAL TUNING OF Fe-DOPED ZnO NANOPARTICLES SYNTHESIZED VIA CO-PRECIPITATION METHOD
Z. KHADRANE **A. BELMOUDDEN** **F. BAZI** **M. El Kouali** **B. MOUNIR**	*Hassan II University Of Casablanca, Morocco*	DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD FOR CELECOXIB DEGRADATION PRODUCTS



10.10.2024 | SESSION-2 | HALL-6

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: SI AHMED Chabane

AUTHOR(S)	ORGANISATION	TOPIC TITLE
SI AHMED Chabane BOUZIDI Mohamed amin MEZIANI Belkacem LILOUCHE Samir	*University of Bejaia, Algeria*	IMPROVE THE THERMAL CONDUCTIVITY OF ADOBE USING NATURAL SAWDUST
Khamis Hadjazi Boumedyen Abdesselam Med Larbi Bennegadi Zouaoui Sereir	*University of Science and Technology of Oran-Mohamed Boudiaf, Algeria*	STATIC PERFORMANCE PREDICTION IN THE RIVETED AND HYBRID DOUBLE SHEAR LAP JOINTS
Ukatu, V.E. Muhammad A.A.	*Kebbi State University of Science and Technology, Aliero*	THE EFFECT OF MANAGEMENT SYSTEM ON SOME HAEMATOLOGICAL PARAMETERS OF LAYER CHICKEN AT LABANA FARM, ALIERO, KEBBI STATE, NIGERIA
Wen-Jhan Jane Ya-Chu Chang Chia-Ching Chang	*Shih Hsin University, Taiwan*	THE IMPACT OF BOARD EXTERNAL NETWORKING ON FIRM PERFORMANCE: EVIDENCE FROM TAIWAN
Oluwakemi Racheal OSHINOWO Moses Adeolu AGOI Benjamin Johnson OLASIJU Olasunkanmi Julius OLATUNDE	*Lagos State University of Education, Nigeria*	THE IMPORTANCE AND IMPLEMENTATION OF HUMAN- COMPUTER INTERACTION IN EDUCATION: A SURVEY ON EVOLVING INNOVATIONS IN CLASSROOM MANAGEMENT
Khalid Elatife Abdellatif El Marjani Zakaria Lafdaili	*Mohammed V University in Rabat, Morocco*	APPLICATION OF THE DOE METHOD TO OPTIMIZE A RADIAL IMPULSE TURBINE FOR WAVE ENERGY CONVERSION
Abdennour ZEGHIDA Lotfi FARAH Halim MERABTI	*Badji Mokhtar Annaba University, Algeria Research Center in Industrial Technologies CRTI, Algeria*	TRAJECTORY TRACKING AND AVOIDING OBSTACLES OF DIFFERENTIAL DRIVE MOBILE ROBOT USING NMPC-PSO



11.10.2024 | SESSION-1 | HALL-1

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Prof. Dr. Z. Gönül BALKIR

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Prof. Dr. Z. Gönül BALKIR **Dr. Gülbahar KESKİN**	*İstanbul Aydın University, Türkiye* *Haliç University, Türkite*	COMPLIANCE AND NON-COMPLIANCE BEHAVIORS IN SOCIOLOGY OF CRIME AND THE CONCEPT OF CRIME
Prof. Dr. Z. Gönül BALKIR **Dr. Gülbahar KESKİN**	*İstanbul Aydın University, Türkiye* *Haliç University, Türkite*	MIGRATON AND CRIME RELATIONSHIP: URBAN ADAPTATION PROBLEMS
Asst. Prof. Dr. Mustafa Göktürk Yıldız	*Yalova Universityi Türkiye*	WRITTEN EVICTION COMMITMENT IN RESIDENTIAL AND ROOFED WORKPLACE LEASES AND ANALYSES REGARDING THE ARRANGEMENT OF THIS COMMITMENT AS A RESULT OF MEDIATION
Asst. Prof. Dr. Yetkin KARAOĞLU	*Ordu University, Türkiye*	PROJECTIONS OF THE CONCEPT OF TABUNKA KYŌSEI: THE CASE OF MUSLIMS IN JAPAN
Lect. Şeyda ATMACA	*Çukurova University, Türkiye*	ETHICS SIMILARITIES BETWEEN ISLAM AND JAPANESE CULTURE IN THE CONTEXT OF RELIGIOUS TEXTS
Prof. Dr. Muammaer KULA **Nihal POLATDEMİR**	*Erciyes University, Türkiye*	THE NOTIONS OF CLOSURE OPERATORS IN THE TOPOLOGICAL CATEGORY OF CAUCHY SPACES



11.10.2024 | SESSION-1 | HALL-2

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Asst. Prof. Dr. Mehmet ÖZSAN

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Serim Tuna KOÇ **Halime PEHLİVANOĞLU**	*Trakya University, Türkiye* *Tekirdağ Namık Kemal University, Türkiye*	THE USE OF ZEBRAFISH (DINIO RERIO) AS A MODEL IN TYPE 2 DIABETES STUDIES
Asst. Prof. Dr. Mehmet ÖZSAN **Prof. Dr. Nurcan DÖNMEZ**	*Niğde Ömer Halisdemir University, Türkiye* *Selçuk University, Türkiye*	PHYSIOLOGICAL PROCESSES UNDER THE SKIN: BLOOD CIRCULATION, NERVOUS SYSTEM, AND IMMUNE FUNCTIONS
Asst. Prof. Dr. Mehmet ÖZSAN **Prof. Dr. Nurcan DÖNMEZ**	*Niğde Ömer Halisdemir University, Türkiye* *Selçuk University, Türkiye*	PATHOPHYSIOLOGY OF THE MONKEYPOX VIRUS
İpek Çiğdem UÇAR, MD	*Bursa Gürsu Cüneyt Yıldız State Hospital, Türkiye*	A DECADE ANALYSIS OF ARTIFICIAL INTELLIGENCE RELATED ARTICLES REGARDING JOURNAL QUERTILE RANKINGS IN OPHTHALMOLOGY
Fatih KAR **Ezgi KAR**	*Kütahya Health Sciences University, Türkiye*	WE ASKED ARTIFICIAL INTELLIGENCE. WHERE IS TRANSLATIONAL MEDICINE AND SCIENTIFIC RESEARCH HEADED?
Fazilet TÜRKOĞLU **Assoc. Prof. Dr. Şule YÜCELBAŞ**	*Tarsus University, Türkiye*	THE ROLE OF DATA AUGMENTATION METHODS IN CERVICAL VERTEBRA MATURATION STAGE DETECTION: A REVIEW
Semih DALKILIÇ **Lütfiye Kadıoğlu Dalkılıç** **Dudu Bayındır** **Fatima Almho**	*Fırat University, Türkiye*	INVESTIGATION OF CYTOTOXIC EFFECT OF CURCUMIN AND INFLAMMATION MARKERS IN MCF-7 AND HEPG2 CELL LINES
Doç. Dr. Şule YÜCELBAŞ **Doç. Dr. Cüneyt YÜCELBAŞ**	*Tarsus University, Türkiye*	"ETHNICITY DETECTION THROUGH NON-CONTACT FACE AND ORAL TEMPERATURE THERMAL MEASUREMENTS"
Semih Dalkılıç **Lütfiye Kadıoğlu Dalkılıç** **Kübra Çakmak** **Mustafa Timurkaan**	*Fırat University, Türkiye*	INVESTIGATION OF HTR3A (RS1062613) POLYMORPHISM IN IRRITABLE BOWEL SYNDROME PATIENTS



11.10.2024 | SESSION-1 | HALL-3

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Assoc. Prof. Dr. Oğuzhan ERDOĞAN

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Assist. Prof. Dr. Cemile ŞEKER Assist. Prof. Dr. Bumin Çağatay AKSU Assist. Prof. Dr. Aslı KAYA Assist. Prof. Dr. Turgay KARALİNÇ	*Near East University, Northern Cyprus İstanbul Gelişim University, Türkiye*	THE ROLE OF CREATIVITY AND INTERACTIONAL/TRANSFORMATIONAL LEADERSHIP IN THE RELATIONSHIP BETWEEN INNOVATION AND ORGANIZATIONAL LEARNING
Dr. Gizem Gülsün TÜRELİ	*İstanbul Ticaret University, Türkiye*	VIOLENCE AND NORMALIZATION IN MEDIA IN THE FRAMEWORK OF EMPATHY AND DESENSITIZATION CONCEPTS
Dr. Gizem Gülsün TÜRELİ	*İstanbul Ticaret University, Türkiye*	EVALUATION OF THE FEAR OF MISSING OUT (FoMO) CONCEPT IN TERMS OF INFORMATION OVERLOAD
Assoc. Prof. Dr. Oğuzhan ERDOĞAN	*Burdur Mehmet Akif Ersoy University, Türkiye*	THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE PUBLIC SECTOR IN TURKEY: ARTIFICIAL INTELLIGENCE-PUBLIC SECTOR INTERACTION
Birol ALTUN	*Bandırma Onyedi Eylül University, Türkiye*	COVID 19, REMOTE WORKING MODEL AND THE FEELING OF SOCIAL ISOLATION EXPERIENCED BY EMPLOYEES
Asst. Prof. Dr. Mehmet BULDUK Asst. Prof. Dr. Veysel CAN Eda Nur MUHAFİZ	*Van Yüzüncü Yıl University, Türkiye*	THE EFFECT OF VIOLENCE AGAINST HEALTH PERSONNEL ON OCCUPATIONAL MOTIVATION
Dr. Öğr. Üyesi Esra GÜRBÜZ	*Trakya Üniversitesi, İpsala Meslek Yüksekokulu, Dış Ticaret Bölümü*	NEW VENTURES IN DIGITAL CREATIVITY PERSPECTIVE
Dr. Abdullah TÜRK	*İstanbul Bilgi Üniversitesi, Uygulamalı Bilimler Fakültesi, Havacılık Yönetimi Bölümü*	QUALITATIVE ROLES OF THE RELATIONSHIP BETWEEN ORGANIZATIONAL SOCIALIZATION AND ORGANIZATIONAL COMMITMENT: A RESEARCH IN THE AVIATION SECTOR
Assoc. Prof. Dr. Yunus DOĞAN Prof. Dr. Veli BATDI	*Fırat University, Türkiye Gaziantep University, Türkiye*	DIGITAL DESIGN IN EDUCATION
Assoc. Prof. Dr. Yunus DOĞAN Prof. Dr. Veli BATDI	*Fırat University, Türkiye Gaziantep University, Türkiye*	COPING WITH STRESS



11.10.2024 | SESSION-1 | HALL-4

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Vakhtang Nanitashvili

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Vakhtang Nanitashvili	*Georgian Technical University, Georgia*	ECOLOGICAL SAFE IRRIGATION WITH AN INNOVATIVE IRRIGATION SYSTEM
Ph.D. Petre Nadirashvili Ph.D. Giorgi Cubinidze Ph.D. Aleksi Burduladze Ph.D. Manuchar Shishinashvili	*Georgian Technical University*	CONDITION RATING OF THE ROAD PAVEMENT AND SELECTION OF REPAIR METHODS
Rabia Dars Sheheryar Khan Joshua Mehwa	*Zhengzhou University, China*	ASSESSMENT OF FLOOD SPREADING IMPACT ON GROUNDWATER QUALITY AND GROUNDWATER LEVEL VARIATION USING GEOSPATIAL AND ERS TECHNIQUE
Sheheryar Khan Rabia Dars Prof. Dr Wang Huiliang	*Zhengzhou University, China*	NOVEL INTEGRATION OF SHAP WITH TIME SERIES MODELS FOR ACCURATE AND TRANSPARENT ET FORECASTING IN CLIMATE VULNERABLE REGION
Noura AFLAK Fatima-Ezzahraa ESSEBBAR Lahoucine BAHSIS Hicham Ben El AYOUCHIA Hafid ANANE Salah-Eddine STIRIBA	*University Cadi Ayyad, Morocco*	GREEN SYNTHESIS OF 1,4-DISUBSTITUTED 1,2,3-TRIAZOLES VIA BIOMASS-WASTE IMMOBILIZED COPPER CATALYST IN A CUAAC REACTION
Z. El Hamri M. Karaoui M. Alami M. Assouag	*University Moulay Ismail, Morocco*	PHYSICO-CHEMICAL CHARACTERIZATION OF SNAIL SHELL POWDER OBTAINED FROM MECHANOCHEMICAL PROCESSING AND HEAT TREATMENT
Samsul Bakri Suripto Dwi Yuwono Rahayu Sulistiowati Sri Septyastuti Taofiq Martha Rusyana Adella Putri Apriliani	*The University of Lampung, Indonesia*	THE ROLE OF OWNERSHIP OF WOOD PLANTS AS A DETERMINANT OF ACCEPTABILITY TO THE IDEA OF AGROFORESTRY DEVELOPMENT IN MONOCULTURAL FOOD CROPS AREAS: A STUDY AT NATAR DISTRICT, SOUTH LAMPUNG REGENCY
Anila Peposhi	*Polytechnic University of Tirana, Alvabia*	GREEN'S RELATIONS IN Γ-TERNARY SEMIGROUPS
Dhivya C R Arunkumar	*Tamil Nadu Agricultural University, Coimbatore, India*	ROLE OF DIGITAL PLATFORMS IN FARMER EDUCATION AND EXTENSION SERVICES



11.10.2024 | SESSION-1 | HALL-5

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

EAD OF SESSION: Prof. (Assoc.) PhD. Anna KOPICZKO

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Esat Bardhoshi	*University of Medicine, Albania*	THE USE OF ANTIBIOTICS IN ORAL SURGERY
Major Gheorghe GIURGIU **Prof. Dr. Med Manole COJOCARU**	*Deniplant-Aide Sante Medical Center, Romania* *Titu Maiorescu University, Romania*	GUT DYSBIOSIS IN DOGS WITH SPINAL CORD INJURY: IMPACT OF POLENOPLASMIN
Prof. (Assoc.) PhD. Anna KOPICZKO **Jakub BAŁDYKA**	*Józef Piłsudski University of Physical Education in Warsaw, Poland*	RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND BODY COMPOSITIONS, STRENGTH, TYPE OF SPORT COMPETITION, VITAMIN D AND BIRTH VARIABLES IN ELITE POLISH TRACK AND FIELD ATHLETES: A CROSS-SECTIONAL STUDY
Danilo Henrique LATTARO **Thiago Argenton TELAROLLI** **Rodrigo Brochetto FERREIRA** **Profa. Dra. Selma SIÉSSERE** **Profa. Dra. Neide Pena COTO** **Profa. Dra. Simone Cecílio Hallak REGALO**	*Universidade de São Paulo, Brazil*	EVALUATION OF THE SYMMETRY RELATIONSHIP BETWEEN THE MUSCULATURE OF THE STOMATOGNATHIC SYSTEM AND KNEE MUSCULATURE IN PROFESSIONAL SOCCER PLAYERS
Rajmonda Tare **Dasantila Tahiraj** **Artan Simaku**	*University of Elbasan 'Aleksandër Xhuvani', Albania*	THE INTERPLAY BETWEEN COVID-19 AND DIABETES: IMPLICATIONS FOR HEALTH OUTCOMES
Eglantina Bejko	*Institute of Public Health, Albania*	ORTHODONTIC TREATMENT FOR CHILDREN
Natália de Morais BARBOSA **Gabriella Simi Gariba SILVA** **Profa. Dra. Selma SIÉSSERE** **Prof. Edson Donizetti VERRI** **Prof. Dr. Evandro Marianetti FIOCO** **Profa. Dra. Simone Cecílio Hallak REGALO**	*Universidade de São Paulo, Brazil*	EVALUATION OF MAXIMUM MOLAR BITE STRENGTH AND MUSCLE THICKNESS IN ATHLETES PRACTITIONING INDIVIDUAL AND TEAM PHYSICAL ACTIVITY
Prof. Thamyres Branco **Prof. Alice Helena de Lima Santos Cardoso** **Prof. Dr. Nicole Barbosa Bettiol** **Prof. Dr. Marcelo Palinkas** **Prof. Dr. Selma Siéssere** **Prof. Dr. Simone Cecilio Hallak Regalo**	*University of São Paulo, Brazil*	BICHECTOMY: A STUDY OF BITE FORCE AND THE MORPHOLOGY OF THE MASSETER AND TEMPORALIS MUSCLES
Herion Dredha **Arsen Seferi** **Artan Simaku**	*University Hospital Center 'Mother Teresa', Albania*	FLUID DYNAMICS IN BENIGN PROSTATIC HYPERPLASIA



11.10.2024 | SESSION-1 | HALL-6

Tokyo Local Time: 16^{00}-18^{00}

Ankara Local Time: 10^{00}-12^{00}

HEAD OF SESSION: Prof. Assoc. Dr. Jonida Bushi

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Rodrigue Lézin ALLEMBE	*Université Marien Ngouabi, Republic of Congo*	LINGALA LANGUAGE INTERFERENCE IN ENGLISH LEARNING AT JUNIOR SECONDARY SCHOOL IN NORTHERN BRAZZAVILLE
Prof. Assoc. Dr. Jonida Bushi Msc. Arsilda Aliaj Prof. Assoc. Dr. Ema Kristo	*University of Tirana, Albania*	FORMATIVE ASSESSMENT IN PROJECT-BASED LEARNING: ENHANCING STUDENT ACHIEVEMENT AND DEVELOPMENT
Assoc. Prof. Dr. Efegbere, Henry Akpojubaro	*Edo State University Uzairue, Nigeria*	APPRAISING THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOAL NUMBER THREE OF HEALTHY LIVING FOR ALL BY ASSESSMENT OF ROLE OF PHYSICAL ACTIVITY IN OBESITY RISK DETERMINANTS, PREVENTION AND MANAGEMENT AMONG UNDERGRADUATE STUDENTS IN A TERTIARY INSTITUTE IN NIGERIA
Afriana	*Putera Batam University, Indonesia*	THE POLITENESS STRATEGY AND MECHANISM OF POWER RELATION IN ONLINE CLASSROOM
Mohd Sualh	*Aligarh Muslim University, India*	THEORY OF MAQAMAT AND AHWAL IN SUFISM: A COMPARATIVE ANALYSIS OF AL-QUSHAYRI'S AL-RISALA AL-QUSHAYRIYAH AND AL-HUJWIRI'S KASHF AL-MAHJÜB
Sahraoui Amara	*Baji Mukhtar Annaba University, Algeria*	IMPACT OF COVID-19 ON PSYCHOLOGICAL WELL-Beıng And LZARNING DISRUPTION IN UNDERGRADUATE STUDENTS
Dr. ABODOHOUI Orerien Olivier	*University of Abomey-Calavi, Benin*	A CRITICAL OVERVIEW OF REGIONAL DISPARITIES IN GEORGE ELIOT'S SILAS MARNER
Shahima Roushon Dr. H. R. Laskar	*Assam University, India*	FACTORS INFLUENCING CAREER CHOICES OF COLLEGE STUDENTS WITH SPECIAL REFERENCE TO NEURAL BEHAVIOUR
Shahima Roushon Dr. H. R. Laskar	*Assam University, India*	FACTORS INFLUENCING ENTREPRENEURIAL INTENTION AMONG COLLEGE STUDENTS
Resiani SIMAMORA Della Senda G. TOISUTA Nasrul	*Universitas Kristen, Indonesia*	JOB SATISFACTION CATEGORIES AND THEIR IMPLEMENTATION IN MANAGEMENT OF CHRISTIAN RELIGIOUS EDUCATION IN SCHOOLS
Koszhanov R.A. Abekova A.Zh. Zhambyl A.Zh. Yerbol Y.Q.	*Almaty Technological University, Kazakhstan*	RESEARCH AND DESIGN OF 3D SUITS FOR PARACHUTING



11.10.2024 | SESSION-2 | HALL-1

Tokyo Local Time: 18^{30}-20^{30}

Ankara Local Time: 12^{30}-14^{30}

HEAD OF SESSION: Assist. Prof. Dr. Ayşe IŞIK ÖNER

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Assist. Prof. Dr. Ayşe IŞIK ÖNER	*İstanbul Sabahattin Zaim University, Türkiye*	REFLECTIONS OF TEACHING PRACTICE COURSE ON CLASSROOM TEACHERS AND CANDIDATES
Uzm. Aydın SELLİOĞ Assoc. Prof. Dr. Nezaket Bilge UZUN	*Mersin University, Türkiye*	DEVELOPMENT OF AWARENESS SCALE FOR SUSTAINABLE ENERGY
Büşra MERGEN DEMİR Prof. Dr. Gülay EKİCİ	*Gazi University, Türkiye*	REVIEW OF MASTER'S AND PHD THESIS WRITTEN IN THE FIELD OF INFORMATION LITERACY
Dr. Fatih KAMÇI	*Yenişehir BİLSEM, MEB, Türkiye*	ARTIFICIAL INTELLIGENCE APPLICATIONS THAT CAN BE USED IN TEACHING TURKISH TO FOREIGNERS
Dr. Fatih KAMÇI	*Yenişehir BİLSEM, MEB, Türkiye*	EXAMINATION OF TURKISH ACTIVITY BOOKS USED IN SCIENCE AND ART CENTERS
Gökhan KARA	*Cumhuriyet University, Türkiye*	EXAMINATION OF THESIS WRITTEN ON EARTHQUAKE IN THE FIELD OF COMMUNICATIONS IN THE LAST TEN YEARS
Dr. Bingül HARMANCI Uzm. Psk. Sadık Ahmet BÖLÜKBAŞI	*Near East University, Northern Cyprus*	EXAMINATION OF THE RELATIONSHIP BETWEEN THE TRAUMA LEVEL, EXISTENTIAL ANXIETY AND PLACE ATTACHMENT OF INDIVIDUALS WHO EXPERIENCED THE FEBRUARY 6 EARTHQUAKES
Asst. Prof. Dr. Mihriban Akyol Akin	*Istanbul Beykent University, Türkiye*	TRANSFORMATION OF PRIVACY AND SOCIAL NORMS: AN ANALYSIS OF YORGOS LANTHIMOS' 'POOR THINGS' IN THE FRAMEWORK OF ANTHONY GIDDENS



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HEAD OF SESSION: Dr. Öğr. Üyesi Günay ÇERİT

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Elif BOZKURT Prof. Dr. Elif KARAGÜN Sabit SELVİ	*Kocaeli University, Türkiye*	EXAMINATION OF SELF-CONFIDENCE LEVELS OF INDIVIDUALS ATTENDING FITNESS CENTERS
Dr. Öğr. Üyesi Murat BALCI	*İstanbul Aydın Üniversitesi, Eğitim Fakültesi, Özel Eğitim Bölümü*	WHAT IS DISLALI?
Ergün ÇINAR Prof. Dr. Elif KARAGÜN Sabit SELVİ	*Kocaeli University, Türkiye*	EXAMINATION OF ACADEMIC ACHIEVEMENT AND SELF-CONFIDENCE LEVELS OF 14-18 YEARS OLD STUDENTS WHO DO AND DO NOT DO SPORTS
Dr. Öğr. Üyesi Günay ÇERİT Doç. Dr. Meliha UZUN	*Şırnak Üniversitesi, Beden Eğitimi ve Spor Yüksekokulu, Şırnak/Türkiye.*	EXAMINING THE FACTORS THAT HINDER PARTICIPATION IN PHYSICAL ACTIVITY: A STUDY ON GENERATION Z
Dr. Öğr. Üyesi Günay ÇERİT Doç. Dr. Meliha UZUN	*Şırnak Üniversitesi, Beden Eğitimi ve Spor Yüksekokulu, Şırnak/Türkiye.*	EXAMINATION OF THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY LEVELS AND MENTAL WELL-BEING OF THE PROVINCIAL DIRECTORATE OF YOUTH AND SPORTS PERSONNEL
Uzm. Psk. Elif Aybike Şık Dr. Bingül Harmancı Subaşı	*Near East University, Northern Cyprus*	INVESTIGATION OF ATTACHMENT STYLES, EMOTIONAL INTELLIGENCE, AND ROMANTIC JEALOUSY LEVELS IN ROMANTIC RELATIONSHIPS
Demet ÇELİK Yasemin ŞANLI	*Karamanoğlu Mehmetbey University, Türkiye*	CULTURAL APPROACH TO CHRONIC DISEASES IN DISASTERS
Demet ÇELİK Yasemin ŞANLI	*Karamanoğlu Mehmetbey University, Türkiye*	EFFECT OF DIABETES ON SEXUAL FUNCTIONS



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HEAD OF SESSION: Asst. Prof. Dr. Hatice YAREN KULOĞLU

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Kerem Can TUNÇ **Assoc. Prof. Dr. Esin POYRAZOĞLU** **Prof. Dr. Hacı Halil BIYIK**	*Aydın Adnan Menderes University, Türkiye*	BACTERIAL DIVERSITY ON MICROPLASTIC SAMPLES COLLECTED FROM THE BARENTS SEA
Asst. Prof. Dr. Hatice YAREN KULOĞLU	*Aksaray University, Türkiye*	EXAMINATION OF RETICULAR FIBERS IN THE SPLEEN OF THE PARTRIDGE (Alectoris chukar)
Ali DOGAN **Enes ERSOY** **Assoc. Prof. Dr. Imren KUTLU**	*Eskisehir Osmangazi University, Türkiye*	PHYSIOLOGICAL EFFECTS OF DIFFERENT BIOCHAR SOURCES ON MAIZE PLANTS UNDER EXTREME TEMPERATURE CHANGES
Dilek Nur EKİNOĞLU **Asst. Prof. Dr. Venhar ÇELİK** **Res. Assis. Esra GÜL** **Prof. Dr. Hakan KALENDER** **Prof. Dr. Burhan ÇETİNKAYA** **Prof. Dr. Hasan ÖNGÖR**	*Fırat University, Türkiye* *Malatya Turgut Özal University, Türkiye*	DEVELOPMENT OF RECOMBINANT STRAINS PRODUCING CLOSTRIDIUM PERFRINGENS BETA, EPSILON AND CLOSTRIDIUM C. NOVYI ALPHA TOXINS FOR USE IN COMBINED CLOSTRIDIAL VACCINE PRODUCTION
Res. Assist. Ecem KARA **Assoc. Prof. Dr. Gökhan BAKTEMUR** **Prof. Dr. Hatıra TAŞKIN**	*Sivas Bilim ve Teknoloji University, Türkiye* *Çukurova University, Türkiye*	DETERMINATION OF DROUGHT STRESS OF WHITE HEAD CABBAGE (Brassica oleracea var. capitata. L.) IN VITRO CONDITIONS
Res. Assist. Ecem KARA **Prof. Dr. Hatıra TAŞKIN** **Assoc. Prof. Dr. Gökhan BAKTEMUR**	*Sivas Bilim ve Teknoloji University, Türkiye* *Çukurova University, Türkiye*	DETERMINATION OF THE EFFECTS OF DIFFERENT DOSES OF PEG IN VITRO CONDITIONS ON CARROT (Daucus carota L.) PLANTS
Nuri BOZKURT **Assoc. Prof. Dr. Şeyda TAŞAR** **Prof. Dr. Gülbeyi DURSUN**	*Fırat University, Türkiye*	PHOTOCATALYST DESIGN AND PROCESS PARAMETERS AFFECTING PHOTOCATALYTIC DEGRADATION EFFICIENCY



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HEAD OF SESSION: Assist. Prof. Dr. Ömer Fatih SAK

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Assist. Prof. Dr. Ömer Fatih SAK	*Doğuş University, Türkiye*	COST ANALYSIS OF BUILDING REINFORCEMENT METHODS
Muhammad Mukhtar ALI **Assoc. Prof. Dr. Çilen ERÇİN**	*Near East University, Northern Cyprus*	EVALUATING USER EXPERIENCES BASED ON UN-HABITAT INDICATORS IN KIZILBAS PARK
Prof. Dr. Zeki Ünal YÜMÜN **Assist. Prof. Dr. Melike ÖNCE NİŞANCIOĞLU**	*Tekirdağ Namık Kemal University, Türkiye*	RADIOLOGICAL EVALUATION OF IZNIK LAKE SEDIMENTS
Muneeb Jadallah Omair Elshafei Elkhalil Mohieldin **Prof. Dr. Adem DOĞANGÜN**	*Bursa Uludağ University, Türkiye*	COMPARATIVE ANALYSIS OF PROGRESSIVE COLLAPSE RESISTANCE IN LOW AND MID-RISE RC SOLID SLAB BUILDINGS DESIGNED ACCORDING TO TBEC-2018
Assoc. Prof. Dr. Murat ÇELİKER **Prof. Dr. Sedat TÜRKMEN** **Prof. Dr. Cüneyt GÜLER**	*Elazığ DSI 9th Regional Directorate Türkiye* *Çukurova University, Türkiye* *Mersin University, Türkiye*	DETERMINATION OF GROSS ALPHA AND GROSS BETA RADIOACTIVITIES IN GROUNDWATER OF THE ULUOVA BASIN (ELAZIĞ, TÜRKİYE)
Dr. Kadir Berkhan AKALIN **Asst. Prof. Dr. Çağdaş KARA**	*Eskisehir Osmangazi University, Türkiye*	UNDERSTANDING FACTORS AFFECTING ENERGY CONSUMPTION IN URBAN METRO SYSTEMS: A DATA-DRIVEN CASE STUDY OF İZMİR, TÜRKİYE
Raziye PEKER **Dr. Kadir Berkhan AKALIN** **Asst. Prof. Dr. Mustafa Sinan YARDIM**	*Eskisehir Osmangazi University, Türkiye* *Yidiz Technical University, Türkiye*	HOW INFRASTRUCTURE SATISFACTION AND SAFETY PERCEPTIONS AFFECT UNIVERSITY STUDENTS' TRANSPORTATION DECISIONS?
PhD. Lect. Birsen YÜCESES **Prof. Dr. Semra ARSLAN SELÇUK**	*Ostim Technical University, Türkiye* *Gazi University, Türkiye*	PREDICTING THE BUILDING ENERGY PERFORMANCE WITH MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE: A REVIEW FOR THE EARLY DESIGN PHASE



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Assoc. Prof. Dr. Kevser TAŞDÖNER	*Adıyaman University, Türkiye*	RELIGIOUS REFORMS DURING THE PERIOD OF EMPEROR AUGUSTUS
Assoc. Prof. Dr. Tuğba TORUN	*Düzce University, Türkiye*	WOMEN'S ONTOLOGICAL EXISTENCE
Assist. Prof. Beyza ALTAY	*Istanbul Beykent University, Türkiye*	THE THEME OF LOVE IN IVAN SERGEYEVICH TURGENEV'S WORKS FIRST LOVE AND SPRING TORRENTS
ZUHAİR M. M. ALZAMLİ	*Düzce University, Türkiye*	THE HISTORICAL AND CULTURAL HERITAGE OF GAZA AN EVALUATION OF THE ÖMER MOSQUE IN TERMS OF FAITH TOURISM
Asst. Prof. Dr. Aziz COŞKUN	*Bitlis Eren University, Türkiye*	SEMIOTIC ANALYSIS OF THIRD WORLD WAR THEMED CARTOONS
Assoc. Prof. Dr. Günay MAMMADOVA	*Nahçıvan State University, Azerbaijan*	THE CHARACTERISTIC FEATURES OF THE TRADITIONAL DANCE TUNES PLAYED IN THE KARS REGION
Meryem ÖZBAHAR **Assoc. Prof. Gülçin KARACA**	*Anadolu University, Türkiye*	DERRIDA'S INFLUENCE ON ART
Marina Metreveli	*International Center for Caucasus Tourism, Georgia*	SYNERGY BETWEEN SCIENTIFIC AND RURAL TOURISM FOR INNOVATIVE RESEARCH ON CULTURAL HERITAGE



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TABUNKA KYŌSEİ KAVRAMININ İZDÜŞÜMLERİ: JAPONYA'DAKİ MÜSLÜMANLAR ÖRNEĞİ

PROJECTIONS OF THE CONCEPT OF TABUNKA KYŌSEI: THE EXAMPLE OF MUSLIMS IN JAPAN

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ÖZET
Bu çalışma, Tabunka Kyōsei kavramının Japonya'daki izdüşümünü, burada yaşayan Müslümanların Japon toplumsal yaşamındaki birlikte yaşama tecrübelerinin ilgili kavram üzerinden değerlendirilmesini içermektedir. Çokkültürlülük, birlikte yaşama, dini çoğulculuk, birlikte var olmakla anlamlandırılan Tabunka Kyōsei, Japonya'da günümüzde dini toplumsal açıdan önemli bir konu haline gelmiştir. Dünyanın diğer bölgelerinin nüfus çeşitliliğine nispeten daha homojen özellikler gösteren Japonya'da, yabancı nüfusla birlikte dini-kültürel çeşitliliğin artışıyla çokkültürlülüğün ve dini çoğulculuğun imkânı gündeme gelmiştir. Bu konunun önemli bir yönünü Japonya'daki Müslümanlar oluşturmaktadır. Japonya'daki Müslümanların, Japon toplumunun çoğunluğunu oluşturan Şintoist, Budist ve dini hareket mensuplarının oluşturduğu tecrübeleri, karşılaştıkları olaylar, konu üzerine tartışmalar çokkültürlülüğe ve dini çoğulculuğa dair Tabunka Kyōsei kavramını öne çıkarmaktadır. Bu tecrübelerin eğitim-öğretim, iş yerlerinde, ev yaşamında, camilerin inşaatı, ibadetlerin uygulanması, mezarlıkların tesisi vb. konularda olduğu görülmüştür. Bunlara ek olarak yazılı-görsel medyada, basılı ve elektronik yayınlarda Müslümanlara dair değerlendirmelerin yapıldığı, onların dini-kültürel yaşamlarında Japon toplumuna yabancılığına ve farklılığına vurgu yapıldığı, çokkültürlü ve dini çoğulcu bir perspektifin kavramın içeriğini şekillendirdiği tespit edilmiştir. Araştırmamızla Japonya'daki farklı kültür mensuplarının birlikte yaşamına dair tecrübelerin, Tabunka Kyōsei kavramına yüklenen anlamlar üzerinden anlaşıldığı tespit edilmiştir. Bu perspektiflerin tespiti ve Japonya'daki Müslümanların yaşadıkları tecrübelere etkisinin değerlendirilmesi, ülkedeki çokkültürlü toplum yapısının anlaşılmasına katkı sağlamaktadır. Çalışmamızın, alanına katkı sağlaması, akademik anlamda konuya dikkat çekmesi ve yeni araştırmalara zemin oluşturması amaçlanmıştır.

Anahtar Kelimeler: Dinler Tarihi, Tabunka Kyōsei, Çokkültürlülük, Dini Çoğulculuk, Japonya'da Müslümanlar.

ABSTRACT
This study involves the projection of the concept of Tabunka Kyōsei in Japan and the evaluation of the coexistence experiences of Muslims living here in Japanese social life through the concept of Tabunka Kyōsei. Tabunka Kyōsei, which is defined as multiculturalism, coexistence, religious pluralism and coexistence, has become an important religious social issue in Japan today. The possibility of multiculturalism and religious pluralism has come to the fore with the increase in religious-cultural diversity with the foreign population in Japan, which has more homogeneous characteristics compared to the population diversity in other parts of the world. Muslims in Japan are an important aspect of this issue. The experiences of Muslims in Japan, who are members of the Shinto, Buddhist and religious movements that make up the majority of Japanese society, the events they have encountered and the discussions on the subject highlight the concept of Tabunka

Kyōsei regarding multiculturalism and religious pluralism. These experiences have been observed in education and training, the workplace, family life, the construction of mosques, the practice of worship, the establishment of cemeteries, etc. In addition, it was found that print and electronic publications make judgements about Muslims, emphasising their foreignness and difference from Japanese society in their religious-cultural life, and that a multicultural and religious pluralist perspective shapes the content of the concept. Our research found that the experiences of members of different cultures living together in Japan are understood through the meanings attached to the concept of tabunka kyōsei. Identifying these perspectives and assessing their impact on the experiences of Muslims in Japan contributes to the understanding of the multicultural social structure in the country. It is hoped that our study will contribute to the field, draw academic attention to the issue and provide a basis for new research.

Keywords: History of Religions, Tabunka Kyōsei, Multiculturalism, Religious Pluralism, Muslims in Japan.

GİRİŞ

多文化共生 (Tabunka Kyōsei) "Çokkültürlü Birlikte Yaşam" anlamına gelen bir kavramdır.(Y. Yamashita, 2022, s. 2) Çokkültürlü Birlikte Yaşam, diğer bir ifadeyle çok kültürlü birlikte varoluş, Japonya'ya yeni gelen yabancılarla iletişim, birlikte iyi geçim ve yerel halk ve sivil toplum kuruluşlarıyla iş birliği içinde toplumsal uyumu içermektedir.(Chikako, 2016, s. 1) Bu kavram şu şekillerde tanımlanmıştır:

"Farklı milletlerden veya etnik kökenlerden vb. insanların yerel toplumun kurucu üyeleri olarak bir arada yaşamaları ve birbirlerinin kültürel farklılıklarını tanıyarak eşit ilişkiler kurmalarıdır" (Roberts, 2013, s. 209)

"Farklı milliyetlere, etnik kökenlere veya diğer özelliklere sahip insanların, birbirlerinin kültürel geçmişlerindeki farklılıklara saygı duyarak ve eşitler olarak ilişkiler kurmaya çalışarak yerel toplumun diğer üyeleri olarak birlikte yaşadıkları bir durumdur." (Soumu, 2006, ss. 1-11)

Tabunka Kyōsei, çok kültürlülüğün Japonya versiyonu olarak kabul edilebilmektedir. Genellikle üyeleri arasında farklı etnik/kültürel geçmişlere dayanan bir topluluk/toplum vizyonu olarak anlaşılmaktadır (H.-R. Kim & Oh, 2011, ss. 1563-1581). Bu kavram, 1990'larda Japonya'ya yeni gelen göçmenlerin artışıyla yaygınlık kazanmıştır. Bununla birlikte, kavramın kendisini ya da kamu politikalarında anlaşılma ya da kullanılma biçimlerini hedef alan eleştiriler de ortaya çıkmıştır. Örneğin Tabunka Kyōsei, asimilasyon politikasından çok az farkı olan boş bir slogan olarak ya da eşitsizlik ve ayrımcılık sorunlarına dikkat edilmemesi nedeniyle eleştirilmiştir (Bkz. Chapman, 2006, ss. 89-102; Choi & Kato, 2008; Higuchi, 2010, ss. 3-10; Iwabuchi, 2010).

Tabunka Kyōsei kavramının, kültürel çeşitliliğe vurgusu, Japon toplumunda farklı yorumlarına yol açmaktadır. Bu tanımın oluşumundaki zeminin Japonya'ya kendi din ve kültürleriyle gelen yabancılara yönelik olduğu ifade edilmektedir. Örneğin Shinji Yamashita**,** etnik ve kültürel açıdan çeşitlilik gösteren yabancıların, kültürel anlamda homojen Japonların karşısında tanımlandıklarını, bu ise Japonların yabancıların yabancı olduklarının tanınması ve bu eksende ilişkilerini sürdürmeleri gerektiği şeklinde anlaşıldığını ifade etmektedir (S. Yamashita, 2010, s. 331).

Tabunka Kyōsei kavramı 1990'ların başından beri kullanılmaktadır. Ancak popüler bir kavram ve söylem olarak yükselişi, Ocak 1995'teki Büyük **Hanshin Awaji Depremi** sonrasında yabancı sakinleri desteklemek için yapılan dinî-sosyal faaliyetlerinin etkisiyle gerçekleşmiştir. Kobe Şehrindeki Nagata bölgesinin ağır hasar gören bölgesi, birçok eski ikamete sahip etnik Koreliler **ve** Vietnamlı mülteciler gibi 在日 **(Zainichi) "Kalıcı İkamet(liler)" olarak adlandırılan** göçmenlere de ev sahipliği yapmıştır. Zainichi, Tabunka Kyōsei ekseninde değerlendirilen bir alt kavramdır. Önceden güney Amerika'ya göç eden Japonların, orada kurdukları ailelerden olan

ikinci neslin de Japonya'ya göç etmeleri sonucunda bunlara da 日系人 (Nikkeijin) "Kökeni Japon Olmayan Kişi" denmiştir (Sellek, 2001, ss. 73-75). Bu nedenle sadece ülke dışından gelerek ülkede ikamet eden yabancı uyruklulara değil, bir yönüyle Japon olanların da ülkeye göç edişi de Tabunka Kyōsei olarak değerlendirilmiştir. Buna ek olarak, Çin, Filipinler ve diğer ülkelerden gelen ve eşi Japon olanlar, öğrenciler, sanatçılar ve mühendisler gibi çeşitli vize statülerine sahip göçmenler de artmıştır. Kayıtlı yabancı uyrukluların sayısı 1980'de 800.000'den az iken 1990'da bir milyonun üzerine çıkmış ve 2010'da iki milyona ulaşmıştır (Chikako, 2016, s. 3).
Dolayısıyla Tabunka Kyōsei kavramı, temel anlamda Zainichi ve Nikkei kavramlarına dayanmakta ve temelde ırki-kültürel tanımlamalar içermektedir. Bu nitelikte olsa da çokkültürlü birlikte yaşam düşüncesi Japonya'da ırki-kültürel ayrım vurgulanmaksızın desteklenmiş, toplumsal bir politika olarak uygulanmaya çalışılmıştır. Tabuka Kyōsei kavramı üzerine çeşitli çalışmalar yapılmıştır. Bu çalışmalardan bazıları şunlardır: (Chapman, 2006, 2006; Chikako, 2016; Choi & Kato, 2008; Iwabuchi, 2010; Y. Kim, 2007; Kondo, 2011; Suh, 2000; Takezawa, 2009; Tanada, 2019). Sözü edilen çalışmalarda Tabunka Kyōsei kavramı, farklı etnik ve kültürel kökenden insanlardan örneklerle hem alan araştırması hem de teorik zeminde ele alınmıştır. Bu çalışmada Tabunka Kyōsei kavramının Japonların, Müslümanları bu kavramın hangi yönüyle dikkate aldıkları; çokkültürlü çoğulcu olarak mı, tekkültürlü dışlayıcı olarak mı değerlendirildikleri incelenmiş, konuya dikkat çekilmesine çalışılmıştır.
Bu çalışma, Japonya'da Din ve İnanç Özgürlüğü, Japonya'ya Müslüman Göçleri, Japon-Müslüman Çokkültürlü Aile Yapısı ve Japon Toplumunda Müslümanlara Bakış olarak dört ana başlıkta incelenmiştir.

1. Japonya'da Din ve İnanç Özgürlüğü

Japonya'nın imparatorluk döneminde din-devlet ilişkisi, sadece devlet dini olarak kabul görmüştür. O dönemlerde teokratik bir yönetim görülmüştür (İnoue, 2000, s. 16). Ancak ikinci Dünya Savaşı sonrasında 1947'de Japon devlet anayasasında ciddi değişimlerin yaşanması bu antiseküler yaklaşımı değiştirmiştir. Bu açıdan 1946'daki yeni anayasaya aşağıdaki madde eklenmiştir:

"*Din özgürlüğü her alanda herkese garanti edilemez*", "*Hiçbir dinî örgüt devletin herhangi biriminden imtiyaz alamaz ve herhangi bir otoriteyi kullanamaz*" ve "*Din eğitimi devletin herhangi bir kurumu tarafından verilemez" (Astley, 2006, s. 101; The Constitution of Japan, t.y.)*

Bu madde, başlangıçta din-devlet ilişkilere ciddi zararlar vereceği şeklinde yorumlanmıştır. Ancak ilgili maddelerin üçüncü "*Din eğitimi devletin herhangi bir kurumu tarafından verilemez*" ile tamamlandığı ifade edilmiştir. Japon toplumsal yapısından din-devlet işlerinin ayrı oluşu ve dinî eğitimin devlet tarafından verilmemesi, değişen sosyoekonomik gelişmelere uyum sağlamanın bir gereği olarak yorumlanmıştır (Kitagawa, 1990, s. 305; Shimazono, 2012, s. 291).
Japonya'da faaliyet gösteren diğer dinlere mensup dinî ve sosyal gruplar, din-inanç özgürlüğünü sağlayan seküler bir düzlemde 1990'lara kadar devam etmiştir. Bu maddelerin konusu, inanç ve ritüellerin birey ve tecrübeleri değerli hale gelmiştir. Bilhassa 1970'lerden itibaren 1990'lara değin diğer din ve dinî grup mensupları toplumsal ve akademik sahada, insanların maneviyatına odaklanan topluluklar olarak bilinmiştir. Ancak toplumdaki hızlı gelişim ve büyüme, Japon toplumunda Japon olan ve olmayan birey veya gruplarda topluma adaptasyon sorunları, buna bağlı olarak da anti-seküler ve şiddete eğilimli oluşa zemin hazırladığı vurgulanmıştır (Y. Sakurai, 1997, s. 119).
Japonya için bu gelişmelerin kırılma noktası, yabancı bir kültürün etkisiyle şekillenen Aum Shinrikyô üyelerinin 1995'te Tokyo'da bir metro istasyonunda ölümlerle sonuçlanan bir terör faaliyeti düzenlemeleridir (Battal, 2019, s. 110). Bu olaydan sonra 1947'den 1990'lara kadar diğer din/dinî gruplara ve üyelerine yönelik olumlu algıda kırılmalar yaşanmıştır. Japon hükümeti, aynı

yıl yeni bir kanun maddesini yürürlüğe almıştır. Buna göre din veya dinî hareketler faaliyetlerinde üst bir kuruma (Eğitim Bakanlığı'na) bağlanmıştır. Onların faaliyetleri resmiyete bağlı olarak her an denetime açık hale getirilmiştir. Diğer taraftan yapılan her faaliyetin bir kaydının da Eğitim Bakanlığı'na sunulması gerekli kılınmıştır. Bununla birlikte Eğitim Bakanlığı tarafından sınırsız denetime tabi tutulmuştur. Bu düzenleme günümüzde halen geçerlidir (Fourth Periodic Report by the Government of Japan under Article 40 Paragraph 1(b) of the International Covenant on Civil and Political Rights, t.y.).

2. Japonya'ya Müslüman Göçleri

İlk Müslüman göçmenleri çoğunlukla tüccarlar oluşturmuştur. 20. yy'in başlarında Osmanlı İmparatorluğu ve diğer Müslüman ülkelerden (Mısır, İran) gelen temsilciler Japonya ile diplomatik ve ticarî ilişkiler kurmuştur (Okai & Takahashi, 2023, s.268). 徳川時代 Tokugawa Dönemi'nde (1603-1868) Japonya 鎖国 (Sakoku) "Ulusal İzolasyon" politikasını uygulayarak kendisini dünyadan soyutlamıştır. Ancak bu dönemin sonlarına doğru Japonya, öncelikle Batı ülkelerine odaklanarak yabancı ülkelerle doğrudan müzakerelere başlamıştır. Aynı zamanda Japonya'nın 1853'te dış dünyaya açılması Batılı tüccarların ülkeye gelmesine yol açmıştır. Bu dönemde Hindistan, Çin ve Rusya üzerinden ticari ilişkiler ile Japonların İslâm'a aşina oldukları düşünülmekte ve İslâm'ın bir din olduğu ve yayıldığı coğrafya bilinmektedir. Ancak İslâm hakkında bilgiler Japonya için net değildir. Dahası bu temasların kapsamı ve etkisi hakkında yeterli belge bulunmamaktadır (Levent, 2020, s.165). Öte yandan Japonya ve Müslümanlar arasında ticaret yoluyla temasların M.S. 8. yy. gibi erken bir tarihte gerçekleştiğine dair bir görüş vardır. Bu temaslar Orta Doğu, Orta Asya ve Doğu Asya'yı birbirine bağlayan ünlü İpek Yolu üzerinden gerçekleşmiştir (Fathil & Fathil, 2011 s.132). Japonya'nın jeopolitik vizyonunu da etkilemiş ve Japon ordusunun İpek Yolu bölgelerini Rus ve muhtemelen Çin imparatorluklarına karşı potansiyel bir tampon bölge olarak görmesine neden olmuştur (Esenbel, 2017, s.11). Kızıldeniz ve Süveyş Kanalı üzerinden o zamanlar Osmanlı egemenliği altında olan Mısır'dan geçişi gerektiriyordu. Mısır seyahatleri esnasında Japonlar Mısırdaki karma mahkemelere şahit olmuşlardır (Levent, 2020, s.165).

1900'ün başlarından itibaren Japonya'da Müslümanların tebliğ faaliyetlerinin varlığı, Hint Müslüman tüccarlar başta olmak üzere çeşitli ülkelerden gelen Müslümanların bireysel çabalarıyla sınırlı kalmıştır. Söz konusu dönemdeki tebliğ faaliyetlerinin geniş çaplı olmaması ve yeterince belgelendirilmemesi, tarihî kayıtlar arasında yer almalarını zorlaştırmıştır (Sat, 2018, s.115). İslam, ticaretin yanı sıra Müslüman ülkelerle diplomatik ilişkiler yoluyla da Japonya'ya ulaşmıştır. Belgelerle kanıtlanan ilk önemli temas, 19. yy.ın sonlarında Japonya ile Osmanlı İmpatorluğu'yla diplomatik ilişkilerin kurulmasının ardından gerçekleşmiştir (Anis, 1998 s.331).

Japonların Müslümanlarla ilişkileri 1890'dan itibaren başlamıştır. Bu tarihten İkinci Dünya Savaşı bitişine kadarki dönem, İslam'ın Müslüman olmayan Japonlar aracılığıyla siyasi ve politik nedenlerin etkisiyle etkili olduğu bir dönemdir. Bu, dönemin siyasi yönetiminin kuzeybatı Çin ve Asya'nın genelindeki sömürge politikasından kaynaklanmaktadır (Dündar, 2011, ss. 16-18). Bu politikayı benimseyen Japonlardan bir kısmı Müslüman olmuştur. Ancak, bu yüzeysel bir dönüşüm olarak algılanmıştır. Bu sebeple, çok az sayıda Japon'un, savaş bitene kadar Müslüman kaldığı belirtilmiştir. Savaşın öncesi ve devamı esnasında Müslüman olmayan Japonlar, dönemin siyasi yönetiminin etkisiyle İslam Politikasını teşvik etmek için İslam'ı bir din olarak savunmuşlardır. Fakat, savaşın bitişinin ardından bu politikanın dışında kendi tercihleriyle Müslüman olan Japonların, Japonya'da İslam'ı bireysel çabalarıyla tanıttıkları belirtilmiştir. O dönemde Japon Müslümanların, İslam diniyle ilgili pek çok temel hususu bilmedikleri zikredilmiştir. Bu sebeple Japonya'da İslam'ın, Japonya'da eğitim gören veya iş sebebiyle ülkeye gelen diğer bölgelerden Müslümanların girişimleriyle yayılmaya çalışıldığı ifade edilmiştir. Bu gelişmelerle birlikte Japon Müslümanların sayısında bir artış yaşandığı vurgulanmıştır (Karaoğlu, 2023, ss. 172-173).

İkinci Dünya Savaşı'ndan sonra Japonya'ya Müslüman işçi akını artmıştır. Bu Müslüman toplulukların kademeli olarak büyümesine yol açmıştır. Günümüzde Japonya'daki Müslümanlar Endonezyalılar, Pakistanlılar, Bangladeşliler, Türkler ve diğer Orta Doğu ve Güney Asya ülkelerinden gelen insanlar da dahil olmak üzere çeşitli etnik kökenlerden ve ülkelerden gelen bireylerden oluşmaktadır (Okai & Takahashi, 2023, s.268).

1980'lerden itibaren yabancı Müslümanların ülkeye akın etmesinin ardından ülkede Müslüman aileler oluşmuştur. Bu ailelerde doğan ikinci nesil küçük yaşlardan itibaren İslami değerlerle yetiştiriliyor, ancak bazıları okul günlerinden itibaren farklılıkların farkına varmış ve aile değerleri ile sınıf arkadaşlarının değerleri arasındaki uçurumdan muzdarip olmuş ve gençlik yıllarında Müslüman kimlikleriyle nasıl yüzleşmeleri gerektiğini merak ederek "ben kimim" sorusuna cevap bulmaya çalışmışlardır (Kureshi, 2021, s. 154).

3. Japon-Müslüman Çokkültürlü Aile Yapısı

2019'a ait verilere göre Japonya'da Müslüman nüfusunun yaklaşık 170.000 olduğu tahmin edilmektedir. Japonya'yı ziyaret eden veya Japonya'da yaşayan Müslümanların sayısının gelecekte artması beklenmektedir (Yamagata, 2019, s.1). Japonya'daki ikinci neslin en yaygın ebeveyn kombinasyonu yabancı bir baba ve Japon bir annedir; bunu her iki ebeveynin de yabancı olması veya Japon bir baba ve yabancı bir anne takip etmektedir. Japonca öğrenmek ve yabancı kültür ve geleneklere uyum sağlamak için çok çalışmak zorunda kalan yabancı ebeveynlerin aksine, Japonya'da eğitim görmüş olan ikinci neslin, belirgin bir rahatsızlık duymadan Japon toplumuna entegre olduğu görünmektedir. Bununla birlikte, bazıları ikinci nesle özgü zorluklarla karşılaşmaktadır. Toplumda farklılıklara saygı gösterilmesi çağrılarına rağmen, ikinci nesil çocuk ve ergenlerin günlerini geçirdikleri okullarda birbirleriyle ilişkilerinde farklılıklara yönelik güçlü bir eğilim bulunmaktadır (Sugimoto, 2002, s. 152). Örneğin, ten rengi ve yüz hatları gibi dış görünüş farklılıkları alay konusu olmakta ve dinî ve kültürel açıdan dışlanma eğilimi oluşturmaktadır. İkinci neslin, erken yaşlardan itibaren evlerinde yaşadıkları-geliştirdikleri değerler ile sınıf arkadaşlarının değerleri arasındaki ciddi farklılık nedeniyle kafası karışmış ve çevrelerine uyum sağlamaya duydukları güçlü arzu ve ebeveynlerinin yaşam tarzlarına ve dinî değerlerine yüz çevirme arzusu arasında çelişki içinde oldukları zikredilmektedir (Kureshi, 2021, s. 155).

Japonya'da yaşayan Müslümanlar üzerine yapılan araştırmalar çoğunlukla ebeveynlerin nesli üzerinde gerçekleştirilmiştir. Başta dinî uygulamalar olmak üzere gerçek yaşam koşulları (Higuchi, 2007; K. Sakurai, 2003), cemaatlerin inşası ve camiler üzerine detaylı araştırmalar (Tenda & Okai, 2008) ve evlendikten sonra inanca katılan Japon kadınların manevi hareketleri ve yaşamları incelenmiştir (Takeshita, 2003; Kudo, 2008). Bu ailelerin çocukların tecrübeleri genellikle eğitim-öğretim bağlamında tartışılmaktadır. Örneğin, Müslüman öğrencilerin okul yemekleri ve bazı dersler için özel önlemler alınması gerektiği öne sürülmüştür (Maruyama, 2007; Sugimoto, 2002). Tenda ve Okai (2010), okul yemekleri ve ders içeriklerinin öğrenciler tarafından okul eğitimiyle ilgili en sık dile getirilen endişeleri odluklarını belirtmişlerdir (Tenda & Okai, 2008). Bunların yanı sıra, okullarda İslam'ın anlaşılmasındaki kültürel yabancılık ve bunun öğrenciler arasında zorbalığa neden olduğu da dile getirilmiştir. Bu durum, sadece okul sisteminde değil toplumsal alanda da karşılık bulan örnekleri oluşturmaktadır (Kureshi, 2021, s. 156). Bu şekilde, annenin ve babanın farklı ırkta ve kültürlerde olan ailelerin çocuklarına Japonya'da ハーフ (Hāfu) "Yarım" denmektedir. Bu kişilerin ortak noktası, dış görünüş farklılıkları nedeniyle ötekileştirme deneyimi yaşamalarıdır (Miura, 2015; Miura vd., 2016). Bu deneyimler ikinci nesil Müslümanlar tarafından farklı derecelerde paylaşılmaktadır, ancak aynı zamanda ebeveynlerinden dini pratikler konusunda güçlü beklentiler taşıdıklarını da belirtilmektedir (Kureshi, 2021, s. 156).

4. Japon Toplumunda Müslümanlara Bakış

Japonya'da İslâm genellikle tek bir "homojen kültür", Müslümanları da bir "homojen topluluk" olarak algılanmaktadır. Bu da yerel yönetimlerin toplumsal tedbirlerini Tabunka Kyōsei kavramının tanımına göre almalarına, Müslümanların mescit açmak ve turistler için helal gıda

seçenekleri sunma düşüncelerinin yerine uyguladıklarında çeşitli sorunlara yol açmaktadır. Örneğin Tanada, camilerle belirli seviyelerde iletişim halinde olan bazı yerel yönetim organlarının Müslüman sakinler için mescit açmak ve etkinlikler için Tabunka Kyōsei önlemlerini uygulamada zorluklarla karşılaştığını, bunun nedeninin Japonya'daki camilerin (ve diğer İslâmî kuruluşların) etnik ve dinî anlamda çeşitli olduğunu, Müslümanların İslâmî inançlar ve uygulamalar hakkında farklı görüşlere sahip olduklarını ve belirli dinî kurallar üzerinde anlaşmaya varmakta zorlandıklarını tespit ettiğini zikretmektedir (Tanada, 2019, s. 231). Bununla birlikte Yamashita da bazı Müslümanların karışık cinsiyetli etkinliklere katılmayı veya karışık cinsiyetli ibadet odalarını kullanmayı kabul etmediklerinden; bazılarının alkol veya domuzdan elde edilen malzemeler içeren yemeklerin pişirildiği mutfakta hazırlanan yemekleri helal olarak kabul etmediklerinden, domuz eti içermeyen diğer yemekleri helal olarak kabul ettiklerini tespit ettiklerinden söz etmektedir (Y. Yamashita, 2022, s. 10).

Yukarıdaki örneklerde ve tespitlerde görüldüğü üzere Tabunka Kyōsei'nin tanımının farklı İslâmî ve Müslüman topluluklara homojen bir bakış açısının uygulanamayacağı ifade edilmektedir. Ancak Japonya'da genel olarak kabul gören ve uygulanan homojen kültür temelli Tabunka Kyōsei yaklaşımı, Morris-Suzuki tarafından "yüzeysel çokkültürlülük" olarak tanımlanmaktadır. O, aynı zamanda bu yüzeysel yaklaşımı besleyen unsurların da olduğunu zikretmektedir. Ona göre; kültürlerin farklılıkları dikkate alınmaksızın homojen bir estetik ve sanat tanımıyla nitelenmesi; kültürel etkinliklerde o kültürün farklı müziklerinin dikkate alınmaksızın tek-homojen bir müziğin icrası ve Japon olmayan Müslümanların Japonlardan farklılıklarının zikredilerek öne çıkarılması Tabunka Kyōsei'nin mevcut tanımsal yaklaşımını, diğer taraftan bu hususların tam tersinin gerçekleştirilmesi ise ciddi anlamda bir arada yaşama düşüncesini güçlendirmektedir (Morris-Suzuki, 2013, ss. 183-185).

Örneğin, Müslüman kuruluşlar 2011'de Japonya'nın kuzeydoğusunda meydana gelen 2011 Tōhoku Depremi ve Tsunamisi sonrası gıda dağıtımı gibi hayırsever faaliyetlerde bulunmuşlardır. Bu faaliyetler medyada haber olmuş ve Müslümanlara yönelik nefret söylemleri karşısında yer almış, olumlu bir imaj oluşturmuştur (Bkz. J-Cast, 2016). İslâm ve Müslümanların imajına olumlu etkiye sahip başka gelişmeler de bulunmaktadır. Örneğin, Japonya'da uzun süredir devam eden ekonomik sıkıntı, Japon işletmelerini yabancı ziyaretçileri önemli bir gelir kaynağı olarak görmeye zorlamış ve hükümet, ülkenin içinde bulunduğu darboğazdan çıkmasının bir yolu olarak turizm sektörünün canlanmasına çaba sarf etmiştir. Bu durum Müslüman turist sayısında büyük bir artışa ve genellikle "Helal patlaması" olarak adlandırılan bir eğilime yol açmıştır. Buna göre Japonya'da büyük şehirlerdeki ve turistik yerlerdeki restoranların, büyük gıda zincirlerinin ve diğer satış noktalarının son yıllarda mallarını Helal olarak tanıtımına çabaladıkları ve birçoğunun çeşitli sertifika derneklerinden birinin Helal sertifikasını sergiledikleri görülmektedir. Konuyla ilgili çok sayıda eser mevcuttur. Hatta bazı yerel yönetimler Helal sertifikası almak isteyen şirketlere mali destek sağlamaktadırlar (Bkz. Taito-ku, 2019). Bu artış her ne kadar dinî ve kültürel olmaktan ziyade finansal endişe ve politikaların bir sonucu olarak görülebilse de İslâmî uygulamalara ilişkin farkındalığın artmasına olumlu anlamda etki ettiği Japonya'daki Müslümanların daha iyi anlaşılmasına ve toplumda kabul görmesine yol açma potansiyeline sahip olduğu da söylenebilmektedir (Takahashi, 2021a, s. 176).

Bu konuda Manga'nın rolü önemlidir. Örneğin, popüler bir web tabanlı Manga platformunda yayınlanan ödüllü Satoko to Nada (Satoko ve Nada) serisi**,** Amerika Birleşik Devletleri'nde yaşayan Japon bir kız öğrencinin üniversitede kaldığı eve vardığında ev arkadaşının peçe takan Suudi bir Müslüman olduğunu fark etmesini anlatıyor. Başta temkinli yaklaşsa da Satoko kısa sürede Nada ile benzer ilgi alanlarını paylaştıklarını görür ve ilişkileri yakınlaştıkça da Satoko İslam'ın olumlu unsurlarını öğrenir (Bkz. Yupicheka, 2018). Bu noktada Manga ötekini tanıma tamamen objektif de değildir. Örneğin, Japonya'daki ve dünyanın geri kalanındaki ataerkil yapıları uygun bir şekilde görmezden gelerek Müslüman ülkelerdeki kadın hakları ihlallerine odaklanmaktadır. Ancak genel olarak, *"Müslümanlar tıpkı sizin ve benim gibi insanlardır"*

şeklinde mesaj vererek karşılıklı anlayışı teşvik etmektedir (Bkz. Yupicheka, 2018). Bu yayınların çoğu yalnızca yabancı Müslümanlara odaklansa da Japon Müslümanların hikayeleri de ilgi çekmektedir. Bu da Japon toplumu hakkında artan bir farkındalığa işaret etmektedir (Bkz. Sato, 2015). Ayrıca Japon toplumunda inanca yönelik kayıtsızlık, hangi dine mensup olunursa olunsun, toplum kurallarına uyduğu durumlarda toplumun birer parçası olarak kabul edilebilecekleri anlamına da gelmektedir (Takahashi, 2021a, s. 176).

Bu açıdan Japonya, çok kültürlü bir arada yaşama konusunda kendisini geliştirmektedir. 多文化共生 (Tabunka Kyōsei) "Çok Kültürlü Yaşam" Japon toplumunda yaygın olarak kullanılan bir terim olmuştur. Terimin popüler anlayışı, büyük ölçüde hükümet özellikle de yerel belediyeler tarafından artan sayıda göçmene yönelik bir politika olarak benimsenmesiyle şekillenmiştir. Bu bağlamda yerel topluluklarda Japon ve Japon kökenli olmayanlar arasında ideal bir "bir arada yaşama" durumu olarak görülmektedir (Okai & Takahashi, 2023, s.268). Japonya'da Müslüman toplumun dinî ve sosyal ihtiyaçlarını karşılamak üzere camiler ve İslâm merkezleri inşa edilmiştir. Japonya'da İslâm ve Müslümanlara yönelik algı ve tutumlar açısından, olumsuz tutumların arttığına dair çok az kanıt bulunmaktadır. Aksine, Japonya genel olarak Müslümanlara karşı misafirperver bir tutum sergilemektedir (Komai, 2001, s.80). Zaman zaman gözetim ve muhafazakâr aktivizm örnekleri olsa da bunlar Müslümanlara yönelik belirli ayrımcı politikaları yansıtmamaktadır. Japonya'da Müslümanların medyadaki temsili genellikle tarafsız ve bilgilendirici olmakla birlikte, terör saldırıları gibi olaylardan kaynaklanan olumsuz algılar zaman zaman ortaya çıkmaktadır. Ancak bu durum ana akım medya temsillerinde yaygın bir olgu değildir (Takahashi, 2021, s.174).

SONUÇ

Japonya'da çokkültürlü birlikte yaşamı ifade eden Tabunka Kyōsei kavramı, Japon tarihi ve kültürü içerisinde şekillenen bir anlam geçmişine sahiptir. Bu anlamsal süreç ilgili kavramı, homojen bir toplumdan heterojen bir toplum yapına evrilen Japon toplumunun önemli konularından olmaya devam etmektedir. Bu çalışmamızda Tabunka Kyōsei'nin ne olduğu, din ve inanç özgürlüğüyle ilgisi, Japonya'ya Müslüman göçleriyle ilişkisi, Japon-Müslüman çokkültürlü aile yapısının ve Müslümanların toplumsal yaşamının Tabunka Kyōsei kavramı ekseninde toplumsal alandaki izdüşümleri araştırılmış, elde edilen veriler incelenmiş, araştırmamızla bazı sonuçlara ulaşılmıştır.

İlki, Japonya'da din ve inanç özgürlüğü denildiğinde Japon vatandaşlarının din/dinî harekete mensubiyetlerinde ve inançlarında bir kısıtlamaya tabi olmadıkları vurgulanmıştır. Ancak, Japon toplumsal yaşamında bulunmayan, dışarıdan işçi göçleriyle getirilen din, inanç ve kültürlerin Japonya'da benzerlik ve farklılıklarının bilinerek toplumsal yaşama dahil edilebileceğine işaret edilmektedir. Bu ise din ve inanç özgürlüğünün din ve inancın kavramlarının nasıl ve ne şekilde anlamlandırıldığıyla ilgili olduğu görülmüştür.

İkincisi, Japonya'da farklı din ve kültürlerin yaşamında onların Japonlar tarafından yabancı bir kültür olarak bilinmesi, ülkeye gelen Müslümanların, Japon kadınlarla evlilikleriyle aile oluşlarıyla da ilişkilidir. Bu şekilde hem bir açıdan farklı hem bir açıdan benzer olan melez bir kültürel aile yapısında yetişen dış görünüşü, dini ve kültürü açısından yarım olduğu vurgulanarak "Hāfu" denildiği tespit edilmiştir. Bu ise Japonya'da Müslümanların ikinci nesli olarak bilinen bir jenerasyonun varlığını, Japonların kültürel yabancılık açısından tanımlamayı ve farklılıklara odaklanan bir niteleme biçimini tercih ettiklerini göstermektedir. Ancak ana metinde de edildiği gibi bu durum, İslam'a yönelik bir fobi veya tavır değil, İslam'ın bir din olarak henüz anlaşılmaması nedeniyle olduğu vurgulandığı anlaşılmıştır.

Üçüncü, Japonya'da Müslümanlara bakış, işçi göçlerinin gerçekleştiği ilk dönemlerden çok daha ilerlemiş bir seviyededir. Bu ise İslam'ın Japonya'da doğan, orada eğitim alan Müslüman Japonların İslam'ı Japonya'nın kültürel ve sosyal hayatına uyumlu bir biçimde çokkültürlü bir

arada yaşamı daha iyi tecrübe etmelerine, birlikte yaşama alanları oluşturmalarına yol açmakta olduğu anlaşılmıştır.

KAYNAKÇA

Anis, B. (1998). The emergence of Islam and the status of Muslim minority in Japan. *Journal of Muslim Minority Affairs*, *18*(2), 329-345. https://doi.org/10.1080/13602009808716415

Astley, T. (2006). An Introduction to The Japanese New Religions. İçinde P. L. Swanson & C. Chilson (Ed.), *Nanzan Guide to Japanese Religious*. University of Hawaii Press.

Battal, E. (2019). *Kıyametin Gölgesinde Yeni Dini Hareketler ve Şiddet* (2. Baskı). Okur Akademi.

Chapman, D. (2006). Discourses of multicultural coexistence (Tabunka Kyosei) and the "old-comer" Korean residents of Japan. *Asian Ethnicity*, *7*(1), 89-102. https://doi.org/10.1080/14631360500498593

Chikako K. (2016). Multicultural Discourse and Policies in Japan: An Assessment of Tabunka kyōsei. *The Gakushuin Journal of International Studies*, *3*, 1-15.

Choi, S., & Kato, C. (Ed.). (2008). *Nihon ni Okeru Tabunka Kyōsei Towa Nanika: Zainichi no Keiken Kara*. Shin'yōsha.

Dündar, A. M. (2011). *Japonya'nın Orta Asya Politikaları* (ss. 1-72) [Araştırma]. Ahmet Yesevi Üniversitesi. http://www.ayu.edu.tr/static/kitaplar/japonya_ortaasya_rapor.pdf

Esenbel, S. (Ed.). (2017). *Japan on the Silk Road: Encounters and Perspectives of Politics and Culture in Eurasia*. Brill.

Fathil, F., & Fathil, F. (2011). Islam in minority Muslim countries: A case study on Japan and Korea. *World Journal of Islamic History and Civilization*, *1*(2), 130-141.

Fourth Periodic Report by the Government of Japan under Article 40 Paragraph 1(b) of the International Covenant on Civil and Political Rights, 15-18 II. Information on Individual Articles of The Covenant. Geliş tarihi 20 Kasım 2021, gönderen https://www.mofa.go.jp/policy/human/civil_rep4/article15_18.html

Higuchi, N. (2007). 'Gaten'-kei e no Michi Rōdō e no Tekiō, Shōhi e no Yūwaku. İçinde *Kokkyō o Koeru Tainichi Musurimu İmin no Shakai-gaku* (ss. 83-114). Seikyūsha.

Higuchi, N. (2010). 'Tabunka Kyōsei' Saikō: Posuto Kyōsei Nimuketa Shiron. *Asia Taiheiyō Kenkyū Sentā Nenpō*, *7*, 3-10.

Iwabuchi, K. (2010). Tabunkashakai no <Bunka> o Tou: Kyōsei, Komyunitii, Media. İçinde *Multicultural Society: Living Together, Community and Media*. Seikyūsha.

İnoue, N. (2000). *Contemporary Japanese Religion*. Foreign Press Center.

J-Cast. (2016, Mart 1). Musuirmu-tachi ha, Mayowazu Hisaichi he Mukatta: 100kai no Shien to 'İsuramu no Oshie'. *J-Cast*.

Karaoğlu, Y. (2023). Japonya'daki İslam Tarihi'nden Bakışla Japon Maneviyatı. *Ordu Üniversitesi İlahiyat Fakültesi Dergisi*, *1*, Article 1.

Kim, H.-R., & Oh, I. (2011). Migration and Multicultural Contention in East Asia. *Journal of Ethnic and Migration Studies*, *37*(10), 1563-1581. https://doi.org/10.1080/1369183X.2011.613332

Kim, Y. (2007). *Tabunka Kyōsei Kyōiku to Aidentiti*. Akashi Shoten.

Kitagawa, J. M. (1990). *Religion in Japanese History*. Columbia University Press.

Komai, H. (2001). *Foreign migrants in contemporary Japan*. Trans Pacific Press. http://archive.org/details/foreignmigrantsi0000koma

Kondo, A. (2011). *Tabunka Kyōsei Seisaku eno Apurochi*. Akashi Shoten.

Kudo, M. (2008). *Ekkyō no Jinrui-gaku — Zainichi Pakisutan Hito Musurimu İmin no Tsuma-tachi*. Tōkyō Daigaku Shuppan-kai.

Kureshi Y. (2021). Nihon ni Kurasu Musurimu Dainisedai: Tōjisha no Katari kara Mieru Kattō no Yōsō. *Keio SFC journal*, *21*(1), 154-176. https://doi.org/10.14991/003.00210001-0154

Levent, S. (2020). Japanese Knowledge about Muslims from the Meiji Restoration to Today: Islamic World in the Context of a Trans-National Space. *Cihannüma: Tarih ve Coğrafya Araştırmaları Dergisi*, *6*(1), 163-176. https://doi.org/10.30517/cihannuma.722035

Maruyama, H. (2007). Diversity as Advantage in a "Homogeneous" Society: The Educational Environment for Muslims in Japan. *Shingetsu Electronic Journal of Japanese-Islamic Relations*, *7*.
Miura, A. (2015). *Nyūkamā no Kodomo to İmin Komyuniti ― Dainisedai no Esunikku Aidentiti*. Keisōshobō.
Miura, A., Tsubota, K., & Nukaga, M. (2016). Firipin-kei Nyūkamā Dainisedai no Esu Nikku Aidentiti ― Raifukōsu no Bunki to Sentaku-teki Esunishiti e no Hen'yō. *Kokusai Kyōyō Gakubu Ronsō*, *9*(2), 69-96.
Morris-Suzuki, T. (2013). *Hihanteki Sōzōryoku no Tameni: Grōbaruka Jidai no Nihon* (S. Ito, Çev.). Heibonsha.
Okai, H., & Takahashi, N. (2023). Conflict and coexistence among minorities within minority religions: A case study of Tablighi Jama'at in Japan. *Religion, State and Society*, *51*(3), 267-282. https://doi.org/10.1080/09637494.2023.2222616
Roberts, G. S. (2013). Vocalizing the 'I' Word: Proposals and Initiatives on Immigration to Japan from the LDP and Beyond. *Journal of Asia-Pacific Studies*, *19*, 201-219. https://doi.org/10.11588/asien.2012.124.18411
Sakurai, K. (2003). *Nihon no Musurimu Shakai*. Chikumashobō.
Sakurai, Y. (1997). Shinshūkyō no Keisei to Shakai Hendō: Chigai – Gendai Nihon ni Okeru Shinshūkyō Kenkyū no Saikendō. *Hokkaidō Daigaku Bungakubu Kyō*, *46*(1), 111-194.
Sat, N. (2018). *Japonya'da İslam araştırmaları: Eserleri ve fikirleri bağlamında Toshihiko İzutsu* [Doktora Tezi]. Ankara Üniversitesi SBE.
Sato, K. (2015). *Nihon no Naka-de İsuramu-kyou wo Shinjiru*. Bungei Shunju.
Sellek, Y. (2001). *Migrant Labour in Japan*. Palgrave.
Shimazono, S. (2012). From Salvation to Spirituality: The Contemporary Transformation of Religions Viewed from East Asia. *Religious Studies in Japan*, *1*, 3-23.
Soumu. (2006). *Chiiki ni okeru Tabunka Kyōsei Suishin Puran* (Resmi No. 79; ss. 1-11). Soumu. http://www.soumu.go.jp/kokusai/pdf/sonota_b6.pdf
Sugimoto, H. (2002). Isurāmu Kyōto ni Okeru Shakai Bunka Kūkan to Kyōikumondai. İçinde M. Takashi & K. Hirokatsu (Ed.), *Hen'yō suru Nihon Shakai to Bunka Kokusai Shakai 2* (ss. 145-167). Tōkyō Daigaku Shuppankai.
Suh, Y.-D. (2000). Sōron: Tabunka Kyōsei Shakai eno Tenbō. İçinde Y.-D. Suh, J. Toyama, & T. Hashiuchi (Ed.), *Tabunka Kyōsei Shakai eno Tenbō*. Nippon Hyōronsha.
Taito-ku. (2019, Aralık 9). *Taito-ku Hara-ru Ninshou Shutoku Josei Jigyou no Goan-nai*. Taito-ku. http://www.city.taito.lg.jp/index/bunka_ kanko/yukyaku/tourist/251005.html
Takahashi, S. J. (2021a). Islamophobia in Japan: A Country at a Crossroads. *Islamophobia Studies Journal*, *6*(2), 167-181. https://doi.org/10.13169/islastudj.6.2.0167
Takahashi, S. J. (2021b). Islamophobia in Japan: A Country at a Crossroads. *Islamophobia Studies Journal*, *6*(2), 167-181. https://doi.org/10.13169/islastudj.6.2.0167
Takeshita, S. (2003). Kokusai Kekkon ni Okeru Esunishiti no Hyōshō to Shite no Shūkyō ― Gaikoku Hito Musurimu to Nipponjinjosei no Kappuru no Baai. *Kazoku Kenkyū Nenpō*, *28*, 14-26.
Takezawa, Y. (2009). Jo: Tabunka Kyōsei no Genjō to Kadai. *Bunkajinruigaku*, *74*(1), 86-95.
Tanada, H. (2019). Chihō Jichitai ni Okeru Musurimu Jūmin ni Taisuru 'Tabunka Kyōsei' Shisaku no Genjō. *Ningenkagaku Kenkyū*, *32*(2), 225-234.
Tenda, H., & Okai, H. (2008). *Nihon no Mosuku Chōsa 1 ― İsurāmu Reihai Shisetsu no Chōsa Kiroku*. Haya Inada Daigaku Ningen Kagaku Gakujutsu-in Ajia shakai-ron Kenkyūshitsu.
The Constitution of Japan, 1-103 Constitution and Government of Japan. Geliş tarihi 20 Ekim 2021, gönderen https://japan.kantei.go.jp/constitution_and_government_of_japan/constitution_e.html

Yamagata, A. (2019). Perceptions of Islam and Muslims in Contemporary Japan. *New Voices in Japanese Studies*, *11*, 1-25. http://dx.doi.org/10.21159/nvjs.11.01
Yamashita, S. (2010). 2050 nen no Nihon—Filipiina no Yume o Meguru Jinruigakuteki Sōzōryoku. *Bunka Jinruigaku*, *75*(3), 327-344.
Yamashita, Y. (2022). Islam and Muslims in "non-religious" Japan: Caught in between prejudice against Islam and performative tolerance. *International Journal of Asian Studies*, *19*(1), 81-97. https://doi.org/10.1017/S1479591421000012
Yupicheka. (2018). *Satoko to Nada*. Seikaisha Comics.

RASTGELE MUTAGENEZ İLE PROTEAZ ÜRETİCİSİ DOĞAL *Bacillus* sp. SUŞUNUN GELİŞTİRİLMESİ VE MUTANT SUŞTAN ELDE EDİLEN ENZİMİN KARAKTERİZASYONU VE FARKLI ENDÜSTRİYEL ALANLARDA KULLANILABİLİRLİĞİ

IMPROVEMENT OF NATURAL *Bacillus* sp. PROTEASE PRODUCER STRAIN BY RANDOM MUTAGENESIS AND CHARACTERIZATION OF ENZYME OBTAINED FROM THE MUTANT STRAIN AND ITS USABILITY IN DIFFERENT INDUSTRIAL FIELDS

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Özet

Bu çalışmada, proteaz üreticisi doğal *Bacillus* sp. suşunun rastgele kimyasal (EMS: Etil Metan Sülfonat) mutasyon uygulaması ile geliştirilmesi, elde edilen en iyi enzim üreticisi mutant suşa ait enzimin karakterizasyonu ve farklı endüstriyel alanlarda kullanılabilme potansiyelinin belirlenmesi amaçlanmıştır.

Proteaz üreticisi doğal suş farklı süre ve konsantrasyonlarda kimyasal mutajene maruz bırakılmıştır. 75 dk. 5 µL EMS uygulaması sonucunda en iyi proteaz üreticisi mutant suş seçilmiştir. Kontrole göre 1.36 kat daha fazla enzim aktivitesi elde edilmiştir. Mutant suştan elde edilen enzim en yüksek substrat spesifitesini kazeine karşı göstermiştir. Proteazın kazein substratı ile reaksiyonu sonucunda, hidroliz ürünleri olarak açığa çıkardığı amino asitler HPLC analizi ile tespit edilmiştir. Enzim, optimum aktivitesini pH 9.0'da ve 55˚C'de göstermiş, pH 7.0-10.0 ve 30-80˚C arasında 1 saat boyunca hemen hemen tamamen stabil kalmıştır. 2 mM TLCK varlığında aktivitesinin %70.74'ünü, 5 mM PMSF varlığında ise başlangıç aktivitesinin %66.57'sini kaybetmiştir. %1'lik Triton X-100, Tween 20, Tween 80 ve %5'lik H_2O_2 varlığında başlangıç aktivitesinin sırasıyla ortalama %94.49 ve %78.31'ini korumuştur. 5'er mM'lık metal iyonları varlığında enzim aktivitesinin hemen hemen tamamen korumuştur. Enzim %1-25 NaCl konsantrasyonlarına maruz bırakıldığında, maksimum aktivite %1'lik NaCl konsantrasyonunda (%98) gözlemlenmiştir. Enzimin birbirinden farklı ticari sıvı deterjanlarla ortalama %95'in üzerinde uyumluluk sergilediği ve yıkama performans analizlerinde, ticari deterjan ve proteaz karışımının birlikte kullanımının, protein temelli lekelerin kumaştan gideriminde en etkili sonucu verdiği belirlenmiştir. Aynı zamanda enzimin atık X-ray filmlerinden jelatin tabakasını hidroliz edebildiği dolayısıyla gümüşün geri kazanımına yardımcı olduğu ve pıhtı oluşumunu pozitif kontrol heparine göre daha fazla geciktirdiği belirlenmiştir.

Sonuç olarak, mutant *Bacillus* sp. tarafından sentezlenen enzim alkalin, termostabil serin proteazdır ve çamaşır deterjanı, fotoğrafçılık ve farmasötik gibi endüstrilerde kullanım potansiyeline sahiptir.

Anahtar Kelimeler: *Bacillus* sp., alkalin proteaz, mutasyon, EMS, suş geliştirme

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Abstract
This study, it was aimed to improve the protease producer natural *Bacillus* sp. strain by applying a random chemical (EMS: Ethyl Methane Sulfonate) mutation, to characterize the enzyme of the best enzyme producer mutant strain obtained and to determine its potential to be used in different industrial areas.
The protease producer native strain was exposed to chemical mutagen at different times and concentrations. The best protease producer mutant strain was selected as a result of 75 min. 5 µL EMS application. 1.36 times more enzyme activity was obtained compared to the control. The enzyme obtained from the mutant strain showed the highest substrate specificity against casein. The amino acids released as hydrolysis products as a result of the protease reaction with the casein substrate were determined by HPLC analysis. The enzyme showed its optimum activity at pH 9.0 and 55˚C and remained almost completely stable for 1 hour between pH 7.0-10.0 and 30-80˚C. It lost 70.74% of its activity in 2 mM TLCK and 66.57% of its initial activity in the presence of 5 mM PMSF. It retained an average of 94.49% and 78.31% of its initial activity in the presence of 1% Triton X-100, Tween 20, Tween 80, and 5% H_2O_2, respectively. In the presence of 5 mM metal ions, the enzyme almost completely preserved its activity. When the enzyme was exposed to 1-25% NaCl concentrations, the maximum activity was observed at 1% NaCl concentration (98%). It was determined that the enzyme exhibited an average of over 95% compatibility with different commercial liquid detergents and in washing performance analyses, the combined use of commercial detergent and protease mixture gave the most effective result in the removal of protein-based stains from the fabric. It was also determined that the enzyme can hydrolyze the gelatin layer from waste X-ray films, thus helping to recover silver and delaying clot formation more than the positive control heparin.
As a result, the enzyme synthesized by the mutant *Bacillus* sp. is an alkaline, thermostable serine protease and has the potential to be used in industries such as laundry detergent, photography, and pharmaceuticals.

Keywords: *Bacillus* sp., alkaline protease, mutation, EMS, strain improvement
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LIFE HISTORY TRAITS OF HILSHA (*TENUALOSA ILISHA*): NEEDED FOR SUSTAINABLE MANAGEMENT

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Abstract
The Hilsa shad, *Tenualosa ilisha* is the country's most important aquatic resource and affords the largest single species fishery in Bangladesh. Hilsha fish also plays an important role in the field of national economic development, employment and in the supply of protein enrich food to the people of Bangladesh. So, this study focused on the life history traits of Hilsha and their implications for effective management strategies. Total length (TL), body weight (BW), gonad weight (g) were measured with a precision of 0.01 cm and 0.01 g. In this study, the maximum length of Hilsha was found 42 cm in Padma River, 55.5 cm in Meghna River and 53 cm in Bay of Bengal, respectively. Most of the fishes was attained sexual maturity at the length of 23.31 cm, 30.08 cm and 28.84 cm in Padma River, Meghna River and Bay of Bengal, respectively. T. ilisha spawns throughout the year. However, the peak values of GSI were found in the month of October, which indicate that October is the peak spawning season of this species. According to the peak spawning season as determined in this study, it is recommended to adjust the banning Period. However, the banning period of Hilsa fishing was from 12th October to 2nd November. So, based on the present findings, the banning period need to adjust. It may start 3-4 days later in The Meghna River and 7 days in the Padma River. Fishing should be banned for 30 days in the Bay of Bengal, Bangladesh. These findings hold paramount importance in the development of Sustainable management policy aimed at conserving *T. ilisha* populations in the Padma River, Meghna River and Bay of Bengal.

Keywords: 1.Banning period, 2. Management policy, 3. Padma River, 4. Peak spawning season5. Tenualosa Ilisha

Preferred conf. session:
2. Resources Management, Water Quality, Aquatic Environment and Pollution, Biodiversity, Conservation; Stock Assessment

PREDICTING THE BUILDING ENERGY PERFORMANCE WITH MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE: A REVIEW FOR THE EARLY DESIGN PHASE

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ABSTRACT
The emergence of positive energy-building goals aimed at designing energy-efficient structures represents a critical phase influenced by two pivotal parameters: global warming and the depletion of natural energy resources. These factors underscore the imperative for minimizing energy performance in buildings and catalyzing the transition towards sustainable architectural practices. As the global climate crisis intensifies and concerns over resource scarcity escalate, mitigating carbon emissions and optimizing energy usage in the built environment becomes increasingly urgent. Consequently, the conceptualization and realization of energy-positive buildings emerge as a strategic response to these pressing environmental challenges, necessitating innovative design strategies, advanced technologies, and holistic approaches to building performance optimization.
This study centers on models devised for estimating energy performance within buildings at the design phase, focusing on enhancing design decisions. Its primary objective is to discern prevailing trends in the intensity of application, data curation, and methodologies employed to classify machine learning and artificial intelligence models facilitated by bibliometric analysis. Adopting a deductive approach to this inquiry is pivotal in charting a course for forthcoming research endeavors.
This paper critically examines the significance of predicting building energy performance during the early design phase. The study highlights the multifaceted benefits and implications of early energy performance prediction in architectural and engineering endeavors by analyzing existing literature and industry practices. Through a comprehensive review of relevant research, the paper elucidates the necessity of integrating predictive modeling techniques into the early stages of building design processes. Additionally, it underscores the pivotal role of predictive analytics in achieving sustainable, cost-effective, and occupant-centric building solutions. For this purpose, the studies obtained by scanning the Web of Science database with the specified focus over the last 10 years will be examined. Through selected articles for content analysis, data will be digitized and visualized via graphics to elucidate the trends in research during this period.
The obtained results will provide essential insights for identifying niches in the field and developing effective methods for energy-efficient building design. The aim is to contribute to the motivation towards maximizing the contributions of machine learning and artificial intelligence to architecture, which are rapidly making significant contributions to everyday life.

Keywords: Building Energy Performance, Prediction, Machine Learning, Artificial Intelligence, Early Design Phase

INTRODUCTION
Optimizing critical constraints identified in the early design stages of buildings (such as insulation thickness, window type, building orientation) using a machine learning-supported model can

significantly enhance energy performance. Such a model can accurately predict energy performance even with limited data during early design phases and guide design decisions effectively.

The pressing global challenges of climate change and the depletion of natural energy resources have led to the emergence of positive energy building goals, aiming to design energy-efficient and sustainable structures. These goals are driven by the necessity to reduce carbon emissions and optimize energy usage in the built environment, thereby addressing both environmental and resource-related concerns. As the global climate crisis intensifies, the need for innovative design strategies and advanced technologies in architecture becomes increasingly urgent.

This study focuses on the estimation of building energy performance during the design phase, emphasizing the importance of informed design decisions to enhance energy efficiency. By employing a bibliometric analysis, the research aims to identify current trends in the application intensity, data management, and methodologies utilized in the classification of machine learning and artificial intelligence models for energy performance prediction. Understanding these trends is crucial for guiding future research directions in this field.

Furthermore, this paper critically examines the benefits and implications of predicting energy performance early in the design process. By reviewing existing literature and industry practices, the study highlights the advantages of integrating predictive modeling techniques into the architectural and engineering design stages. This approach not only facilitates the creation of sustainable and cost-effective buildings but also ensures that they are optimized for occupant comfort and energy efficiency.

In current building practices, data-driven surrogate modeling is increasingly being applied as an alternative to computationally expensive physics-based energy performance simulations. However, the significance of data sampling in predictive model training has not been adequately represented. In the early stages of building design, it is crucial to achieve energy performance with higher accuracy using fewer samples.

AI-based energy performance prediction models utilize various design criteria as inputs to estimate the energy consumption and efficiency of buildings. These criteria encompass the fundamental factors that influence building energy performance and are crucial for enhancing the accuracy of the prediction models.

There is often a significant discrepancy between the predicted (calculated) energy performance of buildings and the actual energy usage measured after the buildings become operational. As part of the literature review, areas of focus for machine learning-based approaches to energy performance in buildings have been identified. These include efforts to reduce the gap between predictions of building energy performance and the actual lifecycle values of buildings, as well as trends towards dynamically updating building energy models based on data throughout the building lifecycle.

Designers aim to improve the energy efficiency of buildings while maintaining comfort and quality. In this context, Wetter and Polak (2004) developed an optimization algorithm to reduce the annual energy consumption of an office building. Heiselberg et al. (2009) identified key parameters for sustainable building design and reducing energy consumption. The multi-objective optimization of building design using artificial neural networks and genetic algorithms was carried out by Magnier and Haghighat (2010).

Additionally, Ruchi, Ali, and Panos (2003) developed a hierarchical design framework to enhance building performance. In their study, Wright and Mourshed (2009) optimized the size, number, and placement of south-facing windows using genetic algorithms for energy efficiency. Wang et al. (2005) applied genetic algorithms in green building design. M.S. de Wit (2001) identified parameters affecting thermal comfort in naturally ventilated offices. Koo, Park, Hong, and Park (2014) used energy simulation software and algorithms to determine the optimal configurations of building components, particularly the building envelope.

Since 2018, we have observed a significant shift from physical models to machine learning-based models in energy performance prediction (Figure 1).

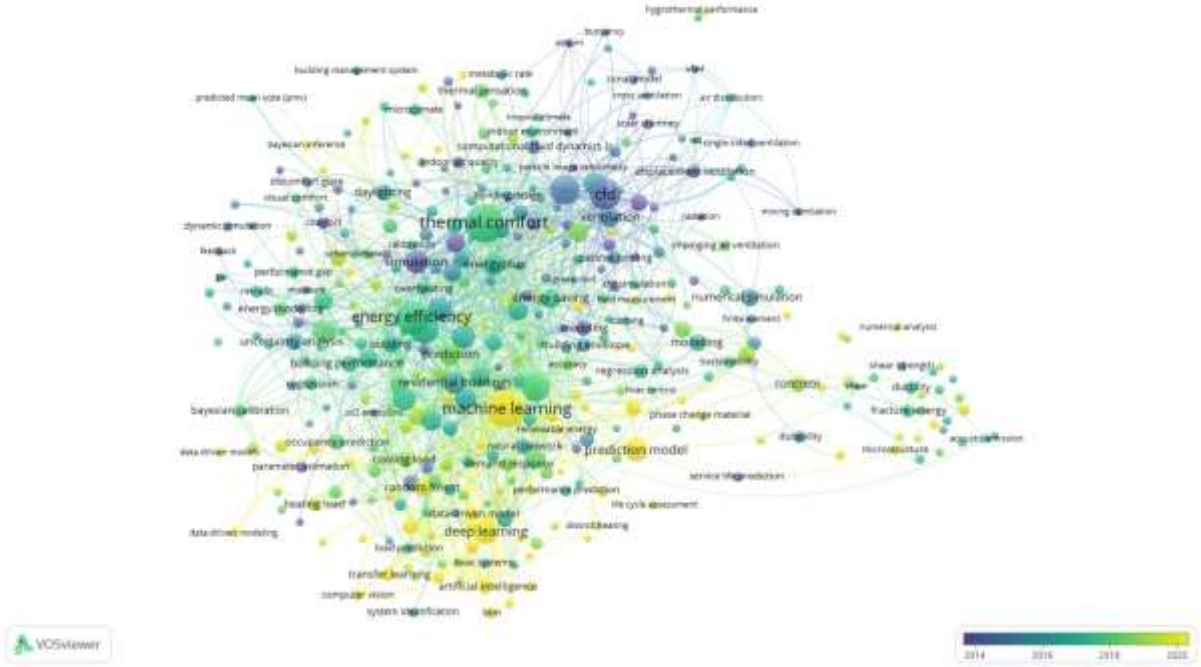


Figure 1. The studies that became prominent between 2016 and 2018 show a noticeable shift towards machine learning after 2018 (Yüceses, Arslan, 2023)

METHODOLOGY

As of January 2024, the research trends of the 39 most-cited articles focused on the early design phase with a machine learning approach for building energy performance prediction, available in the WOS (Web of Science) database, have been analyzed. The parameters used as data have been classified (Figure 2).

The results obtained from the content analysis of 39 articles that used a machine learning model focused on the building design phase for predicting building energy performance, using the WOS (Web of Science) database, are presented (Figure 2). In the selected articles, the data used for prediction models in the early design phase were identified on a per-article basis. The identified data categories were analyzed and classified accordingly. The primary aim of this analysis is to observe which types of data yield accurate results despite limited data availability during the early design phase, among the numerous models and algorithm combinations present in the literature (Chakraborty, Elzarka, & Bhatnagar, 2016); (Paterson, Mumovic, Das, & Kimpian, 2017); (Feng, Lu, & Wang, 2019; J. Lee, Boubekri, & Liang, 2019).



NO	REF.	TITLE	YEAR
1	[17]	Generation of accurate weather files using a hybrid machine learning methodology for design and analysis of sustainable and resilient buildings	2018
2	[15]	Energy use predictions with machine learning during architectural concept design	2017
3	[18]	Energy Model Machine (EMM) Instant Building Energy Prediction using Machine Learning	2017
4	[19]	A novel method based on extreme learning machine to predict heating and cooling load through design and structural attributes	2018
5	[11]	Assessing environmental performance in early building design stage: An integrated parametric design and machine learning method	2019
6	[20]	Impact of Building Design Parameters on Daylighting Metrics Using an Analysis, Prediction, and Optimization Approach Based on Statistical Learning Technique	2019
7	[12]	Combining context-aware design-specific data and building performance models to improve building performance predictions during design	2019
8	[21]	Development of a surrogate model by extracting top characteristic feature vectors for building energy prediction	2019
9	[22]	Building Energy Prediction for Early-Design-Stage Decision Support: A Review of Data-driven Techniques	2019
10	[23]	Developing a parametric daylightable annual daylight prediction model with improved generalization capability for the early stages of office building design	2021
11	[24]	A machine learning and deep learning based approach to predict the thermal performance of phase change material integrated building envelope*	2021
12	[25]	Predictive models for daylight performance of general floorplans based on CNN and GAN: A proof-of-concept study	2021
13	[34]	Design Optimization of a Passive Building with Green Roof through Machine Learning and Group Intelligent Algorithm	2021
14	[26]	Review of onsite temperature and solar forecasting models to enable better building design and operations	2021
15	[27]	Artificial Neural Networks to Optimize Zero Energy Building (ZEB) Projects from the Early Design Stages	2021
16	[28]	A Machine Learning-Based Prediction Model of LCCO2 for Building Envelope Renovation in Taiwan	2021
17	[29]	Generation of whole building renovation scenarios using variational autoencoders	2021
18	[30]	BEEM: Data-driven building energy benchmarking for Singapore	2022
19	[13]	Early-stage design support combining machine learning and building information modeling	2022
20	[14]	Buildings' energy consumption prediction models based on buildings' characteristics: Research trends, taxonomy, and performance measures	2022
21	[31]	Data-driven prediction and optimization of residential building performance in Singapore considering the impact of climate change	2022
22	[32]	Machine Learning-Based Method for Detached Energy-Saving Residential Form Generation	2022
23	[33]	Modeling energy-efficient building loads using machine-learning algorithms for the design phase	2023
24	[34]	Energy consumption predictions by genetic programming methods for PCM integrated building in the tropical savanna climate zone	2023
25	[35]	A hybrid ensemble learning framework for zero-energy potential prediction of photovoltaic direct-driven air conditioners	2023
26	[36]	Forecasting energy demand of PCM integrated residential buildings: A machine learning approach	2023
27	[37]	Machine learning as a surrogate to building performance simulation: Predicting energy consumption under different operational settings	2023
28	[38]	Effect of adaptive intelligent sampling and machine-learning emulators in surrogate energy modeling of architectural massing	2023
29	[39]	Predicting energy performances of buildings' envelope wall materials via the random forest algorithm	2023
30	[40]	Room energy demand and thermal comfort predictions in early stages of design based on the Machine Learning methods	2023
31	[41]	Toward the application of a machine learning framework for building life cycle energy assessment	2023
32	[42]	Employing ANN for daylight and energy prediction of hot climate office buildings: a case study of new Cairo, Egypt	2023
33	[43]	Predicting the Energy Consumption of Commercial Buildings Based on Deep Forest Model and Its Interpretability	2023
34	[44]	A practical decision process for building facade performance optimization by integrating machine learning and evolutionary algorithms	2023
35	[45]	Enhancing Zero-Energy Building Operations for ESG: Accurate Solar Power Prediction through Automatic Machine Learning	2023
36	[46]	Data-driven prediction and optimization toward net-zero and positive-energy buildings: A systematic review	2023
37	[47]	A Machine Learning-Based Approach to Evaluate the Spatial Performance of Courtyards-A Case Study of Beijing's Old Town	2023
38	[48]	Estimating the received solar irradiance by traditional vaulted roofs using optimized neural networks and transfer learning	2023
39	[49]	Research on Light Comfort of Waiting Hall of High-Speed Railway Station in Cold Region Based on Interpretable Machine Learning	2023

Figure 2. The articles selected for content analysis

DISCUSSION

Five out of the 39 studies are bibliometric analysis studies. The effects of shading and reflections caused by surrounding buildings play a significant role in a building's energy performance. These influences can directly impact both energy consumption and indoor comfort. Shadows cast by neighboring structures can reduce the amount of sunlight received by a building, thereby decreasing the natural heating of interior spaces. This can be beneficial in warm climates, where it helps to reduce cooling loads and achieve energy savings. However, in cold climates or during winter months, insufficient sunlight may increase the building's heating requirements, leading to higher energy consumption (Mehrotra & Yi, 2023).

Another two studies developed a model proposal for material-based (the thermal performance of phase change material integrated building envelope) energy performance prediction (Bhamare, Saikia, Rathod, Rakshit, & Banerjee, 2021); (Nazir, Memon, Saurbayeva, & Ahmad, 2023). Another study that used façade characteristics as data for energy performance was conducted by Lin and Tsay (2023).

Based on the literature review, when compiling the algorithms used in the early design phase of buildings (Figure 3);

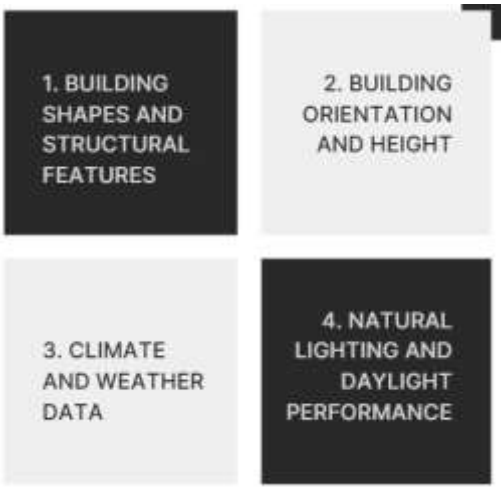


Figure 3. Classification of Prediction Models Derived from Data in Analyzed Articles

In the early design phase of buildings, machine learning-based prediction models utilize specific data categories to enhance energy performance assessments. The primary data classifications include Building Shapes and Structural Features, which capture the geometry and physical attributes of the structure; Building Orientation and Height, which influence solar exposure and shading effects; Climate and Weather Data, which provide essential information on environmental conditions impacting energy consumption; and Natural Lighting and Daylight Performance, which evaluate the effectiveness of natural light in reducing reliance on artificial lighting. These four classifications form the core data sets employed in developing predictive models for energy efficiency in architectural design (Figure 3).

Structural characteristics such as building geometry, total area, volume, floor plans, and the number of floors influence energy performance. Buildings with large volumes or multiple stories may have different energy requirements. The facade area and window-to-wall ratio significantly impact heat loss and gain. Buildings with a high window-to-wall ratio can experience increased heat gain and loss. Sunshades and shading systems help control solar heat gain, reducing cooling loads and improving energy efficiency.

Local climatic conditions, such as outdoor temperature, humidity, solar radiation, and wind, affect energy performance. Climate data are important inputs in energy simulations. Environmental factors, such as surrounding buildings, trees, and bodies of water, can also influence energy consumption.

Additionally, artificial intelligence has been utilized in the design sampling phase through parametric design software. Data extracted from the generated parametric design sets were applied comparatively to algorithms on the models. This approach enabled the identification of alternatives for the most successful prediction model to be realized more quickly than in traditional design processes (Guo et al., 2022); (Yu, Zhan, Tian, & Wang, 2023).

RESULTS

Based on the analysis, early design phase prediction models for building energy performance heavily rely on data related to structural characteristics, façade features, climate conditions, and natural lighting. Structural aspects such as building geometry, floor plans, total area, and the window-to-wall ratio significantly influence a building's energy consumption patterns. For instance, buildings with large volumes or a high window-to-wall ratio are prone to increased heat gain and loss, affecting heating and cooling loads. The integration of shading devices and façade optimization can help mitigate these effects by controlling solar heat gain, thus improving energy efficiency.

Environmental conditions, including local climate data—such as outdoor temperature, solar radiation, and wind—are crucial for accurate energy performance predictions. These factors directly impact energy consumption by influencing the heat balance and indoor comfort levels. The effects of shading and reflections from surrounding structures also play a key role, particularly in urban settings where shadows can either reduce cooling loads in warm climates or increase heating needs in colder environments. Incorporating diverse data types in machine learning-based predictive models enables architects and engineers to achieve more reliable energy performance assessments during the early stages of building design.

Predicting building energy performance at the early design phase is critical for several reasons, and machine learning (ML) plays a key role in supporting this process. Early intervention allows potential energy efficiency issues to be identified and addressed before construction, leading to more cost-effective solutions. By integrating ML models into the design phase, architects and engineers can optimize building features, enhance energy efficiency, and align designs with sustainability goals. Furthermore, ML models provide an opportunity to manage the complexity of building systems, analyzing multiple variables that influence energy performance. This enables the identification of optimal solutions without the need for extensive simulations. As the models continue to function after construction, they also support ongoing energy performance predictions and adjustments, ensuring long-term efficiency.

The primary advantage of using ML for early-stage predictions is its ability to offer actionable insights even in the conceptual stage, guiding decision-makers toward energy-efficient designs (Sapnken, Hamed, Soldo, & Tamba, 2023); (Mousavi, Villarreal-Marroquín, Hajiaghaei-Keshteli, & Smith, 2023); (S. Lee et al., 2023; Lu et al., 2023). However, a challenge lies in the dependence on large, high-quality training datasets, which can be time-consuming to generate. Inconsistent datasets may lead to less accurate predictions, emphasizing the need for careful dataset selection and preparation. Despite these challenges, ensemble methods like Random Forest (RF), Gradient Boosting Machines (GBM), and XGBoost, as well as Artificial Neural Networks (ANN), have proven effective in predicting building energy performance. These models empower architects and engineers to simulate various scenarios, making them invaluable tools for early-stage energy performance prediction (Ayoub, 2023); (Arjunan, Poolla, & Miller, 2022).

REFERENCES

Arjunan, P., Poolla, K., & Miller, C. (2022). BEEM: Data-driven building energy benchmarking for Singapore. *Energy and Buildings, 260,* 10. doi:10.1016/j.enbuild.2022.111869

Ayoub, M. (2023). Estimating the received solar irradiances by traditional vaulted roofs using optimized neural networks and transfer learning. *International Journal of Architectural Computing*. doi:10.1177/14780771231186259

Bhamare, D. K., Saikia, P., Rathod, M. K., Rakshit, D., & Banerjee, J. (2021). A machine learning and deep learning based approach to predict the thermal performance of phase change material integrated building envelope. *Building and Environment, 199,* 12. doi:10.1016/j.buildenv.2021.107927

Breesch, H., & Janssens, A. (2010). Performance evaluation of passive cooling in office buildings based on uncertainty and sensitivity analysis. *Solar Energy, 84*(8), 1453-1467. doi:https://doi.org/10.1016/j.solener.2010.05.008

Chakraborty, D., Elzarka, H., & Bhatnagar, R. (2016). Generation of accurate weather files using a hybrid machine learning methodology for design and analysis of sustainable and resilient buildings. *Sustainable Cities and Society, 24*, 33-41. doi:10.1016/j.scs.2016.04.009

Feng, K. L., Lu, W. Z., & Wang, Y. W. (2019). Assessing environmental performance in early building design stage: An integrated parametric design and machine learning method. *Sustainable Cities and Society, 50,* 15. doi:10.1016/j.scs.2019.101596

Guo, H. X., Duan, D., Yan, J. C., Ding, K. Y., Xiang, F. K., & Peng, R. (2022). Machine Learning-Based Method for Detached Energy-Saving Residential Form Generation. *Buildings, 12*(10), 21. doi:10.3390/buildings12101504

Lee, J., Boubekri, M., & Liang, F. (2019). Impact of Building Design Parameters on Daylighting Metrics Using an Analysis, Prediction, and Optimization Approach Based on Statistical Learning Technique. *Sustainability, 11*(5). doi:10.3390/su11051474

Lee, S., Park, S., Kang, B., Choi, M. I., Jang, H., Shmilovitz, D., & Park, S. (2023). Enhancing Zero-Energy Building Operations for ESG: Accurate Solar Power Prediction through Automatic Machine Learning. *Buildings, 13*(8). doi:10.3390/buildings13082050

Lin, C. H., & Tsay, Y. S. (2023). A practical decision process for building facade performance optimization by integrating machine learning and evolutionary algorithms. *Journal of Asian Architecture and Building Engineering*. doi:10.1080/13467581.2023.2244564

Lu, C. J., Li, S. H., Gu, J. H., Lu, W. Z., Olofsson, T., & Ma, J. G. (2023). A hybrid ensemble learning framework for zero-energy potential prediction of photovoltaic direct-driven air conditioners. *Journal of Building Engineering, 64*. doi:10.1016/j.jobe.2022.105602

Magnier, L., & Haghighat, F. (2010). Multiobjective optimization of building design using TRNSYS simulations, genetic algorithm, and Artificial Neural Network. *Building and Environment, 45*, 739-746. doi:10.1016/j.buildenv.2009.08.016

Mehrotra, A., & Yi, H. (2023). Effect of adaptive intelligent sampling and machine-learning emulators in surrogate energy modeling of architectural massing. *Journal of Building Engineering, 72*. doi:10.1016/j.jobe.2023.106614

Mousavi, S., Villarreal-Marroquín, M. G., Hajiaghaei-Keshteli, M., & Smith, N. R. (2023). Data-driven prediction and optimization toward net-zero and positive-energy buildings: A systematic review. *Building and Environment, 242*. doi:10.1016/j.buildenv.2023.110578

Nazir, K., Memon, S. A., Saurbayeva, A., & Ahmad, A. (2023). Energy consumption predictions by genetic programming methods for PCM integrated building in the tropical savanna climate zone. *Journal of Building Engineering, 68*. doi:10.1016/j.jobe.2023.106115

Paterson, G., Mumovic, D., Das, P., & Kimpian, J. (2017). Energy use predictions with machine learning during architectural concept design. *Science and Technology for the Built Environment, 23*(6), 1036-1048. doi:10.1080/23744731.2017.1319176

Ruchi, C., Ali, M., & Panos, Y. P. (2003). *A HIERARCHICAL DESIGN OPTIMIZATION FRAMEWORK FOR BUILDING PERFORMANCE ANALYSIS*. Paper presented at the Proceedings of Building Simulation 2003: 8th Conference of IBPSA. https://publications.ibpsa.org/conference/paper/?id=bs2003_0179_186

Sapnken, F. E., Hamed, M. M., Soldo, B., & Tamba, J. G. (2023). Modeling energy-efficient building loads using machine-learning algorithms for the design phase. *Energy and Buildings, 283*, 17. doi:10.1016/j.enbuild.2023.112807

Wang, Y.-G., Lin, X., & Zhu, M. (2005). Robust Estimating Functions and Bias Correction for Longitudinal Data Analysis. *Biometrics, 61*, 684-691. doi:10.1111/j.1541-0420.2005.00354.x

Wetter, M., & Polak, E. (2004). A convergent optimization method using pattern search algorithms with adaptive precision simulation. *Building Services Engineering Research & Technology - BUILD SERV ENG RES TECHNOL, 25*, 327-338. doi:10.1191/0143624404bt097oa

Yu, T. Q., Zhan, X. Q., Tian, Z. C., & Wang, D. R. (2023). A Machine Learning-Based Approach to Evaluate the Spatial Performance of Courtyards-A Case Study of Beijing's Old Town. *Buildings, 13*(7). doi:10.3390/buildings13071850

Zhao, Y., Mourshed, M., & Wright, J. (2009). *Factors influencing the design of spatial layouts in healthcare buildings*.

OPTIMUM DESIGN OF REINFORCED CONCRETE CANTILEVER WOA OPIMIZATION ALGORITHM

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Abstract
In this paper, the optimization of reinforcement cantilever concrete retaining walls are performed by WOA for wall cost and weight. This algorithm has been inspired from intelligent foraging behavior of the WOA. In order to investigate the capability of this algorithm, the obtained results are compared with the other literature. Based on these results, the WOA algorithm is able to minimize the wall cost and weight. Another research is performed to investigate the effect of optimization in comparison with conventional manual design. It shows that the optimization can significantly reduce the cost and weight of the wall. Moreover, two kinds of reinforcement concrete cantilever retaining walls with more variables and constraints are presented and compared with each other. The suggested walls are T-shape wall with variables thickness in stem and normal T-shape wall. These comparisons are performed for two objective function; cost and weight of the wall. In addition, the effect of initial parameters such as unit weight of soil and stem height are investigated by sensitivity analysis. All results show that the WOA algorithm is robust to optimize the cost and weight of reinforcement concrete cantilever retaining wall.

Keywords :reinforcement concrete cantilever retaining wall, woa algorithm, optimization, sensitivity analysis, objective functions, wall cost and weight, T-shape walls.

A NEW CULTIVATOR CONCEPT; CULTIVATOR DESIGN WITH FERTILISER POURING DEVICE, PRESSURE ROLLER, TAPPER AND ROTATING CIRCULAR TILLERS

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ABSTRACT
In this study, a new cultivator design with fertiliser pouring device, pressure roller, tapper and rotating circular tillers is considered. All components and main chase are designed for distribute forces to whole structure. All components made of st-40 steel. Considered machine is hanging type machine. It can be easily mounted to tractor via three-bar connection. That concept mchine does not need extra ennergy for performing its functions properly. Considered machine can be use in any kind of field areas, opposite to regular cultivators in market, include fields having rocks inside. It has special mechanism on circular tiller column's chase connection points therefore each column can be move left-right freely when touch rocks in soil without crash other one during cultivation process. That speciality protect circular tillers from damage and also prevent cultivation speed stability in operation. Many operation ability in one machine gave %38 fuel save, %40 man-power save and % 42 time saving. Also low carbon release rate soil protective design and it contributes significantly to the efforts to protect the natural balance and reduce the carbon footprint achieved. Concept machine prototype was designed and constructed in harran university technopark settlement. All experiments and demonstrations performed with local villagers. This machine can be candidate to be fully automated self-running machine with advanced modifications. Villagers ideas and advices showed that that concept machine can be used for different plant production operations with high efficiency. More advanced version of that concept machine will be export to other countries and provides economic contribution.

Key Words: Cultivator, Multi-Tool Cultivator, Circular Tillager Disc, Concept Agricultural Machinery, Combine Cultivator.

TRAJECTORY TRACKING AND AVOIDING OBSTACLES OF DIFFERENTIAL DRIVE MOBILE ROBOT USING NMPC-PSO

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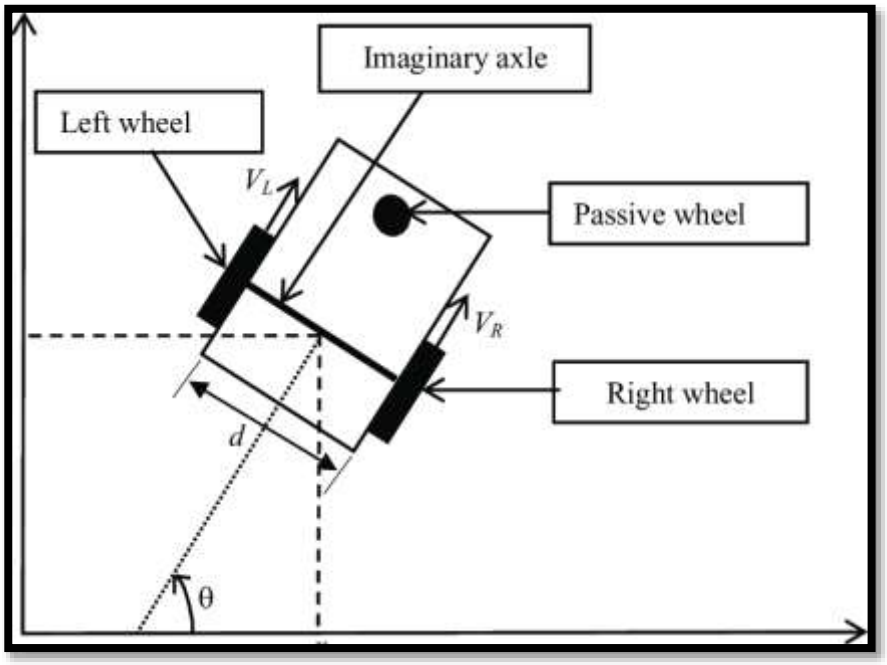
ABSTRACT
This work proposes a non-linear predictive controller for a differential drive mobile trajectory tracking problem. The particle swarm optimization is utilized to compute the solution of the nonlinear predictive controller for a mobile robot to track the trajectory and avoid dynamic and fixed obstacles. The suggested controller used in this study is able to control the velocity of each wheel of the differential drive to redraw the reference trajectory. The efficiency of the controller in avoiding both dynamic and static obstacles is validated through the use of some simulation scenarios.

Keywords: Mobile Robot, NMPC, PSO, Obstacle avoidance.

INTRODUCTION
Mobile robots are a rapidly expanding field of study and use that includes a broad range of autonomous or semi-autonomous machines that can move in different scenarios. These autonomous or human-supervised robots use input from the senses and preprogrammed instructions to navigate around their environment and make decisions. From small, wheeled robots ideal for inside spaces to larger, complex systems designed for outside exploration, industrial tasks, tracking, or surveillance, they vary in terms of size, design, and usefulness. Since the environment in mobile robots is dynamic and unpredictable in advance, it is necessary to calculate the reference path for the next phase in real-time and follow specific limits (Merabti, H,2014), The kinematic model describes how the robot's position and orientation change over time in response to steering commands and velocity to track a reference path. Most of the control inputs are generated by combining the feedback control rule with feedback inputs that are calculated using the reference trajectory (Klančar, G, 2017). The mobile robot needs a locomotion system to enable it to travel along the path and navigate its surroundings. The research indicates that the two-wheeled chassis with a rotating caster is the best architecture since it allows for straightforward implementation, statically stable operation, good durability, and a high load capacity (Md Ghazaly, 2017).
The format of this document is as follows: In section two, we describe the general formulation of model predictive control; in section three, we show the PSO demonstration; in section four, we introduce the problem formulation of wheeled mobile robot tracking trajectory; and in section five, we present the experimental results for a two-wheel robot to avoid obstacle dynamics and statics.

KINEMATICAL MODEL OF MOBILE ROBOT:

The two wheels of a two-wheel differential robot are operated separately and revolve around the same axis(Figure1). The study of mechanical system motion without taking into account the forces influencing the motion is known as kinematic modeling. The following formula is able to be used to determine the linear and angular velocities of the driving wheels inside the robot frame:



$$\dot{x}(t) = \frac{(V_R(t)+V_L(t))}{2} * cos\theta(t) \quad (1)$$

$$\dot{y}(t) = \frac{(V_R(t)+V_L(t))}{2} * sin\theta(t) \quad (2)$$

$$\dot{\theta}(t) = \frac{(V_R(t)-V_L(t))}{d}) \quad (3)$$

Non-linear predictive control :

determining the V_{Right} and V_{Left} control rule that allows the robot wheels to follow a reference trajectory using the coordinates $X_{referecne}$ and $Y_{referecne}$. Evaluate the NLMPC system that was outlined by :

$$x(k+1) = f(x(k),u(k)) \quad 4$$

Where:

The state is $x(k)$, The signal of control is $u(k)$, and f is a continuous mapping. The command signal $u(k)$ is such that:

$$u(k) \in (U) \subset R_m \quad 5$$

U is a compact convex set with $O \in (U)$ and $f(0,0) = 0$. The state may be constrained to stay:

$$x(k) \in X \quad 6$$

$$U = [u(k)u(k+1)....u(k+N-1)] \in UN \quad 7$$

Additionally, at sampling instant k, only $u(k)$ is applied.

The particle swarm optimization:

The PSO method is enhanced to effectively carry out the search process by a swarm of particles that update their relative positions from one iteration to the next. Every particle seeks to reach the global best position (g_best) ***in the swarm and its previous personal best position*** (P_best) ***to obtain the best possible solution (Zhang, Y., 2014). Presuming that there is a minimization issue, one has:***

$$P_{best}^{t} = x_i^* | f(x_i^*) = \underbrace{min}_{K=1,2,3\ldots,t} (\{f(x_i^K)\}) \quad \textbf{8}$$

Where $i \in \{1,2,\ldots\ldots,N)$ and

$$g_{best}^{t} = x_*^i | f(x_*^i) = \underbrace{min}_{\substack{i=1,2,3\ldots N \\ K=1,2,3\ldots,t}} (\{f(x_i^K)\}) \quad \textbf{9}$$

In this case, i stands for the particle index, t for the number of the current iteration, f for the objective function that has to be minimized or optimized, x for the position vector (or possible solution), and N for the total number of particles in the swarm. The following formulas update each particle I's position x and velocity v at each current iteration $(t + 1)$ as follows:

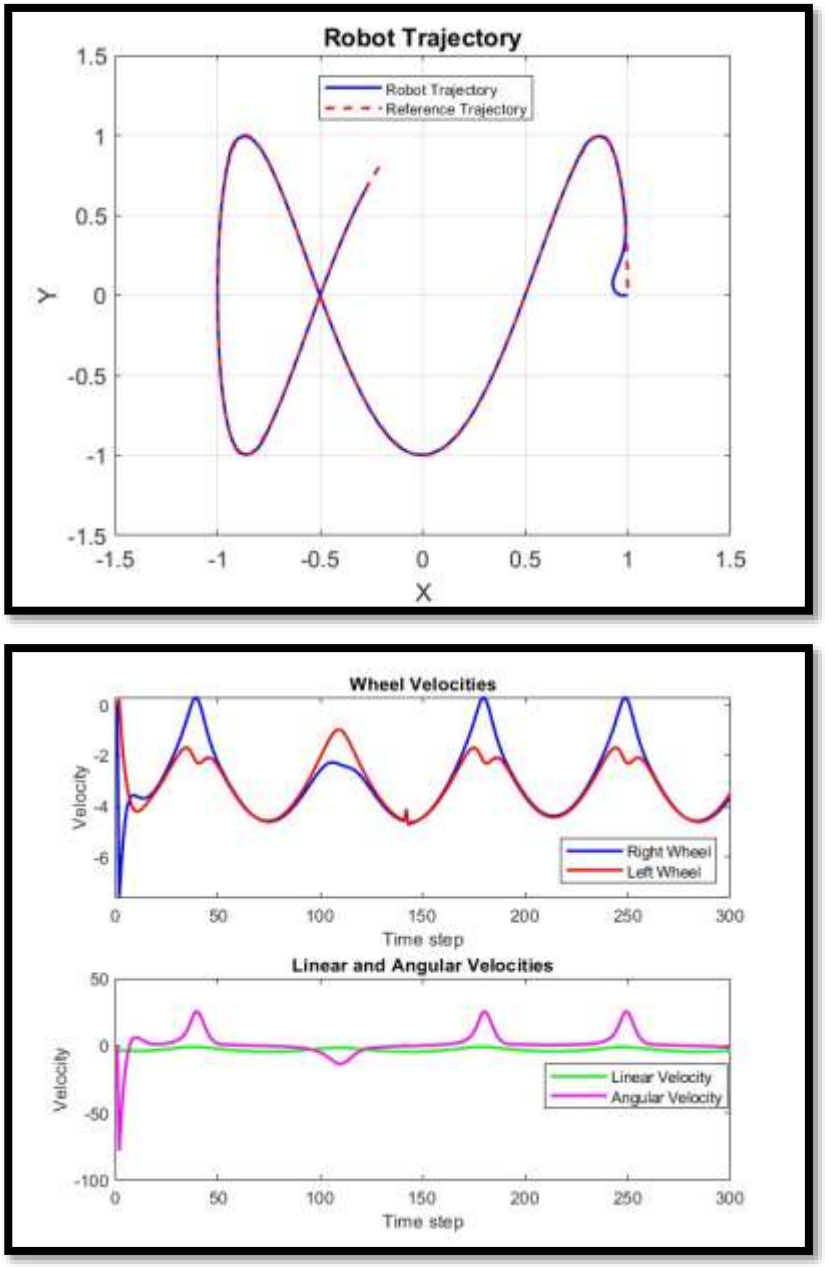
$$v_i^{t+1} = \omega v_i^t + c_1 r_1 (P_{best}^t - x_i^t) + c_2 r_2 (g_{best}^t - x_i^t) \quad \textbf{10}$$

$$x_i^{t+1} = x_i^t + v_i^{t+1} \quad \textbf{11}$$

where V is the vector of velocity, $\omega$is the inertia weight that is used to balance the exploration and local exploitation, $r1$ and $r2$ are random vectors uniformly distributed within the range [0, 1] D (where D is the dimension of the search space or the size of the problem at hand), and $c1$ and $c2$, also known as the "acceleration coefcients," are positive constants.
And this is pseudo code of PSO:

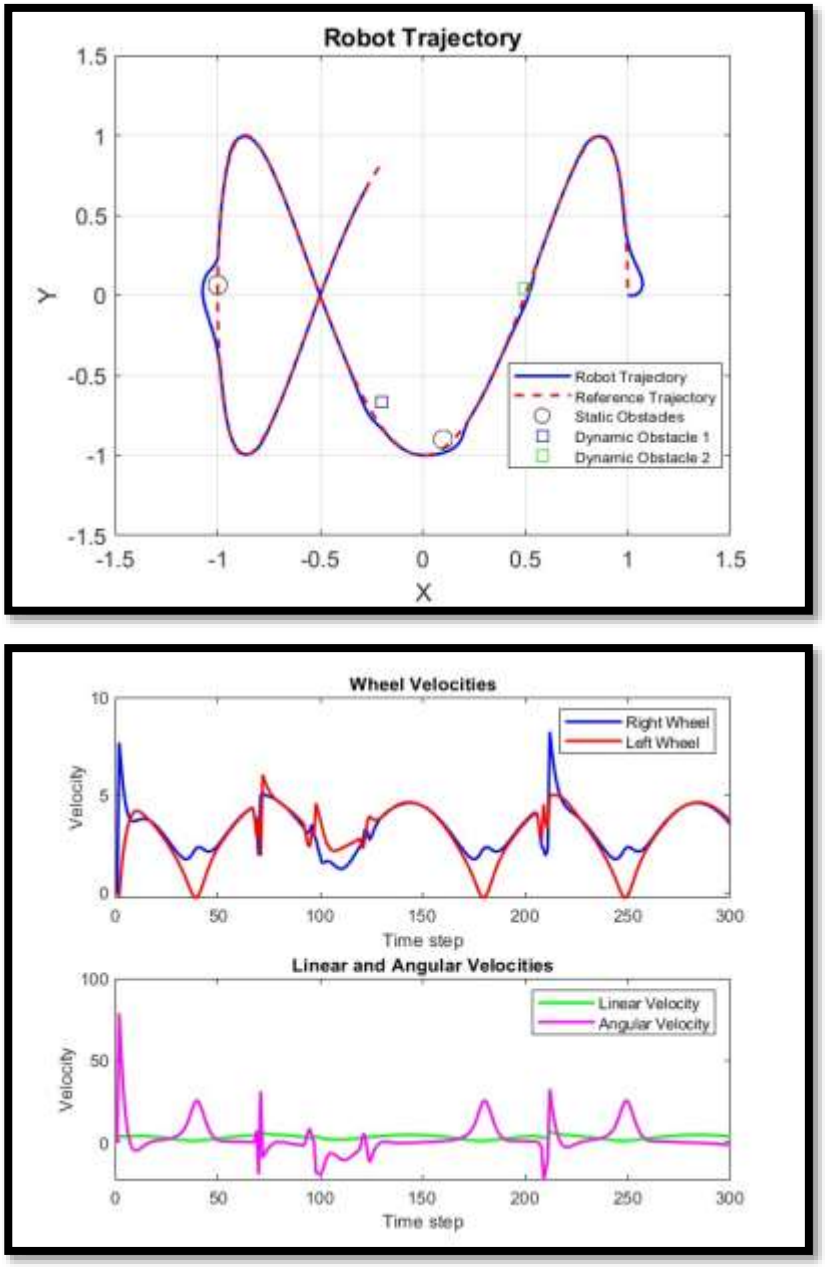
Simulation :

This section will cover our study system's outcomes using the MATLAB 2022b interface. In order to obtain the desired trajectory, the differential drive moves dependent on wheel velocity starting at t = 0, point X0= 1 , Y0. The figure displays the reference trajectory and velocity of eatch wheel To compare the outcomes of MATLAB simulations, we use the same device and settings.



It is evident that the robot tracks and draws the same reference course. The same figure shows the robot's speed on its left and right wheels.

To get the best results and optimize the efficacy of the nlmp-pso technique, two static and dynamic obstacle models are used in simulation. The robot motion scene is examined as follows: numbre of prediction Np = 5; r1 = r2 = 1 and c1=c2=1



The test results, as shown in figure 4, show how the differential wheel tracks the intended course and avoids obstacles using NLPC-PSO, confirming the efficacy of this technique.

Discuss:

First sceanrio : Using NL-MPC optimized with PSO, we will optimize the velocity profiles of the left and right wheels as we simulate the robot's motion to follow a predetermined route .

Result :

1. The robot follows the intended path with success.
2. In order to produce smooth mobility while following the trajectory, the velocity profiles of the left and right wheels have been tuned.

Second sceanario : The NL-MPC controller will also be used in this situation, and obstacles will be included, both static and dynamic. The robot's motion will be optimized by the controller taking into account both static and dynamic impediments.

Result :

1. Tthe robot effectively tracks the desired trajectory while avoiding dynamic and static obstacles.

2. The velocity profiles of the right and left wheels are adjusted dynamically to navigate around obstacles while maintaining trajectory tracking.

CONCLUSION:

The robot can successfully navigate around both static and dynamic obstacles because of the NL-MPC controller's addition of avoidance techniques. NL-MPC and PSO together provide a powerful motion control approach with accurate trajectory tracking, obstacle avoidance, and efficient optimization. This method shows promise in applications like as robots, autonomous vehicles, and other dynamic systems where accurate motion control is essential.

REFERENCES

Merabti, H., Bouchemal, B., Belarbi, K., Boucherma, D., & Amouri, A. (2014, October). Non linear predictive control of a LEGO mobile robot. In *AIP Conference Proceedings* (Vol. 1618, No. 1, pp. 647-650). American Institute of Physics.

Klančar, G., & Škrjanc, I. (2007). Tracking-error model-based predictive control for mobile robots in real time. *Robotics and autonomous systems*, *55*(6), 460-469.Camgöz, B., Saç, M.M., Bolca, M., Özen, F., Oruç, Ö.E. & Demirel, N. (2010). Investigation of radioactive and chemical contents of thermal waters; İzmir, Seferihisar region representative. Ekoloji, 19(76), 78-87.

Md Ghazaly, Mariam & Yew, Soo & Abdullah, Zulkeflee & Amran, Mohd & Md Ali, Mohd Amran & Chong, Shin-Horng & Che Amran, Aliza. (2017). Trajectory Tracking of a Mobile Robot System. Journal of Mechanical Engineering. 1. 207-226. Gezer, M.M. (2012). Socio-economic and culturel structures in Sivas. Afyon Kocatepe University, Institute of Social Sciences, Department of History, Master Thesis, p. 210.

Zhang, Y., Balochian, S., Agarwal, P., Bhatnagar, V., & Housheya, O. J. (2014). Artificial intelligence and its applications. *Mathematical problems in Engineering*, *2014*.

PHYSICO-CHEMICAL CHARACTERIZATION OF SNAIL SHELL POWDER OBTAINED FROM MECHANOCHEMICAL PROCESSING AND HEAT TREATMENT

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ABSTRACT
Natural particles are the most abundant resources exist in nature. Bio-sources of $CaCO_3$ particles have attracted the attention of researchers for multiple cosmetics, industrial, and medical applications. This work investigates the structural evolution of $CaCO_3$ containing in snail shell particles prepared by a mechanochemical process using methods of characterization as well as Differential scanning calorimeter (DSC), Thermogravimetric analysis (TGA), X-ray diffraction (X-RD), Fourier transformation infra-red (FT-IR), and Scanning microscopy equipped with Energy-dispersive X-Ray spectroscopy (SEM-EDXS). The result obtained from the above analysis indicates that SSP calcined between 200°C to 400°C undergoes an elimination of water molecules, followed by a phase transformation from Aragonite to $CaCO_3$ Calcite. At 800°C, the SSP decomposes $CaCO_3$, giving rise to calcium oxide crystals CaO, which release CO_2 molecules. These eliminations and transformations represent a loss of 47.08% of the initial mass at 800°C. The morphological analysis shows the surface of SSP calcined at 800°C with $CaO/CaCO_3$ crystal formation. Also, the mechanochemical process leads to obtaining an SSP with a size between 3.311 µm to 10.140 µm. Snail shells can be a natural source of $CaCO_3$ and CaO, thanks to their ease of extraction and processing.

Keywords: *Composites, Snail shell; Thermal treatment; DSC; XRD; FT-IR.*

References
[1]: M. Karaoui, R. Hsissou, M. Alami, and M. Assouag, “Thermal, flow, and mechanical properties of composites based on polystyrene (PS) and snail shell powder (SSP) biofiller (PS/SSP),” Iranian Polymer Journal (English Edition), vol. 32, no. 4, pp. 1-11, 2023.
[2]: A. Shafiu Kamba, M. Ismail, T. A. Tengku Ibrahim, and Z. A. B. Zakaria, “Synthesis and characterisation of calcium carbonate aragonite nanocrystals from cockle shell powder (Anadara granosa),” Journal of Nanomaterials, vol. 2013, no. 8, p. 5, 2013.
[3]: S. Parveen, A. Chakraborty, D. K. Chanda, S. Pramanik, A. Barik, and G. Aditya, “Microstructure analysis and chemical and mechanical characterization of the shells of three freshwater snails,” ACS Omega, vol. 5, no. 40, pp. 25757-25771, 2020.

ROLE OF DIGITAL PLATFORMS IN FARMER EDUCATION AND EXTENSION SERVICES

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Abstract
The advent of digital platforms has revolutionized farmer education and extension services, offering unprecedented opportunities for knowledge dissemination, real-time support, and community building. This paper explores the transformative impact of digital platforms in enhancing agricultural productivity and sustainability through improved access to information and resources. By leveraging mobile applications, online courses, and social media networks, farmers can now obtain up-to-date agronomic advice, market information, and weather forecasts. The integration of artificial intelligence (AI) and machine learning (ML) into digital platforms further personalizes learning experiences by providing tailored recommendations based on individual farm conditions, crop cycles, and practices. Such innovations help farmers optimize resource use, mitigate risks, and enhance yields. Case studies from various regions illustrate the effectiveness of digital platforms in bridging the gap between research institutions and the farming community, promoting best practices and innovative techniques. Despite these advancements, challenges such as digital literacy, internet connectivity, and the digital divide remain significant barriers. digital platforms play a pivotal role in modernizing farmer education and extension services, offering innovative solutions to long-standing challenges in the agricultural sector. By enhancing access to information, fostering collaboration, and providing personalized support, these platforms contribute to more resilient and sustainable farming systems. The findings underscore the pivotal role of digital platforms in modernizing agricultural extension services, ultimately contributing to food security, climate resilience and rural development.

Keywords: Digital Platforms, Farmers Education, Extension Services and Digital Literacy

ANALYZE THE IMPACT OF BMI, CARBOHYDRATES, AND FAT ON COPD PATIENTS

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a hazardous lung disorder that interferes with normal breathing and is more than just a "smoker's cough". In the setting of severe COPD, cachectic people frequently have extensive weight and muscular loss. Body mass index (BMI) has been used as a survival predictor and a metric to monitor dietary status.

Aim: This study evaluates the association between body mass index (BMI), dietary fat and carbohydrate consumption, and adult COPD incidence and severity.

Methodology: In a cross-sectional study, 100 people with chronic obstructive pulmonary disease (COPD) filled out questionnaires. Factors such as age, gender, height, weight, dietary habits (particularly carbohydrate and fat consumption), and COPD severity were examined. Researchers employed a previously validated 24 hour dietary recall and food frequency questionnaire to gauge food consumption. A statistical analysis was conducted to investigate the correlation between the severity of COPD, BMI, and dietary intake of carbohydrates and fat.

Results: The findings indicated that the patients with COPD who had a normal BMI or slightly over weight had a greater prognosis as compared to under weight or low BMI. COPD patients on a high-fat, low-carb diet had superior respiratory efficiency and lower CO2 levels. However, eating a lot of carbs was linked to respiratory issues**.**

Conclusion: COPD requires a healthy BMI and balanced diet with low carbohydrate and good amount of fat consumption. Low and very high BMI are indeed major risk factors for COPD patients, where a low BMI increases the nutritional requirements by burning higher energy, thus propelling them into a malnourished status, while obesity places added stress on the breathing muscles. It's thus recommended that COPD patients should maintain a healthy BMI. A low carbohydrate intake, especially from complex carbohydrates that are rich in fiber, is also recommended as they act as antioxidants, protect the lungs from inflammation, and enhance immunity through the gut-lung- axis by producing SCFAs in the colon. Fat is also an energy-yielding nutrient, high in calories and rich in vitamins A, E, and D, which also give anti-inflammatory benefits and makes breathing easier by reduced production of CO2. COPD nutritional therapy encourages maintaining a healthy weight and following a balanced diet to enhance lung function and reduce COPD symptoms.

Keywords: Body mass index; Chronic obstructive pulmonary disease; , Carbohydrates; Nutrition; Short chain fatty acids

FLUID DYNAMICS IN BENIGN PROSTATIC HYPERPLASIA

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Benign prostatic hyperplasia (BPH) is a common condition characterized by the non-cancerous enlargement of the prostate gland, which can lead to significant lower urinary tract symptoms (LUTS) in men, particularly those over the age of 50. One of the primary consequences of BPH is the obstruction of urinary flow due to the prostate's enlargement and its compression on the urethra. This compression increases resistance to urine flow, often leading to decreased flow rates, incomplete bladder emptying, and urinary retention.

Fluid dynamics in BPH is heavily influenced by the changes in the urethral geometry and bladder function. As the prostate grows, the urethral lumen narrows, creating higher pressure during urination and requiring the bladder to work harder to expel urine. This increased pressure can result in hypertrophy of the detrusor muscle, which over time may lead to bladder dysfunction. Urodynamic studies reveal that men with BPH typically experience reduced peak urinary flow rates and increased post-void residual volume, both of which are markers of bladder outlet obstruction (BOO).

In understanding the fluid flow in BPH, it is critical to consider the complex interactions between the mechanical obstruction caused by the enlarged prostate and the compensatory mechanisms of the bladder. As the disease progresses, fluid dynamics shift from a compensated state, where urinary flow is maintained despite higher pressures, to a decompensated state, where the bladder's ability to overcome resistance is diminished. Treatment options, including medication (e.g., alpha-blockers and 5-alpha reductase inhibitors) and surgery (e.g., transurethral resection of the prostate), aim to improve urinary flow by either reducing prostatic resistance or restoring bladder function.

Urodynamic assessments are essential for evaluating the severity of obstruction and determining the best course of treatment. Understanding the principles of fluid flow in BPH is crucial for managing this condition effectively and improving patients' quality of life.

Keywords: Benign prostatic hyperplasia (BPH), Fluid dynamics, Bladder outlet obstruction (BOO), Lower urinary tract symptoms (LUTS), Urodynamics

IMPACT OF COVID-19 ON PSYCHOLOGICAL WELL-Beıng and LZARNING DISRUPTION IN UNDERGRADUATE STUDENTS

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ABSTRACT

As we step into the complexities of our modern world, we find humanity grappling with a variety of conflicts, with one of the most pressing being the challenges within educational systems. These systems often fluctuate depending on the psychological states of both teachers and learners, highlighting the fragility of education in times of crisis. The COVID-19 pandemic, in particular, exacerbated these challenges, leading to widespread psychological issues among university students. The abrupt shift to remote learning due to lockdowns and quarantines caused significant disruptions in education, with some groups being more severely impacted than others.

University students from economically disadvantaged backgrounds faced immense difficulties during this period. Lacking access to modern technology and reliable internet connections, they were often unable to participate fully in online classes, further widening the educational gap between rich and poor. This technological divide left many students feeling isolated, frustrated, and anxious, as they struggled to keep up with their coursework while battling the stresses of the pandemic. The lack of interaction with peers and instructors contributed to a sense of disconnection and academic disillusionment, leading to what can be described as "psychological delinquency."

This term refers to the heightened emotional and mental distress that stems from prolonged feelings of helplessness, frustration, and disengagement. For students who were already vulnerable due to their socioeconomic status, the pandemic compounded these issues, leaving long-lasting psychological scars. The consequences of this period are likely to have far-reaching and unexpected dimensions, potentially affecting these students' academic performance, career prospects, and overall mental well-being for years to come. Addressing these psychological impacts is crucial to ensuring a more equitable and resilient educational future.

Keywords: Coronavirus; Psychological statistics; Psychological deviation

DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD FOR CELECOXIB DEGRADATION PRODUCTS

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ABSTRACT
Celecoxib—a cyclooxygenase-2 (COX-2) inhibitor—has been used to treat and prevent breast cancer in addition to osteoarthritis and rheumatism. The British Pharmacopoeia (BP), American Pharmacopoeia (USP), and European Pharmacopoeia (EP) monographs describe its quality control requirements. These requirements were reached by the analytical methods developed for the identification of impurities, such as positional isomer B and meta-isomer A. Simultaneously separating these is hard.
To overcome this difficulty, a new high-performance liquid chromatography (HPLC) technique utilizing Box-Behnken response surface experimental design was developed. Using Minitab software, the ideal parameters were found by a series of studies varying temperature, flow rate, and mobile phase composition and using Chiralpak AD column as stationary phase. The established method was rigorously validated in accordance with the International Council for Harmonization's (ICH) guidelines. A thorough analysis of celecoxib's characteristics and impurities was conducted during development to guarantee the validity and resilience of the approach. A thorough examination evaluated accuracy, precision, linearity, and specificity. The technique demonstrated a short retention time and a simple mobile phase composition, suggesting that it is appropriate for regular and extremely precise quantification of celecoxib. All things considered, this work offers a strong analytical technique that satisfies regulatory requirements for the measurement of celecoxib, hence promoting its application in medicinal and therapeutic contexts.

Keywords : HPLC; Validation; ICH; Isomers; Box Benken

NOVEL INTEGRATION OF SHAP ITH TIME SERIES MODELS FOR ACCURATE AND TRANSPARENT ET FORECASTING IN CLIMATE VULNERABLE REGİON

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ABSTRACT

The Yellow River Basin Henan Region (YRB-HR) is a particularly susceptible area to climatic unpredictability, making evapotranspiration (ET) crucial for agricultural practices and water management in the area. Due to their "black box" character and inability to comprehend their results, traditional ET forecasting models are unable to reflect the intricate interplay of climatic variables. Improving the accuracy and transparency of ET forecasting, this work presents a new strategy that combines advanced time series models (ETS, TBATS, Prophet, and ARIMAX) with Explainable AI (XAI) techniques, particularly SHapley Additive Explanations (SHAP). Key climate factors such as temperature, precipitation, wind speed, and solar radiation can be better understood by looking at SHAP values. The findings indicate that the ETS and Prophet models demonstrate superior prediction accuracy compared to other models. The ETS model recorded the lowest Mean Absolute Error (MAE) values of 0.60 for precipitation, 0.51 for wind speed, and 0.48 for solar radiation. The Prophet model demonstrated strong performance, achieving the lowest Root Mean Squared Error (RMSE) values of 0.62 for solar radiation, 0.67 for wind speed, and 0.74 for precipitation. SHAP analysis indicates that temperature exerts the greatest influence on ET predictions, with SHAP values spanning from -1.5 to 1.0. Wind speed follows, ranging from -0.75 to 0.75, and solar radiation follows, with values between -0.5 and 0.5. The novelty of this research is that it integrates XAI with time series models to improve both prediction accuracy and understanding ease. This is important for managing water resources effectively in the YRB-HR. Future research should integrate additional climate variables and enhance XAI techniques to improve sustainable water management strategies.

Keywords: Evapotranspiration, Machine Learning, Climate Change, Explainable AI, Meteorological variables, interpretability.

DYNAMIC SPECTRUM AND POWER ALLOCATION FRAMEWORK (DySPAF) FOR FULL DUPLEX BACKHAUL 5G NETWORKS

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ABSTRACT
The introduction of 5G networks creates new demands for extraordinary low latency, exceptional throughput, and significant connectivity. With the rise of full-duplex communication as a major contributor to the improvement of spectral efficiency in backhaul networks, the task of dynamic resource allocation grows more difficult. By addressing these challenges, this research develops a Multi-Agent Reinforcement Learning (MARL) framework to optimize resource allocation in 5G full-duplex backhaul networks. Our technique, based on Deep Reinforcement Learning (DRL) algorithms, dynamically allocates resources for bandwidth, power, and interference control in real time across several base stations and users.

The concept of the MARL framework introduces agents that can learn from network conditions while also adapting their resource allocation processes, leading to major improvements in essential performance metrics. Thorough simulations prove that the MARL-based method improves throughput by 35%, decreases latency by 25%, and provides a 20% boost to energy efficiency in comparison to conventional static allocation techniques. Moreover, the framework assures that resources are distributed more fairly, tackling fairness challenges in environments that are lower on resources.

The results of our study bring attention to the abilities of MARL in effectively contending with the challenging trade-offs in full-duplex backhaul 5G networks, delivering a powerful solution designed to handle the dynamic, densely populated environments of future wireless systems. This study leads the way for additional investigations into scalable real-world deployments of MARL for future networks, including potential applications that reach further than 5G into 6G and beyond.

Keywords: 5G networks, Full-duplex, MARL, Deep Reinforcement Learning, Resource allocation, Backhaul networks, Throughput, Latency, Energy efficiency.

GREEN SYNTHESIS OF 1,4-DISUBSTITUTED 1,2,3-TRIAZOLES VIA BIOMASS-WASTE IMMOBILIZED COPPER CATALYST IN A CUAAC REACTION

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ABSTRACT

The 1,2,3-triazoles represent an important class of heterocyclic compounds and they find extensive applications in pharmaceutical, biological chemistry, and drug delivery research. The copper(I) catalyzed [3+2] cycloaddition (CuAAC) reaction between a terminal alkyne and organic azide, commonly known as the “click reaction”, provides easy access to the regioselective synthesis of 1,4-disubstituted-1,2,3-triazole compounds. However, the major limitation of the CuAAC protocol is their performance under homogenous fashion, thus leading to separation problems of catalyst/product(s), together with the requirement of adding reducing agents and stabilizing ligands to the copper(I) catalyst. Therefore, the development of stable, cheaper, and sustainable heterogeneous copper catalysts with improved catalytic activity in absence of any oxidizing/reducing agents is highly desirable.

For this reason, we report on an efficient greener catalytic system based on using copper(II) immobilized on a waste solid biomass for CuAAC reaction. This solid biomass waste was used in this case as both a support and a reducing agent for copper(II). This heterogeneous catalyst is highly active in the regioselective synthesis of 1,4-disubstituted-1,2,3-triazoles by clicking a variety of azides and alkynes with good to excellent yields (78-89%) at room temperature and in water as green solvent. Moreover, this heterogeneous catalyst was easily recovered and reused without significant decrease in its activity or selectivity.

Keywords: Click chemistry, Azides, Alkynes, Copper (I), solid, Triazole, Recycling, Water.

THE IMPACT OF BOARD EXTERNAL NETWORKING ON FIRM PERFORMANCE: EVIDENCE FROM TAIWAN

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ABSTRACT

This study aims to investigate the impact of social media communication methods on the performance of companies in Taiwan by selecting a sample of companies in the FTSE TWSE Taiwan 50 Index (Taiwan 50) in 2022. The study analyzes the impact of directors' and key managers' social networking on company performance. By referring to the regression models of Kramarz and Thesmar (2013) and Fracassi and Tate (2012), the study explores the relationship between social networking and firm performance. The results show that social networking usage among board members and key managers has a negative impact on firm performance, as evidenced by significant negative correlations in net income (NI), return on equity (ROE), and return on assets (ROA). On the other hand, the debt-to-equity ratio has a negative impact on firm performance, with the exception of key managers who show no significant correlation on NI, and all others show a significant negative correlation. These results suggest that firms should be cautious in communication of social networking among board members to enhance firm performance.

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THE POLITENESS STRATEGY AND MECHANISM OF POWER RELATION IN ONLINE CLASSROOM

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ABSTRACT

Power relations in academic settings between students and lecturers can be reflected through various forms of politeness strategies and character. The aims of this study are investigating the types of politeness strategy, the mechanism power relation in a formal environmental setting and character education of the online classroom at Putera University Batam, Indonesia. The primary data are the conversation between students and lecturer taken randomly in 3 online classes and the secondary data are the results of interviewing 10 students. This research is a qualitative study using Brown's and Levinson's theory of politeness. The finding from primary data includes the mechanism of power inside online classroom runs through on record and bald on record negative politeness. Therefore, the novelty of this study is the negative politeness being the language of power inside formal environmental setting enforced by a higher social status. The mechanism of power relation in this case shows that the negative politeness from the lecturer reflects the natures of power such as dominance and the capability to exert control over the students are exercised by negative politeness. In contrast, positive politeness shows no capacity to deliver power and dominance since the mechanism of power always pushes the lecturer to shift politeness strategy from positive to negative when he or she needs to control students' behavior and actions in the classes. Moreover, secondary data also show students' agreement to use negative politeness when they have to interact with other students inside the classroom. However, since their social statuses are on equal position, there is no mechanism of power occurs. The finding also shows that the students show the relationship of politeness with character education in the interview that includes cooperation, tolerance, integrity, and religiosity.

Keywords: On Record Negative Politeness, Bald on Record Negative Politeness, Power Relations, Character Education, Online Classrooms.

THE INFLUENCES OF MULTI-WALLED CARBON NANO TUBES (MWCNT) ON THE IMPROVEMENT OF THE HYBRID KEVLAR/BASALT FIBER REINFORCED EPOXY BASED COMPOSITES' TENSILE PROPERTIES

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ABSTRACT
The objectives of this study are to achieve improvement in the tensile properties of the polymer composite by including different MWCNT content ratios 0.1 wt.%, 0.25 wt.% and 0.5 wt. % MWCNT contents were used in production additives within the polymer matrix. This study used the sequence stacking of hybrid fiber from Kevlar and basalt fiber the sequence was (K5B10K5) and experimented with tensile polymer composites. The SEM micrographs showed a good indication of particle dispersion within the polymer matrix. The tensile values were changed and improved after the inclusion of nanoparticles. The addition of MWCNT nanoparticles in a hybrid composite significantly improved the tensile properties that addition of MWCNT particles at the small contents (0.25 wt. %) slightly increases tensile strength and modulus by 17 % and 20 % respectively. However, excessive MWCNT loading created a reverse effect on the tensile strength and modulus with a decreasing trend, and this was attributed to the poor load transferring from particles to the matrix as a result of agglomeration effects.

KEYWORDS: Tensile strength, Basalt fiber, Kevlar fiber, MWCNT nanoparticles.

EFFECT OF GRAPHENE NANOPLATES (GNPS) ON THE ENHANCEMENT OF TENSILE PROPERTIES OF THE HYBRID KEVLER/CARBON FIBER REINFORCED EPOXY BASED COMPOSITES

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ABSTRACT
The objectives of this study are to achieve improvement in the tensile properties of the polymer composite by including different GnPs content ratios 1wt. %, 2wt.% and 3wt. % GnPs contents were used in production additives within the polymer matrix. This study used the sequence stacking of hybrid fiber from Kevlar and carbon fiber the sequence was (K5C10K5) and experimented with tensile polymer composites.
The SEM micrographs showed a good indication of particle dispersion within the polymer matrix. The tensile values were changed and improved after the inclusion of nanoparticles. The addition of GnPs nanoparticles in a hybrid composite significantly improved the tensile properties that addition of GnPs particles at the small contents (1 wt. %) slightly increased the tensile strength and modulus by 4.6 % and 4.7 % respectively. excessive GnPs loading created a reverse effect on the tensile strength and modulus with a decreasing trend, and this was attributed to the poor load transferring from particles to the matrix as a result of agglomeration effects.

KEYWORDS: Tensile strength, Carbon fiber, Kevlar fiber, GnPs nanoparticles.

CASH WAQF LINKED SUKUK IN THE DEVELOPMENT OF RENEWABLE ENERGY IN NUSA TENGGARA TIMUR: CHALLENGES AND POTENTIAL

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Abstract:
Purpose. This study aims to explore the potential application of Cash Waqf Linked Sukuk (CWLS) as an innovative financing instrument to support the development of renewable energy in Nusa Tenggara Timur (NTT). It seeks to identify how CWLS can provide sustainable and stable funding for renewable energy projects, contributing to both the local economy and green growth in the region.
Design, Methodology, and Approach. The research employs a qualitative approach through a case study analysis. Data collection includes a thorough review of literature, policy documents, and in-depth interviews with relevant stakeholders. The study integrates Islamic green finance principles through CWLS, demonstrating how this instrument can serve as a sustainable funding source for renewable energy projects, particularly solar power plants in NTT.
Findings. The study reveals that CWLS not only addresses financial barriers in developing renewable energy in NTT but also presents long-term prospects for inclusive and sustainable green infrastructure development. CWLS empowers local communities by facilitating participation in social investment, thereby fostering green economic growth in the region.

Research Limitations/Implications. This research is limited by its focus on a specific region (NTT) and a single financing instrument (CWLS). Further studies are recommended to examine the broader applicability of CWLS across different contexts and for various types of renewable energy projects.

Practical Implications
The study offers valuable insights into the practical application of CWLS as a financing mechanism for renewable energy projects in underserved regions like NTT. The findings can guide policymakers, financial institutions, and investors in leveraging CWLS to achieve sustainable development goals.

Originality/Value.
This research contributes to the existing literature by providing a novel analysis of CWLS as a financing instrument for renewable energy projects in a specific region. It introduces a new framework for integrating Islamic finance with green energy initiatives, highlighting CWLS's potential to support sustainable development in regions with limited access to conventional funding sources.

Keywords: Renewable energy, Cash Waqf Linked Sukuk, Islamic finance, Nusa Tenggara Timur, green finance.

EVALUATION OF MAXIMUM MOLAR BITE STRENGTH AND MUSCLE THICKNESS IN ATHLETES PRACTITIONING INDIVIDUAL AND TEAM PHYSICAL ACTIVITY

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ABSTRACT

Regular physical activity is crucial to maintaining good health, but for athletes, the focus is on maximizing performance, which can result in additional challenges such as extreme stress and risk of injury. Sports dentistry plays an essential role in the prevention and treatment of dental and oral problems that can affect athletic performance. This study aimed to evaluate maximum molar bite force and masseter and temporalis muscle thickness in athletes from different sports and compare these data with a control group of healthy young individuals. The observational study included 30 participants (24 athletes and 6 controls) aged between 15 and 40 years. A digital dynamometer was used to measure bite force and ultrasonography was used to assess masseter and temporalis muscle thickness. The group of athletes was subdivided into bodybuilding, Jiu-Jitsu, swimming, and CrossFit. Statistical analysis was performed using ANOVA. The results showed that the maximum molar bite force was significantly higher among bodybuilders, followed by Jiu-Jitsu fighters, swimmers, and CrossFit practitioners. The thickness of the masseter muscles was greater than that of the temporal muscles in all groups, with swimmers presenting the lowest thickness of the masseter muscles and CrossFit practitioners having the lowest values for the temporal muscles. Based on the data obtained, we can conclude that intense and specific training of each sport modality influences the bite force and mandibular muscle thickness. Bodybuilders demonstrated

greater bite force, while swimmers and CrossFit practitioners showed specific variations in muscle thickness. These results highlight the importance of integrating sports dentistry into training programs to improve the performance and health of athletes.

Keywords: High performance athletes; Bite Force; Ultrasound; Stomatognathic System, Masticatory Muscles.

ASSESS THE NUTRITIONAL DEFICIENCIES OF WOMEN WITH CELIAC DISEASE

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Abstract
Celiac disease is a chronic autoimmune disorder with a global prevalence of approximately 1%. It is characterized by various symptoms, including abdominal pain, anemia, weight loss, persistent diarrhea or constipation, nausea, and vomiting. The disease is triggered by the ingestion of gluten, which leads to damage in the small intestine. This damage can lead to severe health issues, including malnutrition, if gluten is not strictly eliminated from daily diet. Gluten is a group of proteins found in wheat and related grains such as barley, rye. This condition is more prevalent in females than males. The objective of this study was to evaluate the common nutrient deficiencies found in women, particularly during their reproductive years (ages 18 to 38). This study involved 138 women diagnosed with celiac disease in Delhi NCR. The results indicated that the most common nutrient deficiencies were iron (leading to anemia), calcium, and vitamin D deficiencies (resulting in bone pain and osteoporosis). The statistical analysis demonstrated significant p-values, highlighting the prevalence of these deficiencies among the participants. The conclusion emphasizes the necessity of proper counseling, guidance, and supplementation to manage these nutrient deficiencies effectively, thereby enhancing the overall health and reproductive performance of women with celiac disease.

Key words: Celiac disease, nutritional deficiencies, reproductive performance, counseling, Supplementation.

SYNERGY BETWEEN SCIENTIFIC AND RURAL TOURISM FOR INNOVATIVE RESEARCH ON CULTURAL HERTAGE

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ABSTRACT

The International Centre for Caucasus Tourism ICCT, founded in 2007, is generally concerned with the development of rural tourism in the enchanting highland regions of Georgia. Initially, we studied the living conditions of the local population aimed at involving them and stakeholders in the rural tourism business. First positive results were followed by the interest of the beneficiaries to draw our attention to the cultural heritage existing in their villages as potential tourist destinations. Adherents of modern sciences showed particular interest in our proposal to join the research with an innovative approach and methodology. The researchers were invited to a 300-year-old house located in the Makhutiant district of Utsera village, Upper Racha region, Western Georgia. As a result of intensive research, the scientists came to the decision to open the museum as an attractive tourist cultural destination.. They organized meetings with the local population, stakeholders and youth to actively participate in collecting exhibits and necessary inventors. It should be noted that in 2014, the Ministry of Culture of Georgia granted the status of cultural heritage to this ancient house. Recently, an unusual place for tourists to rest in a cattle burial ground was opened in the mentioned 300-year-old stone house. Rural tourism experts noted it as having no analogues in Georgia. The product of synergy between scientific and rural tourism was appreciated by the local municipality and the Utsera Resource Centre. ICCT's innovative actions were recognised by UNWTO in 2018 as productive initiatives for rural tourism development and awarded with letters of appreciation. ICCT is in intensive collaboration with academics from various universities who often provide us with valuable advice. Currently, ICCT trainings on rural /agritourism are being incorporated into the Institute of Zoology, Ili State University project: ‘Healthy Soil for Safe Food’, funded by the Rustaveli National Scienific Foundation.

Key words: scientific,rural tourism, innovative , contemporary, cultural heritage

INTEGRATING RECYCLED MARBLE POWDER DUST AS A PARTIAL CEMENT REPLACEMENT IN CONCRETE

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ABSTRACT

The mechanical characteristics of green concrete, which partially replaces cement with waste marble powder (WMP), are the subject of this investigation. We evaluated the concrete's characteristics using both destructive and non-destructive testing procedures. The goal is to lessen the environmental impact of waste marble powder and cut down on the over-depletion of natural resources. We measured the splitting tensile, compressive, and flexural strengths in concrete mixes with varying percentages of WMP substitution (from 0% to 20%). We used the Schmidt Hammer and ultrasonic pulse velocity tests to evaluate the durability properties. Cement manufacturing could safely use concrete containing 10% WMP, according to the results. Adding WMP, however, resulted in a 32.07% decrease in workability as compared to the control mixture, mainly because of its high-water absorption rate. On day 7, there were notable improvements in compressive strength, with increases of up to 25.34 percent for a 10% WMP substitution. However, the compressive strength gradually decreased over time after reaching the 10% replacement level. This reduction points to a 10% WMP substitution level as the sweet spot for efficiency and practicality. Additionally, a correlation analysis between compressive strength measurements obtained by different methods confirmed the reliability of the results obtained by the Universal Testing Machine (UTM).

Keywords: marble powder, cement replacement, workability, strength, Schmidt hammer, ultrasonic velocity.

OPTIMIZING THE MECHANICAL PERFORMANCE OF SUSTAINABLE CONCRETE USING BRICK POWDER AS A PARTIAL SAND REPLACEMENT

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ABSTRACT
The demand for concrete, driven by infrastructure and urbanization, exerts pressure on natural resources and jeopardizes the ecosystem. Integrating recycled materials into concrete can meet this demand without sacrificing quality. This study investigates the mechanical properties of environmentally sustainable concrete incorporating brick powder (BP) as a substitute for sand in fine aggregates. We utilized a combination of destructive and non-destructive testing techniques to assess the characteristics of the concrete. We formulated concrete mixtures by gradually replacing sand with brick powder in proportions ranging from 5% to 25%, and evaluated them for workability, compressive strength, and split tensile strength in comparison to conventional concrete. The results demonstrate that substituting 10% of sand with brick powder enhances strength by 29.94%, diminishes workability by 42.66%, and elevates split tensile strength by 8.74%. Regression analysis validated a robust correlation among compressive strength, ultrasonic pulse velocity (UPV), and rebound number. The incorporation of 10% brick powder improves concrete's mechanical properties and promotes sustainable construction methodologies.

Keywords: Brick powder; workability; strength, Schmidt hammer; ultrasonic velocity.

USING PHOTOGRAMMETRY FOR DIGITAL DOCUMENTATION OF HERITAGE SITES AND OBJECTS IN JORDAN

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Abstract:
The study emphasizes the importance of using photogrammetry as a remote sensing technique for reliable two-dimensional documentation of heritage sites and archaeological objects, because documentation helps us preserve antiquities for the longest possible time, so that we have a database of antiquities in the event of their destruction. Our research data was collected from an archaeological site in the Jordanian desert, including (Al-Harranah) Palace. Images were taken at ideal locations and times to provide realistic colors and an accurate assessment of the building's facade characteristics. Data were processed and composite models were generated using dense image matching techniques. In addition to 3D modeling, orthogonal images of the facades were created. Photographs are to a uniform scale and depict all objects in their flat positions, providing reliable and realistic maps. The results will greatly assist in monitoring and planning preservation activities of historic buildings**.**

Keywords: Photogammetry , Documentation, Close-range, Overlap , Forward overlap, lateral overlap , Agisoft .

IMPACTS OF CLIMATE VARIABILITY ON POMEGRANATE HABITATS IN FES-MEKNES: A GIS AND MAXENT APPROACH

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ABSTRACT
Within the context of Moroccan environmental conditions, this study aims to assess the potential impact of climate change on the spatial distribution of ecological niches for pomegranate, a species resistant to climatic variations and capable of being used as a substitute crop. We employed the Maximum Entropy (MaxEnt) model in conjunction with a Geographic Information System (GIS) to simulate suitable habitats for pomegranate under current and future climate scenarios (horizon 2060). The monthly values of climate data were averaged over two distinct periods (2021-2040 and 2041-2060), representing more than 80% of the optimal conditions for pomegranate cultivation. Currently, under existing climatic conditions, pomegranate cultivation could potentially expand to 620,463.39 hectares, compared to the 1,150 hectares currently cultivated in the Fez-Meknes region, which would account for approximately 47.7% of the region's agricultural land. However, future climate projections indicate a decrease in areas suitable for pomegranate production due to unfavorable climatic conditions. These results are essential for predicting the development of pomegranate cultivation in the region in the face of climate change and for developing effective adaptation strategies.

Keywords: Pomegranate; modeling; ecological niches; MaxEnt; Geographic Information System.

THEORY OF MAQAMAT AND AHWAL IN SUFISM: A COMPARATIVE ANALYSIS OF AL-QUSHAYRI'S AL-RISALA AL-QUSHAYRIYAH AND AL-HUJWIRI'S KASHF AL-MAHJÜB

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Abstract
This paper examines the notion of Maqamat (stations) and Ahwal (states), which are fundamental concepts in Sufism. The analysis is based on two renowned works, "al-Risala al-Qushayriyah" and "Kashf al-Mahjüb," authored by two distinguished Sufi masters. Al-Qushayri follows the Sunni Shâfi'i school of thought, whereas the other, al-Hujwiri, adheres to the Sunni-Hanafi school of thought. The study explores the historical context of Sufism and subsequently analyses the backgrounds and mystical tendencies of the individuals in question. The study examines the doctrines of maqamât and ahwal in the works of al-Qushayri and al-Hujwiri by comparing specific examples from their respective books. This research aims to demonstrate the distinctions and resemblances between their respective notions of maqamat and ahwàl through a comparative analysis. The result reveals that the disparities observed in the perspectives of al-Qushayri and al-Hujwiri regarding categorizing a value as a state or a station are theoretical.

Keywords: Sufism, Maqamât, Ahwal, Al-Qushayri, Al-Hujwiri

EFFECTS OF DE-NOVO THERAPIES FOR THE TREATMENT OF ALOPECIA

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Abstract:
This clinical study delves into the diverse landscape of hair fall therapies, aiming to evaluate their effectiveness and understand the preferences among different age groups and genders. The research identifies significant trends, with topical therapy emerging as the preferred choice, particularly among individuals aged 24-30, owing to its non-invasive and accessible nature. Hormonal therapy exhibits cautious acceptance, peaking in the same age group, possibly due to concerns about side effects. Nutraceuticals maintain consistent popularity, indicating a growing recognition of nutritional support for healthy hair. Platelet Rich Plasma (PRP) therapy gains traction, especially among those in their late twenties to early thirties, highlighting the appeal of natural approaches. Micro-needling is moderately favored, reflecting a preference for holistic solutions, with a peak in the 24-30 age range. Aromatherapy is highly preferred among 18-23-year-olds but declines with age, suggesting evolving attitudes. Hair prosthesis sees moderate acceptance, slightly increasing in the >36 age group, indicating a growing willingness for cosmetic interventions. Hair transplant is more favored among older individuals, reflecting a strategic approach for enduring results. The study concludes that tailoring interventions based on age-specific preferences is crucial for effective and empathetic hair fall management. The multifaceted nature of hair fall therapy preferences necessitates a nuanced and adaptable approach by healthcare professionals, taking into account the latest advancements, as well as the dynamic interplay of psychosocial factors influencing individual choices. This approach ensures more effective and empathetic management of hair fall concerns.

Keywords:
Hair fall therapies, Topical therapy, Hormonal therapy, Nutraceuticals, Nutritional support, Platelet Rich Plasma (PRP) therapy, Micro-needling, Aromatherapy, Hair prosthesis, Cosmetic interventions, Hair transplant.

THE ROLE OF MEDICINE IN THE ECONOMY OF A COUNTRY

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Medicine holds a crucial position in the global landscape, significantly influencing both the health and economic stability of nations. Its contributions to public health are immense, as it plays a vital role in reducing mortality rates, increasing life expectancy, and improving the overall quality of life. Healthy populations are essential for sustaining economic productivity, as they experience fewer healthcare costs and participate more actively in the workforce, which drives economic growth. The healthcare industry, encompassing pharmaceuticals, medical devices, and services, constitutes a substantial portion of national expenditures and acts as a major economic engine.

Investment in healthcare infrastructure and innovation not only stimulates job creation and entrepreneurship but also enhances a nation's competitiveness in the global market. Medicine also serves as a catalyst for innovation, leading to the development of new treatments, therapies, and medical devices, thereby improving healthcare outcomes and fostering economic growth through the generation of intellectual property. Furthermore, the sector drives significant research and development (R&D) efforts, attracting investments that not only advance medical knowledge but also generate spillover effects across other industries, boosting productivity and competitiveness. Despite these positive impacts, the economic influence of medicine is accompanied by challenges such as rising healthcare costs, access disparities, poor health literacy, and the burden of chronic diseases, which necessitate effective policy interventions to ensure equitable healthcare access and cost containment. Understanding the intricate relationship between medicine and the economy is vital for policymakers, healthcare professionals, and stakeholders to craft strategies that promote sustainable development and equitable healthcare access.

In this scientific article, we will discuss the costs associated with translators' medical campaigns, the economic impact of poor health literacy, the challenges posed by large families, and the importance of medication compliance in minimizing diseases and improving health outcomes.

Key Words: Economy, Medicine, Medical knowledge, Sustainable Development.

THE GOVERNANCE, RISK AND COMPLIANCE PRATICIES IN BOSNIA AND HERZEGOVINA CORPORATE SECTOR

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Abstract
The articles in this collection provide valuable insights into the governance, risk, and compliance (GRC) practices in Bosnia and Herzegovina. The studies cover various aspects of GRC, GRC and integrated GRC frameworks Bosnia and Herzegovina. The articles also address the challenges and benefits of adopting such practices, as well as the factors that influence their adoption. The findings suggest that the GRC landscape in Bosnia and Herzegovina is still developing and that there are opportunities for improvement. Challenges such as limited resources, lack of awareness, and weak regulatory frameworks are prevalent, particularly in small and medium-sized enterprises. However, the articles also highlight the benefits of implementing integrated GRC frameworks, including better risk management, increased compliance, and improved transparency and accountability. Overall, the articles suggest that there is a need for continued research and education on GRC practices in Bosnia and Herzegovina to foster the adoption of best practices and improve GRC effectiveness.

Keywords: Governance, Compliance, Risk management, financial crime, GRC

ORTHODONTIC TREATMENT FOR CHILDREN

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Orthodontic treatment for children up to 6 years of age, also known as early or interceptive orthodontics, focuses on the detection and correction of dental and jaw irregularities at an early stage of development. This approach aims to address issues such as misaligned teeth, bite problems (malocclusions), and jaw growth discrepancies that may lead to more severe dental problems if left untreated. By beginning orthodontic intervention during the early stages of dental and skeletal development, it is possible to guide the proper growth of the jaw and ensure enough space for permanent teeth to emerge correctly.

Common orthodontic issues in children under 6 years of age include crowding, open bite, crossbite, overbite, and habits like thumb sucking that can negatively impact the alignment of teeth and jaw growth. Early treatment often involves the use of removable appliances, spacers, or habit-breaking devices to correct these problems before they become more complicated. While not all children require orthodontic treatment at this age, early assessment by a pediatric dentist or orthodontist is crucial to identify children who may benefit from intervention.

Interceptive orthodontics can prevent the need for more complex and invasive treatments later in life. For instance, correcting a crossbite early can avoid the development of asymmetrical jaw growth, while addressing crowding can eliminate the need for future tooth extractions. Early orthodontic treatment is generally most effective between the ages of 4 and 6, when the bones are still growing and flexible. It is a preventive strategy aimed at minimizing future orthodontic complications, ensuring healthy development of a child's teeth and jaws, and promoting better oral health in the long term.

Keywords: Early orthodontics, Malocclusion in children, Jaw growth

THE EFFECT OF MANAGEMENT SYSTEM ON SOME HAEMATOLOGICAL PARAMETERS OF LAYER CHICKEN AT LABANA FARM, ALIERO, KEBBI STATE, NIGERIA

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ABSTRACT

Poultry Management refers to the husbandry practices that help to maximize the efficiency of production. This study was conducted to evaluate the effect of different management systems on the haematological parameters of layer chickens. Three systems: Battery Cage (BC), Deep Litter (DL) and Semi-Intensive (SI) were evaluated. Nine layer chickens, aged eight weeks, three from each system were randomly selected for blood sampling. Blood was collected from the wing vein, once a week for four weeks and analyzed using standard procedures, for haematological parameters (PCV, Hb and MCHC). It was observed that the blood parameters of the three systems were within the normal standard values. However, there were slight differences among the three systems. PCV of SI (23.67 ± 1.90^{b}) was slightly higher than DL (23.17 ± 2.35^{b}) and BC (21.92 ± 4.98^{a}). Hb of DL (7.83 ± 1.03^{a}) was higher than BC (7.70 ± 1.03^{a}) and SI (7.67 ± 0.01^{a}). MCHC of BC (33.60 ± 0.97^{a}) was higher than DL (33.10 ± 2.99^{b}) and SI (32.46 ± 0.71^{a}). It was concluded that there was no significant association between the management systems and blood parameter range of layer chickens in Labana farm. Therefore, other factors such as risk of diseases, sanitation, costs, should be considered in deciding which system to adopt.

Keywood: Management System, Haematological Parameter, Layer Chickens, Labana Farm, Aliero.

GENDER EQUALITY AND THE IMPACT ON DOMESTIC VIOLENCE

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Abstract
In any sphere of life that is established or developed, public or private, gender discrimination is a risk for progress. While the possibilities of confronting the phenomenon of discrimination in public life are more evident, discrimination in the family remains invisible. It is about what happens between spouses and discrimination between children due to gender. Gender equality in family and couple life leads to the cultivation, guarantee and respect of these standards in one of the most important basic cells of society such as the family. The family is, in this way, the safe base for the transmission of these principles to children and other members, transforming gender equality in family life into a right and obligation for the education of future generations. Healthy family and marital relationships are a contribution to the elimination of gender stereotypes. Everything starts in the family and is transmitted in society. For this reason, by right, if we want to know how much a society respects the principles of non-discrimination and gender equality, it is very efficient to start this analysis from the family. Although family law and the relationships produced by it belong primarily to the realm of private law, there is a strong public interest in the "special protection of the family and marriage" just as there is a special and primary interest in the protection of children. What was mentioned is a Constitutional, conventional and legal obligation.

Key words: gender, equality, family, rights, society, principles

RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND BODY COMPOSITIONS, STRENGTH, TYPE OF SPORT COMPETITION, VITAMIN D AND BIRTH VARIABLES IN ELITE POLISH TRACK AND FIELD ATHLETES: A CROSS-SECTIONAL STUDY

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ABSTRACT
The aim of this study was to find the strongest determinants of forearm bone mineral density (BMD) in elite track and field athletes. Somatic measurements, body composition using kinematics and bioelectrical impedance were performed. Bone parameters were measured using densitometry. Handgrip strength was measured using a dynamometer. Birth data were collected using a face-to-face interview. Vitamin D levels were assessed using a blood test. The group was divided into endurance athletes (EA) and throwing athletes (TA). Low BMD prox was significantly more common in the EA group compared to the TA group ($\chi 2=10.8$; $p = 0.001$; $\Phi= 0.6$). Insufficient vitamin D levels were significantly higher in the EA group compared to the TA group ($\chi 2=10.8$; $p = .001$; $\Phi= 0.6$). The main parameters influencing BMD dis and BMC prox in male athletes were HGS (kg) and type of sports competition (Rˆ2 adj.= 0.93; 0.89). BMC dis was influenced by type of sports competition (Rˆ2 adj.= 0.83). There was also a significant relationship between T-score prox and HGS (Rˆ2 adj.= 0.98). In the case of women, the main parameters influencing BMD prox were age at menarche and body composition (Rˆ2 adj.= 0.93). BMC prox was influenced by age at menarche (Rˆ2 adj.= 0.73). In summary, this study showed that regardless of gender, the highest BMD of the forearm bone was characteristic of athletes training in track and field throwing compared to running sports. It was also found that the relationship between BMD and other factors is strongly dependent on gender.

Keywords: BMD; body composition; vitamin D; hand grip strength; birth weight; length of breastfeeding

VISUAL NARRATIVES AND LITERARY IMAGERY: THE CROSSROADS AND CROSS-POLLINATION OF ART AND LITERATURE

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ABSTRACT

Cross-pollination between art and literature represents a dynamic and mutually enriching exchange that transcends traditional boundaries, fostering innovative expressions and deepening cultural narratives. This interaction often manifests in diverse ways, from literature inspiring visual art through vivid descriptions and thematic explorations to art fuelling literary imagination with its visual stimuli and symbolic layers.

Friedman says in *Art of Literature: Cross-Pollination in Creative Disciplines*: "Literature has often borrowed from the visual arts, using vivid imagery and symbolic elements to create more immersive and evocative narratives." (2015, p. 78) The interrelation between these disciplines can be seen in historical movements starting from Renaissance to movements such as Symbolism and Surrealism, where literature and art intertwined to explore the subconscious and challenge conventional perceptions. Contemporary examples further illustrate this synergy, with literary works influencing graphic novels, while visual art often finds resonance in poetic imagery and narrative techniques. By examining these cross-disciplinary influences, one gains insight into how art and literature coalesce to expand creative horizons, reflect societal issues, and cultivate a richer understanding of human experience. This paper explores the mechanisms and impacts of this cross-pollination, highlighting its significance in shaping and enriching both artistic and literary landscapes.

Key Words: Art and Literature, Visual Narratives, Cross Pollination

LATEST PUBLIC GOVTECH DEVELOPMENTS IN THE PRIVATE INSURANCE SECTOR - COMPARISON BETWEEN EUROPE (EU) and ASIA (JAPAN)

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ABSTRACT

Information technology and also its development ink all aspects and dimensions of our lives, including our finances. Private insurance companies are designed to provide financial products, i.e. contracts in form of reinsurance or insurance policies to both wholesale (typically companies) and retail customers (private individuals or smaller companies). Lately the share of financial funds gathered and chanelled back to the national economies by banks decreases and in parallel the share of other market players, e.g. insurance companies increases. In our study we focus on the phenomenon how information technology transformed and reformed the way of business operation of the insurance market and how regulatory and supervisory authorities in Europe (European Union) and Asia (Japan) reacted (RegTech & SupTech). In our paper we, first, display the main characteristics and magnitude of insurance regulation and supervision, i.e. public governance technologies (GovTech) in European Union and Japan focusing on features of public insurance regulatory and supervisory authorities. Second, we introduce the new forms of executing public insurance regulatory and supervisory tasks, that came along the newest information technology developments (big data, machine learning, artificial intelligence and standardization) Finally, we carefully select public insurance regulatory and supervisory solutions in both jurisdictions that could serve as model for the other jurisdiction in the near or far future.

Keywords: European Union, Govtech, Japan, Private Insurance

THYMOL-BASED HYDROPHOBIC DEEP EUTECTIC SOLVENTS AS BIOFUNGICIDES

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ABSTRACT

Aspergillus flavus, *Botrytis cinerea*, *Fusarium graminearum*, and *Monilinia fructicola* are major fungal pathogens in agriculture, causing significant crop losses and economic damage. *A. flavus* is notorious for contaminating crops with aflatoxins, potent carcinogenic compounds harmful to humans and animals. *B. cinerea*, commonly known as gray mold, affects a wide range of fruits, vegetables, and flowers, leading to severe spoilage during storage. *F. graminearum* primarily targets cereals such as wheat, barley, and corn, reducing yield and grain quality. *M. fructicola* is a destructive pathogen that affects stone fruits, causing brown rot, which impacts pre- and post-harvest stages. Traditional control methods rely on chemical fungicides, but their overuse has led to resistant fungal strains and environmental concerns. As a result, there is a growing interest in alternative, eco-friendly strategies such as using natural compounds, biocontrol agents, and innovative natural solvents like hydrophobic deep eutectic solvents (HDES). HDES are increasingly being studied for their potential multipurpose. Our study tested thymol-based HDES against these fungal species using a diffusion method in Petri plates over a 7-day experiment. All HDES showed effectiveness against *M. fructicola* and *B. cinerea*, significantly inhibiting their growth. However, the same NADES did not show any inhibitory effect on *A. flavus* when tested by this method, highlighting the need for further exploration of antifungal strategies for this pathogen.

Keywords: *Aspergillus flavus, Botrytis cinerea, Fusarium graminearum, Monilinia fructicola*

NATURAL DEEP EUTECTIC SOLVENTS AS BIOFUMIGANTS AGAINST *Fusarium graminearum* AND *Monilinia fructicola*

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ABSTRACT

Thymol is a volatile monoterpenoid phenol well-recognized for its broad-spectrum antimicrobial properties. It can be used as a bioactive component in various formulations, including antifungal agents. In agriculture, thymol is utilized as a natural biocide to control fungal pathogens and insect pests, either through direct application to crops or by incorporation into coatings and packaging materials to prolong the shelf life of harvested products. The Environmental Protection Agency (EPA) has approved thymol as a biochemical pesticide, and thymol is listed under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

NADES (Natural Deep Eutectic Solvents) are innovative formulations of natural, biodegradable components. Thymol forms a eutectic mixture when combined with other natural substances such as organic acids, sugars, or amino acids. A hypothesis is that thymol-based NADES could be applied in various ways in agriculture, such as direct foliar sprays, seed treatments, or post-harvest coatings, providing a natural and sustainable alternative for crop pest and disease management. Moreover, these formulations are particularly well-suited for organic farming, where synthetic chemicals are restricted.

In our study, we evaluated thymol-based natural deep eutectic solvents (NADES) in the vapour phase *in vitro* in Petri plates. The experiment aimed to assess the antifungal efficacy of these NADES against *Monilinia fructicola* and *Fusarium graminearum*. The results indicated that the thymol-based NADES were more effective in inhibiting the growth of *M. fructicola* compared to *F. graminearum*, suggesting that thymol exhibits selective antifungal activity depending on the target pathogen.

Keywords: *thymol, HDES, vapour*

COULOMB EFFECT ON ELASTIC ELECTRON SCATTERING BY HYDROGEN ATOM AND HYDROGEN-LIKE IONS IN THEIR METASTABLE 2S STATE IN THE 511-770 KEV ENERGY RANGE IN THE PRESENCE OF A LASER FIELD

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This paper reports on a study investigating the elastic scattering of hydrogen atoms in their metastable state (2S-2S) when subjected to electron impact, with a focus on the Coulomb effect within an energy range spanning from 511 keV to 770 keV. The analysis employs semi-relativistic wave functions to depict the hydrogen states. The validity of using Darwin wave functions is confirmed by ensuring that the condition $Z\alpha << 1$ is met, where α represents the structure constant. Both incident and scattered free electrons are described using Dirac spinors. Notably, the semi-relativistic calculations converge with those of the non-relativistic case at low electron velocities. Additionally, in the presence of the Coulomb effect, the electron wave function is approximated by a Dirac function modulated by the confluent hypergeometric function. The paper presents the relativistic differential cross-section (RDCS) as a function of the final scattering angle for various energies of the incident electron, revealing intriguing insights into diffusion probabilities in specific directions. Moreover, the impact of the atomic number Z on the elastic scattering of hydrogen atoms and hydrogen-like ions by electron impact under the influence of the Coulomb effect is thoroughly examined.

Keywords: Laser-assisted, QED calculations, Differential cross section, relativistic scattering, Hydrogen atom.

THE IMPORTANCE AND IMPLEMENTATION OF HUMAN- COMPUTER INTERACTION IN EDUCATION: A SURVEY ON EVOLVING INNOVATIONS IN CLASSROOM MANAGEMENT

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Abstract
The invention and use of emerging technologies in modern day classroom is dynamically reshaping the educational landscape. In recent times, the integration of Artificial Intelligence and immersive technologies is directed towards optimizing human interaction with computer systems. Human-Computer Interaction (HCI) is an innovational initiative orchestrated to facilitate learning, foster engagement and cater for the unique needs of various learners. The study of Fleck et al. (2009) shows that desktop computer can detect direct interaction with its interface in order to model collaborative learning process. This paper is a descriptive survey on the applications of Human-Computer Interaction (HCI) in education. The paper underscores the importance of the innovations in HCI with educational needs and highlights some of the challenges confronting HCI. In order to gather vital data that will be used in the paper discussion, drafted questions were administered to respondents using online Google form questionnaire instrument. The information collected was subjected to reliability analysis. Conclusively, the paper affirms that HCI has significantly improved students learning experience.

Keywords: Human-Computer Interaction, Evolving Innovations, Classroom Management.

JOB SATISFACTION CATEGORIES AND THEIR IMPLEMENTATION IN MANAGEMENT OF CHRISTIAN RELIGIOUS EDUCATION IN SCHOOLS

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Abstract
This study aims to categorize job satisfaction for employees in Christian religious education in schools. Job satisfaction is a feeling of pleasure or displeasure with one's job that is influenced by various aspects and factors. Employees in schools have an important role to bring life and ensure teaching and learning activities run well. However, employees often fail to achieve job satisfaction due to a lack of good management in dividing workload, wages, career promotion, and supervisor attitudes. Therefore, schools need good management so that employees get job satisfaction and the school is satisfied with the work of its employees. This research will answer the questions; First, what are the aspects and factors that affect job satisfaction? Second, how can job satisfaction be implemented in Christian religious education in schools? This research will use a qualitative method with a literature study approach by accessing books, articles and other documents. This research will produce a good Christian education management literacy so that employee job satisfaction is achieved. In conclusion, job satisfaction can be achieved if schools pay attention to the welfare of their employees, and employees perform their duties optimally and responsibly.

Keywords: Categories of job satisfaction, Christian religious education management, schools.

PSYCHOLOGICAL DETERMINANTS OF OPTIMIZATION OF STUDENTS' INTELLECTUAL ACTIVITY

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The relationship between reading ability, intelligence and creativity has been identified for a long time by both foreign and domestic scientists. And a clear solution to this problem has not yet been found. But most psychologists agree that this relationship is not linear. Students with high indicators of intellectual development (lack of motivation) also achieve low results. However, people with below-average intelligence are never high achievers.

This dependence is reminiscent of the connection between intelligence and creativity: an intellectual may not be creative, but a person of low intelligence will never be creative. This also applies to the connection between intelligence and professional achievements established by W. Schneider. According to him, there is a specific intellectual "limit" for each activity. Academic success is influenced by general intelligence and motivation, as well as many other mental characteristics. Correlations between academic achievement and levels of general or verbal intelligence ranged from 0.19 to 0.60.

Creativity, as a deep characteristic of a person, is manifested in the original vision of a problem. It allows you to go beyond the immediate situation or existing knowledge. For the development of creativity, a diverse environment, a high level of uncertainty and an environment with a low level of regulation of behavior is necessary, because it encourages a person to look for his own ways and approaches. Direction, relying on ready-made examples, on the contrary, hinders the development of creativity.

According to V. N. Druzhinin, it is more effective to use intelligence tests to determine the success of professional training rather than the effectiveness of professional activity. Practical activities are less controllable than education, and their results are less evaluated and delivered in a timely manner. We have already mentioned that when considering intelligence, learning and creativity, V. N. Druzhinin stated that each of them is associated with a certain form of motivation and activity: creativity is itself corresponds to the motivation of understanding and creative activity, intelligence - achievement motivation and flexible behavior, learning-cognitive motivation.

Man is always in the process of development. The desire to grow, self-awareness is the most important quality of personality. The need for self-development, the desire for self-improvement are indicators of personal maturity and, at the same time, conditions for achieving it. Self-development of a person and the study of the personal potential inherent in him is an urgent problem in modern Russian psychology. In the works of V. M. Rusalov, I. N. Sviridenko, M. Y. Semyonov, E. A. Sergiyenko, E. V. Stolyarskaya, self-reflection is considered as an indicator of personal maturity.; "man" capable of self-determination as a property of a complex self-organizing psychological system - in the works of E. V. Galazhinsky, E. R. Kalitievskaya, V. E. Klochko. Self-awareness is also considered as a mechanism that stimulates self-development, turning it into a need, goal and life strategy (K. A. Abulkhanova-Slavskaya, I. A. Akindinova, T. I. Artemyeva, E. I. Golovakha). Self-awareness is related to the process of developing a person as a subject of intellectual activity (D. B. Bogoyavlenskaya, M. A. Kholodnaya), free choice (V. A. Petrovsky).

During the student years, the creative personality of the future specialist continues to be formed in personally valuable educational and professional activities, whose main task is to turn growth and

self-improvement into the goal of further personal and professional development. Students' self-awareness during university studies is the key to their success in their future careers.

Key words. *University, personal development, professional development, intelligence, creativity, ability, attitude*

The student consolidates all that he learns in the productive activity together with the teacher in independent work and does it now in the process of studying at the university. Independent work is a type of learning activity-individual or collective-that increasingly relies on student research and can take place both in and out of the classroom with or without a teacher. Currently, the organization of independent work is not perfect: there is no agreement between the requirements of the teacher and the interests of students, or only the requirements of the teacher are taken into account. The most reasonable type of independent work based on the joint, coordinated interaction of the teacher, student and educational environment can be considered. Since the "teacher-student" system in the educational environment is open, as a result of such interaction, imbalance, entropy is reduced and order is increased, overcome. This type of organization of independent work should be a model for students' professional activities. The inclusion of creative tasks in independent work is becoming a method of active development of professional qualities. There is such a component in the process of independent work, the result of which represents the professional training of students. As such a component, "mediating knowledge and creativity is a process of understanding."

LITERATURE ANALYSIS AND METHODOLOGY

In addition to these direct effects of education, a wide range of effects of education arise in the context of effective joint activities. Important confirmation of the role of effective joint activity of teachers and students in the development of personality, the emergence of permanent changes in the content of moral ideas of students, the formation of moral self-awareness, mastering the norms and methods of collective life, various the emergence of different interpersonal relationships, creating a positive emotional environment in the educational team. These neoplasms of individual and collective consciousness do not have a narrow situation, but go beyond a certain educational situation. That is, a person's contribution to effective joint activity becomes a condition for his further self-development.

The student period is called "the formation of the authorship of one's own life." This is thinking about the meaning of your life, making real life plans taking into account your capabilities, mastering adult roles, looking for a life partner, joining all kinds of social activities. The student defines his place in life, society, culture freely, independently and responsibly, develops his position. According to M. M. Bakhtin, the student is a "subject of reception". During the learning process, the teacher takes into account all these neoplasms and helps their formation in joint activities and communication.

DISCUSSION AND RESULTS

The time of studying at the university corresponds to the first period of maturity (18-25 years), defined by a number of foreign and domestic authors (B. G. Ananyev, D. Birren, E. I. Stepanova). In particular, according to E. I. Stepanova, this period represents an important period for revealing all aspects of a person, for making it complex, and for starting to build one's own way of life. This age period is associated not only with the acquisition of professional knowledge, the formation of professional skills and qualifications, but also with the implementation of the most important individual-personal and social choices. The further development of the personality is closely related to the process of self-realization or profession.

The main condition for the formation of students' intellectual ability at the university is shown schematically in Figure 1.

In training classes	In extracurricular activities
Creative for the student task system	A complex of individual-oriented activities

All the main intellectual qualities appear as integral characteristics that depend on each other. Thus, in the description of intellectual competence, its interrelationship is revealed not only with cognitive features, including understanding, but also with the individual style of students, their creativity, self-management, and the ability to reflect their intellectual potential. Similarly, when individual style is considered, its manifestation is manifested in self-management, creativity and intellectual ability of students, among others. In the process of professional formation of students as future specialists, it is necessary to pay attention to the "formation of meanings" of professional activity, to combine personal and professional development.

We have considered some important conditions necessary for the development of intellectual abilities of students during their educational and professional activities. However, in determining the formation of the intellectual culture of students in the context of their professional activity, it would be unreasonable to think only about them, because such conditions are diverse.

And yet, according to A. Maslow, there are no such conditions that automatically lead to development and self-realization. All this depends on the person himself, and career, purpose, meaning, goal orientation are crucial. The existentialist position that the main factor in human development is man himself, and it is increasingly reflected in much of modern human research, including educational research.

At the first stage of achieving the goal of the research, it was intended to determine the level of mental development of students, which serves to ensure the objectivity and reliability of the results obtained at the next stage. To determine the effectiveness of the application of pedagogical technologies in the educational process, it is important to conduct clarifying experiments. For this, the experimental group was divided into experimental and control groups. At the determining stage, both groups of students were tested on research methods. At the determining stage, the selections in the groups did not take into account any conditional or special indicators. They were conditionally divided into experimental and control groups. Only at the next stage of the research, the experimental group was trained on the basis of a special seminar-training program incorporating pedagogical technologies, and the control group was trained according to the traditional educational program. In the second stage of the research, the results of these two groups will be compared.

The level of intellectual development of students was determined by six methods in the experimental test of the determining stage.

Table 3.2.1, which presents empirical data, evaluates each method as an evaluation criterion of mental development.

Let's turn to the analysis of the results.

Table 1

Students' mental at the stage of defining experiences indicators of development results (N = 134)

Criteria	Groups	**X**	**δ**	**t**	
Distinguish important signs	Experiment	5,54	1,15	1,473	
	Control	5,65	1,23		
Logical thinking	Experiments	5,32	1,15	-1,647	
	Control	4,95	1,23		
Lability of intelligence	Experiments	8,42	2,01	-0,364	
	Control	8,46	2,13		
Complex analogy	Experiments	4,88	1,60	-0,785	
	Control	4,98	1,50		
Spatial imagination	Experiments	4,98	1,51	-2,646*	
	Control	4,26	1,54		
Ability to learn the language	Experiments	90,15	12,2	-0,973	
	Control	91,09	12,3		

Explanation: * $p \leq 0.05$

At the determining stage, there were no sharp differences between the indicators of the subjects of the experimental and control groups: "separation of important signs" was 5.54 in the experimental group and 5.65 in the control group; 5.32 in the experimental group and 4.95 in the control group for "logical thinking"; 8.42 in the experimental group and 8.46 in the control group on "lability of intelligence"; on "complex analogies" 4.88 in the experimental group and 4.98 in the control group; 4.98 in the experimental group and 4.26 in the control group on "spatial imagination"; "Language learning ability" has coefficients of 90.15 in the experimental group and 91.09 in the control group. From these results, only one condition was statistically different between the differences, which was the spatial perception of the experimental group versus the control group, namely 4.98 and 4.26, (t=-2.646; $p \leq 0.05$) . It can be seen that among the students of the experimental group, students who are able to demonstrate technical construction, technical creativity, and also have an advantage over the students of the control group in solving problems related to spatial concepts, area, distance, and the location of three-dimensional objects, and vice versa. results for all criteria are generally limited to the average value. Also, indicators of "lability of intelligence" characterizing students' ability to the educational process reflect average lability according to the standard norms of the research methodology. In the analysis of the results of the research, attention was paid to the correlation analysis in order to study the internal connection and mutual relations of the existing criteria.

CONCLUSION

As a general conclusion, we can conclude that the criterion of the effectiveness of university education is the main intellectual qualities that form the basis of the student's intellectual culture. The conditions of its formation are determined by the interrelated functioning of the structural components of the educational environment, such as semantic education, person-oriented education related to meaningful education; joint effective activity of teachers and students who perform innovative educational functions and work as a generator of cultural tasks, a carrier of a cultural model, an assistant of culture, including intellectual assimilation, the purpose of which is to develop mechanisms of self-regulation of education , is the construction of mastered scientific activities and the acts of interaction in them and the positions of the individual. It is necessary to create conditions for the formation of a person in a person - the value-semantic world of a person, its dynamics, openness to the environment (natural, social, cultural), where the level of openness means the level of psychological health of the entire system. Thanks to the value coordinates, the

human world becomes a space for the realization of possibilities, expression of its essence, self-determination and self-determination, which brings it closer to other people.

List of used literature

1. Abulkhanova-Slavskaya K.A. Development of personality in the course of life
Psychology of personality formation and development. - M., 1981. - B. 19-45.
2. Akopov G.V. Social psychology of higher education. - Samara, 1993. - 212 With.
3. Berestneva O.G., Dubinina I.A. Technology of assessment of convergent and divergent abilities as factors of intellectual abilities of students // Izvestia TPU. - 2006. - No. 6. - Pages 230-238.
4. Safoev N.S. Psikhologicheskie osobennosti natsionalnogo samosoznaniya studencheskoy molodeji// Diss.doktor.psikhol.nauk.-Tashkent, 2005.-291 p.
5. Pedagogical technologies - as a factor of optimizing students' intelligence. Rachmanova D.U. Social and humanitarian sciences in the educational system ISSN 2181-7286 1/2024 (from page 56 to page 61) https://lib.cspu.uz/index.php?newsid=9580
6. Piaget J. Psychology of intellect: izbr. psycho. tr. M., 1994. - P. 51-237.

THE USE OF ANTIBIOTICS IN ORAL SURGERY

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The judicious application of antibiotics in oral surgery is pivotal in preventing postoperative infections and ensuring optimal patient outcomes. Antibiotic prophylaxis aims to mitigate the risk of infections particularly in surgeries involving osseous manipulation, dental implant placement, or in immunocompromised patients. This abstract elucidates the indications, benefits, and potential complications associated with antibiotic administration in oral surgical procedures.
Antibiotics are crucial in high-risk scenarios, such as patients with systemic comorbidities, extensive surgical interventions, or when foreign materials are utilized within the oral cavity. Frequently prescribed antibiotics include beta-lactams (e.g., penicillin), lincosamides (e.g., clindamycin), and nitroimidazoles (e.g., metronidazole), selected based on their efficacy against common oral pathogens.
The inappropriate use of antibiotics can precipitate adverse outcomes including the emergence of antimicrobial resistance, hypersensitivity reactions, and dysbiosis of the gastrointestinal flora. Hence, adherence to evidence-based guidelines is imperative for oral surgeons to determine the necessity and appropriateness of antibiotic prophylaxis. Current literature underscores the importance of precise dosing regimens, optimal timing, and appropriate duration of antibiotic therapy to balance efficacy against potential adverse effects.
In summary, antibiotics constitute an integral component of infection control in oral surgery, providing a prophylactic shield against postoperative infections. However, their use must be circumspect and individualized to prevent the propagation of antibiotic resistance and other related complications. Ongoing research should aim to refine antibiotic protocols and explore adjunctive strategies to enhance antimicrobial stewardship in the context of oral surgical practice

AN INNOVATIVE META-HEURISTIC APPROACH FOR PARAMETER IDENTIFICATION IN SOLAR PHOTOVOLTAIC MODELS.

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Abstract:
As solar photovoltaic (PV) systems stand as pivotal components within the realm of solar energy, the modeling and optimization of these systems assume paramount significance. The efficacy of PV systems is intrinsically tied to the variability of parameters within their models, which unfortunately are not readily accessible. The precise determination of these parameters is consistently imperative for ensuring efficiency and accuracy. Despite the myriad methodologies devised for extracting parameters from the PV module equivalent circuit model, ensuring the method's quality and stability remains a challenging endeavor. In an effort to guarantee stability and efficacy in parameter extraction, this paper introduces a novel hybrid algorithm that amalgamates analytical methods with the Bird Mating Optimizer (BMO), a meta-heuristic algorithm. Within this approach, the analytical method is employed to ascertain the photovoltaic current and inverse saturation current, while the BMO method is deployed to determine the remaining three parameters: series resistance, shunt resistance, and ideality factor. The efficacy of the proposed hybrid method is validated through its application to obtain the optimal Shockley–Diode Model (SDM) parameters for four common PV modules. These modules include R.T.C France, operating at 33 ◦C under a solar radiance of 1000 W/m2; Photowatt-PWP201, comprising 36 polycrystalline silicon cells in series at an irradiance of 1000 W/m2; the commercial solar panel model STP6-120/36 manufactured by Schutten Solar, featuring 36 polycrystalline silicon cells aligned in series, at 55◦C and 1000 W/m2; and the commercial solar panel model STPM 40/36 manufactured by Schutten Solar with 36 cells in series, at 51◦C and 1000 W/m2. To assess the performance of the hybrid algorithm, comprehensive comparisons were made against other state-of-the-art algorithms. Notably, the Bird Mating Optimizer algorithm, when applied to the presented case study, demonstrated lower values of the root mean square deviation (RMSE). Consequently, the simulated current-voltage (I-V) and power-voltage (P-V) characteristics of these PV modules closely aligned with the measured data. These results substantiate the utility of the proposed technique in deriving the optimal Shockley–Diode Model parameters for various PV modules based on manufacturers' provided data.

Key words: Photovoltaic, Single diode model, Meta-heuristic algorithms, Bird Mating Optimizer, parameter estimation

GREEN'S RELATIONS IN Γ-TERNARY SEMIGROUPS

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Abstract- In this paper we present Green's relations in Γ-ternary semigroups giving the relationship between them. Here we give the Green's theorem for Γ-ternary semigroups. We define a regular element in a Γ-ternary semigroup, a regular Γ-ternary semigroup giving the condition which may satisfy a class related to green's relations to be a regular class. We give the concept of an idempotetent element in a Γ-ternary semigroup which is closely related to the concept of regularity. We also introduce the notion of a left congruence, right congruence and congruence in a Γ-ternary semigroup. We give the conditions that a Green's relation have to satisfy to be a congruence. The notion of a congruence in a Γ-ternary semigroup is followed by left and right reductive congruence.

Key words- Γ-ternary semigroup, Green's relation, regular Γ-ternary semigroup, regular element, congruence, reductive congruence.

1. Preliminary

Let we introduce some elementary concepts in $\Gamma-$ternary semigroups.

Definition 1.0. *A $\Gamma-$ternary semigroup is an ordered system $(M, {}_M(\cdot)_\Gamma, {}_\Gamma(\cdot)_M)$ where M and Γ are two non-empty sets, ${}_M(\cdot)_\Gamma$ is a multiplication in M with elements of Γ, ${}_\Gamma(\cdot)_M$ is a multiplication in Γ with elements of M such that:*

$\forall a,b,c,d,e \in M$ and $\forall \alpha,\beta,\gamma,\delta \in \Gamma$, $(a\alpha b\beta c)\gamma d\delta e = a\alpha(b\beta c\gamma d)\delta e = a\alpha b\beta(c\gamma d\delta e)$

For $\Gamma-$ternary semigroups, as well as ternary semigroups, the notion of a $\Gamma-$ternary subsemigroup is given.

Definition 1.1. *A non-empty subset S_1 of S is called a $\Gamma-$ternary subsemigroup of a $\Gamma-$ternary semigroup $(S, {}_S(\cdot)_\Gamma)$ if $(S_1, {}_{S_1}(\cdot)_\Gamma)$ is a $\Gamma-$ternary semigroup.*

Let X be a non-empty subset of a $\Gamma-$ternary semigroup S. From the above statement the intersection of all left ideals [right ideals, lateral ideals, ideals, quasi-ideals] containing X is a left ideal [right ideal, lateral ideal, ideal, quasi-ideal] of S since this intersection is non-empty given that it contains $X \neq \mathcal{O}$. Precisely this left ideal [right ideal, lateral ideal, ideal, quasi-ideal] is called *left ideal [right ideal, lateral ideal, ideal, quasi-ideal] generated by X* and it is denoted $(X)_l\left[(X)_r, (X)_m, (X)_t, (X)_q\right]$.

It is easy to show that :

$$(X)_l = X \cup S\Gamma S\Gamma X$$
$$(X)_r = X \cup X\Gamma S\Gamma S$$
$$(X)_m = X \cup S\Gamma X\Gamma S \cup S\Gamma S\Gamma X\Gamma S\Gamma S$$
$$(X)_t = X \cup S\Gamma S\Gamma X \cup X\Gamma S\Gamma S \cup S\Gamma X\Gamma S \cup S\Gamma S\Gamma X\Gamma S\Gamma S$$
$$(X)_q = X \cup (S\Gamma S\Gamma X \cap (S\Gamma X\Gamma S \cup S\Gamma S\Gamma X\Gamma S\Gamma S) \cap X\Gamma S\Gamma S)$$

If the set X consists of a single element x then we have:

$$(x)_l = x \cup S\Gamma S\Gamma x$$
$$(x)_r = x \cup x\Gamma S\Gamma S$$
$$(x)_m = x \cup S\Gamma x\Gamma S \cup S\Gamma S\Gamma x\Gamma S\Gamma S$$
$$(x)_t = x \cup S\Gamma S\Gamma x \cup x\Gamma S\Gamma S \cup S\Gamma x\Gamma S \cup S\Gamma S\Gamma x\Gamma S\Gamma S$$
$$(x)_q = x \cup (S\Gamma S\Gamma x \cap (S\Gamma x\Gamma S \cup S\Gamma S\Gamma x\Gamma S\Gamma S) \cap x\Gamma S\Gamma S)$$

2. Green's relations in Γ-ternary semigroups

Green's relations L, R, M, H in a $\Gamma-$ternary semigroup are defined by equivalences:

$a\mathrm{R}b \Leftrightarrow (a)_r = (b)_r$

$a\mathrm{L}b \Leftrightarrow (a)_l = (b)_l$

$$aMb \Leftrightarrow (a)_m = (b)_m$$

$$a\mathrm{H}b \Leftrightarrow (a)_r = (b)_r \wedge (a)_l = (b)_l \wedge (a)_m = (b)_m$$

It is clear that L, R, M, H are equivalence relations in S and H=L∩M∩R.

If we denote
$$a\Gamma S^1\Gamma S^1 = \{a\} \cup a\Gamma S\Gamma S$$
$$S^1\Gamma S^1\Gamma a = \{a\} \cup S\Gamma S\Gamma a$$
$$S^1\Gamma a\Gamma S^1 = \{a\} \cup S\Gamma a\Gamma S \cup S\Gamma S\Gamma a\Gamma S\Gamma S,$$
than by the definition of a principal left ideal, principal right ideal and principal lateral ideal we have:

$$a\mathrm{R}b \Leftrightarrow a\Gamma S^1\Gamma S^1 = b\Gamma S^1\Gamma S^1$$
$$a\mathrm{L}b \Leftrightarrow S^1\Gamma S^1\Gamma a = S^1\Gamma S^1\Gamma b$$
$$a\mathrm{M}b \Leftrightarrow S^1\Gamma a\Gamma S^1 = S^1\Gamma b\Gamma S^1$$
$$a\mathrm{H}b \Leftrightarrow a\Gamma S^1\Gamma S^1 = b\Gamma S^1\Gamma S^1 \wedge S^1\Gamma S^1\Gamma a = S^1\Gamma S^1\Gamma b \wedge S^1\Gamma a\Gamma S^1 = S^1\Gamma b\Gamma S^1.$$

Since that it follows:

• $a\mathrm{R}b$ if and only if $a = b$ or there exist elements s_1, s_2, s_3, s_4 in S and elements $\alpha, \beta, \gamma, \delta$ in Γ such that $a = bas_1\beta s_2$ and $b = a\gamma s_3\delta s_4$.

• $a\mathrm{L}b$ if and only if $a = b$ or there exist elements s_1, s_2, s_3, s_4 in S and elements $\alpha, \beta, \gamma, \delta$ in Γ such that $a = s_1as_2\beta b$ and $b = s_3\gamma s_4\delta b$.

• $a\mathrm{M}b$ if and only if $a = b$ or there exist elements s_1, s_2, s_3, s_4 in S and elements $\alpha, \beta, \gamma, \delta$ në Γ such that $a = s_1ab\beta s_2$ and $b = s_3\gamma a\delta s_4$ or there exist elements $s_1, s_2, s_3, s_4, s_5, s_6, s_7, s_8$ in S and elements $\alpha, \beta, \gamma, \delta, k, \lambda, \mu, \xi$ in Γ such that $a = s_1as_2\beta b\gamma s_3\delta s_4$ and $b = s_5ks_6\lambda a\mu s_7\xi s_8$.

• $a\mathrm{H}b$ if and only if $a = b$ or there exist elements $s_1, s_2, \dots, s_{20}$ in S and $\alpha_1, \alpha_2, \dots, \alpha_{10}, \beta_1, \beta_2, \dots, \beta_{10}$ such that $a = s_1\alpha_1s_2\alpha_2b, b = s_3\beta_1s_4\beta_2a, a = ba_3s_5\alpha_4s_6, b = a\beta_3s_7\beta_4s_8$ and $a = s_9\alpha_5b\alpha_6s_{10}, b = s_{11}\beta_5a\beta_6s_{12}$ or $a = s_{13}\alpha_7s_{14}\alpha_8b\alpha_9s_{15}\alpha_{10}s_{16}, b = s_{17}\beta_7s_{18}\beta_8a\beta_9s_{19}\beta_{10}s_{20}$

Preposition 2.0. *The relations R and L commute respected to the composition of relations, namely RoL =LoR.*

Proof. Since the relations R and L are equivalence relations, it is enough to show that RoL $\subseteq$Lo R. Let $(a, b) \in$ RoL. Then there exists $c \in S$ such that $a\mathrm{L}c$ and $c\mathrm{R}b$. We distinguish the cases:

Case 1. $a = c$. Then $a\mathrm{R}b$ and since $b\mathrm{L}b$ we have $(a, b) \in$LoR.

Case 2. $b = c$. Then $a\mathrm{L}b$ and since $a\mathrm{R}a$ we have $(a, b) \in$LoR.

Case 3. $a \neq c$ and $b \neq c$. Then, since $a\mathrm{L}c$ and $c\mathrm{R}b$ we have that there exist elements $x, y, z, t, u, v, w, k \in S$ and $\alpha, \beta, \gamma, \delta, \lambda, \mu, \theta, \varphi \in \Gamma$ such that:

$x\alpha y\beta a = c, z\gamma t\delta c = a, c\lambda u\mu v = b, b\theta w\varphi k = c$

We denote $d = z\gamma t\delta c\lambda u\mu v$. Then $a\lambda u\mu v = z\gamma t\delta c\lambda u\mu v = d$ and $d\theta w\varphi k = z\gamma t\delta c\lambda u\mu v\theta w\varphi k = z\gamma t\delta b\theta w\varphi k = z\gamma t\delta c = a$. Thus, we have aRd. We also have $z\gamma t\delta b = z\gamma t\delta c\lambda u\mu v = d$ and $x\alpha y\beta d = x\alpha y\beta z\gamma t\delta c\lambda u\mu v = x\alpha y\beta a\lambda u\mu v = c\lambda u\mu v = b$ that imply dLb. Thus aRd and dLb that both imply RoL $\subseteq$ LoR.

From the above preposition we have that LoR is an equivalence relation in S. Even this relation is called Green's relation in a $\Gamma-$ternary semigroup S and it is denoted D. Thus D=LoR = RoL.

Let S be a $\Gamma-$ternary semigroup and α, β two elements of Γ . We define a multiplication o in S by $aobboc = a\alpha b\beta c$, for every three elements of S. It is clear that (S, o) is a ternary semigroup. This ternary semigroup is denoted $S_{\alpha,\beta}$.

Definition 2.1. *A Γ–ternary semigroup is called a Γ–ternary group if for any $\alpha, \beta \in \Gamma$, the ternary semigroup $S_{\alpha,\beta}$ is a group.*

[4] Let S be a $\Gamma-$ternary semigroup and α, β two elements of Γ . An element e of S is called $\alpha, \beta-$idempotent if $e\alpha e\beta e = e$. The set of all $\alpha, \beta-$idempotents is denoted $E_{\alpha,\beta}$, whereas $\bigcup_{\alpha,\beta\in\Gamma} E_{\alpha,\beta}$ is denoted $E(S)$. The elements of the set $E(S)$ are called idempotents of S. A $\Gamma-$ternary semigroup S is called a $\Gamma-$idempotent semigroup if $S = E(S)$. If e is a $\alpha, \beta-$idempotent of a $\Gamma-$ternary semigroup S, then we denote $e\alpha S\beta e\alpha S\beta e$ the set of elements in the form $(e\alpha s_1\beta e)\alpha s_2\beta e$, for any $s_1, s_2 \in S$, which we simply denote $e\alpha s_1\beta e\alpha s_2\beta e$. The set $e\alpha S\beta e\alpha S\beta e$ is a ternary subsemigroup $S_{\alpha,\beta} = (S, o)$ since we have $eoSoeoSoe = e\alpha S\beta e\alpha S\beta e$. Furthermore, a $\alpha, \beta-$idempotent is the identity of this ternary subsemigroup since $eoeoe = e$ and consequently we have $eoeo(eoSoeoSoe) = (eoeoe)oSoeoSoe = eoSoeoSoe$, $(eoSoeoSoe)oeoe = eoSo(eoSoeoeoe) = eoSoeoSoe$.

Thus, for every two elements a, b in S, aDb if and only if there exists $c \in S$ such that aRc and cL b or there exists $c \in S$ such that aLc and cRb.

The equivalence classes of an element $a \in S$ related to the relations R,L,M,H,D are denoted R_a, L_a, M_a, H_a, D_a respectively.

Theorem 2.2. *Let S be a ternary semigroup, $\alpha, \beta \in \Gamma$ and e an $\alpha, \beta-$idempotent. Then*

$(i)\ \forall a \in L_e, a\alpha e\beta e = a$

$(ii)\ \forall a \in R_e, e\alpha e\beta a = a$

Proof. (i) Let $a \in L_e$. Then aLe. Thus $a = e$ or there exist $x, y \in S$ and $\alpha, \beta \in \Gamma$ such that $a = x\alpha y\beta e$. If $a = e$ then $a\alpha e\beta e = e\alpha e\beta e = e = a$. If $a = x\alpha y\beta e$ then $a\alpha e\beta e = (x\alpha y\beta e)\alpha e\beta e = x\alpha y\beta(e\alpha e\beta e) = x\alpha y\beta e = a$.

(ii) The proof is similar to (i)

Theorem 2.3. *(Green's Theorem for $\Gamma-$ternary semigroups) If the elements a, b, c and $a\alpha b\beta c$ belong to the same H-class H, then H is a ternary subgroup of a ternary semigroup $S_{\alpha,\beta}$.*

Definition 2.4. *An element a of a $\Gamma-$ternary semigroup S is called regular if there exist elements $x, y \in S$ and $\alpha, \beta, \gamma, \delta \in \Gamma$ such that $a = (a\alpha x\beta a)\gamma y\delta a = a\alpha x\beta(a\gamma y\delta a)$.*

Theorem 2.5. *If an element a of a $\Gamma-$ternary semigroup S is regular then every element of a D-class D_a is regular.*

Proof. Since a is regular, there exist elements $x, y \in S$ and $\alpha, \beta, \gamma, \delta \in \Gamma$ such that $a = (a\alpha x\beta a)\gamma y\delta a = a\alpha x\beta(a\gamma y\delta a)$. Let $b \in D_a$, that is to say aDb. Then aLc and cRb for any element $c \in S$. Since aLc, $a = c$ or there exist $x, y, z, t \in S$ and $\alpha, \beta, \gamma, \delta \in \Gamma$ such that $x\alpha y\beta a = c, z\gamma t\delta c = a$. Since cRb, $b = c$ or there exist $u, v, w, k \in S$ and $\lambda, \mu, \theta, \varphi \in \Gamma$ such that $c\lambda u\mu v = b, b\theta w\varphi k = c$.

We distinguish the cases:

Case 1. $a = c$ and $c = b$. Then $a = b$ and so an element b is regular.

Case 2. $a = c$ and $c\lambda\mu v = b, b\theta w\varphi k = c$. Then the following statements are true:
$\big(b\theta w\varphi(k\alpha x\beta a)\big)\gamma y\delta b = \big((b\theta w\varphi k)\alpha x\beta a\big)\gamma y\delta b = (c\alpha x\beta a)\gamma y\delta b = (c\alpha x\beta a)\gamma y\delta(c\lambda\mu v) =$
$(a\alpha x\beta a)\gamma y\delta(a\lambda\mu v) = \big((a\alpha x\beta a)\gamma y\delta a\big)\lambda\mu v = a\lambda\mu v = c\lambda\mu v = b$
which imply that an element b is regular.
Case 3. $x\alpha y\beta a = c, z\gamma t\delta c = a, b = c$. Then the following statements are true:
$\big(b\alpha x\beta(a\gamma y\delta z)\big)\gamma t\delta b = (c\alpha x\beta a)\gamma y\delta(z\gamma t\delta b) = (c\alpha x\beta(a\gamma y\delta z))\gamma t\delta b =$
$\big((x\alpha y\beta a)\alpha x\beta(a\gamma y\delta z)\big)\gamma t\delta b = \big((x\alpha y\beta a)\alpha x\beta a\big)\gamma y\delta(z\gamma t\delta b) = \big((x\alpha y\beta a)\alpha x\beta a\big)\gamma y\delta a =$
$\big(x\alpha y\beta(a\alpha x\beta a)\big)\gamma y\delta a = x\alpha y\beta\big((a\alpha x\beta a)\gamma y\delta a\big) = x\alpha y\beta a = b$
which imply that an element b is regular.
Case 4. $x\alpha y\beta a = c, z\gamma t\delta c = a, c\lambda\mu v = b, b\theta w\varphi k = c$. Then the following statements are true:
$\big(\ b\theta w\varphi\big(k\alpha x\beta(a\gamma y\delta z)\big)\big)\gamma t\delta b = \big((b\theta w\varphi k)\alpha x\beta(a\gamma y\delta z)\big)\gamma t\delta b =$
$\big(c\alpha x\beta(a\gamma y\delta z)\big)\gamma t\delta(c\lambda\mu v) = \big((x\alpha y\beta a)\alpha x\beta(a\gamma y\delta z)\big)\gamma t\delta(c\lambda\mu v) =$
$\big((x\alpha y\beta a)\alpha x\beta a\big)\gamma y\delta\big((z\gamma t\delta c)\lambda\mu v\big) = x\alpha y\beta\big((a\alpha x\beta a)\gamma y\delta a\big)\lambda\mu v = (x\alpha y\beta a)\lambda\mu v =$
$c\lambda\mu v = b$
which imply that an element b is regular again. Thus, in any case an arbitrary element b of D_a is regular.
In other words, this theorem shows that the regularity of an element of a D-class of a $\Gamma-$ternary semigroup injects this quality into every element of this D-class.
Let D be a D-class. From the above theorem, either every element of D is regular or any element of D isn't regular. A D-class is called *regular* if an element of it (and consequently every element of it) is regular.
Preposition 2.6. *If an element a of a $\Gamma-$ternary semigroup S is regular, then every L-class and every R-class contained in a D-class D_a has at least one idempotent element.*
Let S be a $\Gamma-$ternary semigroup. An equivalence relation ρ is called *a right congruence [a left congruence]* if for every $a, b, c, d \in S$ and for every $\alpha, \beta \in \Gamma$ the implication is true:
$(a, b) \in \rho \Rightarrow (a\alpha c\beta d, b\alpha c\beta d) \in \rho$
$$[(a, b) \in \rho \Rightarrow (d\beta c\alpha a, d\beta c\alpha b) \in \rho].$$
An equivalence relation ρ in S is called *a congruence* if it is simultaneously a left congruence and a right congruence.
Green's relation L [R] is a right congruence [a left congruence] in S. Indeed, if $(a, b) \in$ L then either $a = b$ or there exist elements $s_1, s_2, s_3, s_4 \in S$ and elements $\alpha, \beta, \gamma, \delta \in \Gamma$ such that
$a = s_1\alpha s_2\beta b \wedge b = s_3\gamma s_4\delta a$.
Thus, for every $c, d \in S$ and for every $k, \theta \in \Gamma$ we have either
$akc\theta d = bkc\theta d$
or
$akc\theta d = s_1\alpha s_2\beta(bkc\theta d) \wedge bkc\theta d = s_3\gamma s_4\delta(akc\theta d)$
And consequently $(akc\theta d, bkc\theta d) \in$ L.
In a similar way we show that R is a left congruence.
Let S be a $\Gamma-$ternary semigroup and ρ a congruence in S. For every $a, a', b, b', c, c' \in S$ and for every $\alpha, \beta \in \Gamma$, since ρ is a right congruence and a left congruence, the following statements are true:
$\big(a \equiv a'(\rho), b \equiv b'(\rho), c \equiv c'(\rho)\big) \Rightarrow \big(a\alpha b\beta c \equiv a'\alpha b\beta c(\rho), a'\alpha b\beta c \equiv a'\alpha b'\beta c(\rho), a'\alpha b'\beta c \equiv$
$a'\alpha b'\beta c'(\rho)\big) \Rightarrow a\alpha b\beta c \equiv a'\alpha b'\beta c'(\rho)$

.

Then, for equivalence classes according to $\rho, \bar{a}, \overline{a'}, \bar{b}, \overline{b'}, \bar{c}, \overline{c'}, \overline{aa'b\beta c}, \overline{a'ab'\beta c'}$ we have:
$\bar{a} = \overline{a'}, \bar{b} = \overline{b'}, \bar{c} = \overline{c'} \Rightarrow \overline{aa'b\beta c} = \overline{a'ab'\beta c'}$.
Thus, in the factor set S/ρ a factor operation is correctly defined through the elements of Γ by the equality:
$\bar{a}\alpha\bar{b}\beta\bar{c} = \overline{aa'b\beta c}$.
An ordered pair $(S/\rho, S/\rho\,(\cdot)_\Gamma)$ is a $\Gamma-$ternary semigroup since for every $\bar{a}, \bar{b}, \bar{c}, \bar{d}, \bar{e} \in S/\rho$ and for every $\alpha, \beta, \gamma, \delta \in \Gamma$ the following statements are true:
$(\bar{a}\alpha\bar{b}\beta\bar{c})\gamma\bar{d}\delta\bar{e} = \overline{aa'b\beta c}\gamma\bar{d}\delta\bar{e} = \overline{(aa'b\beta c)\gamma d\delta e} = \overline{aa'b\beta(c\gamma d\delta e)} = \bar{a}\alpha\bar{b}\beta\overline{c\gamma d\delta e} =$
$\bar{a}\alpha\bar{b}\beta(\bar{c}\gamma\bar{d}\delta\bar{e})$
.
A $\Gamma-$ternary semigroup $(S/\rho, S/\rho\,(\cdot)_\Gamma)$ is called a *$\Gamma-$factor semigroup according to congruence ρ in S of a $\Gamma-$ternary semigroup S* and when there is no ambiguity is simply denoted S/ρ.

Theorem 2.7. *Let S be a $\Gamma-$ternary semigroup and ρ a congruence in S.*

1) *If $\rho \subseteq L$ then for every two elements a, b of S, a L b if and only if $\bar{a}$ L $\bar{b}$ in S/ρ*
2) *If $\rho \subseteq R$ then for every two elements a, b of S, a R B if and only if $\bar{a}$ R $\bar{b}$ in S/ρ*
3) *If $\rho \subseteq \mathcal{M}$ then for every two elements a, b in S, a M b if and only if $\bar{a}$ M $\bar{b}$ in S/ρ*
4) *If $\rho \subseteq H$ then for every two elements a, b in S, a H b if and only if $\bar{a}$ H $\bar{b}$*

Proof. 1) Let a, b be elements in S such that a L b. Then $a = b$ or there exist $x, y, z, t \in S$ and $\alpha, \beta, \gamma, \delta \in \Gamma$ such that $a = x\alpha y\beta b$ and $b = z\gamma t\delta a$. Let's consider two possible cases:
Case 1. $a = b$. Then $\bar{a} = \bar{b}$ and consequently a R a and $\bar{a}$ R $\bar{a}$ are both true statements, hence they are equivalent.
Case 2. $a = x\alpha y\beta b$ and $b = z\gamma t\delta a$. Then $\bar{a} = \overline{x\alpha y\beta b} = \bar{x}\alpha\bar{y}\beta\bar{b}$ and $\bar{b} = \overline{z\gamma t\delta a} = \bar{z}\gamma\bar{t}\delta\bar{a}$ and consequently $\bar{a}$ L $\bar{b}$ in S/ρ.
Conversely, suppose that for every two elements a, b in S we have $\bar{a}$ L $\bar{b}$. Thus, $\bar{a} = \bar{b}$ or there exist elements $x, y, z, t \in S$ and $\alpha, \beta, \gamma, \delta \in \Gamma$ such that $\bar{a} = \bar{x}\alpha\bar{y}\beta\bar{b}$ and $\bar{b} = \bar{z}\gamma\bar{t}\delta\bar{a}$. Let's consider two possible cases :
Case 1. $\bar{a} = \bar{b}$. Thus $(a, b) \in \rho$ and consequently, since $\rho \subseteq L$ we have $(a, b) \in L$, that is to say $\bar{a}$ L $\bar{b}$.
Case 2. $\bar{a} = \bar{x}\alpha\bar{y}\beta\bar{b}$ and $\bar{b} = \bar{z}\gamma\bar{t}\delta\bar{a}$. Then $\bar{a} = \overline{x\alpha y\beta b}$ and $\bar{b} = \overline{z\gamma t\delta a}$. Thus, $(a, x\alpha y\beta b) \in \rho$ and $(b, z\gamma t\delta a) \in \rho$. Since $\rho \subseteq L$ we have $(a, x\alpha y\beta b) \in L$ and $(b, z\gamma t\delta a) \in L$. Thus:
$a \in S^1\Gamma S^1(x\alpha y\beta b) \subseteq S^1\Gamma S^1 b = (b)_l$
$b \in S^1\Gamma S^1(z\gamma t\delta a) \subseteq S^1\Gamma S^1 a = (a)_l$.
Hence we find the equality $(a)_l = (b)_l$ and consequently a L b.
2) and 3) are proved in a similar way to 1).
4) derived from the first three.
A congruence ρ in S is called *right reductive [left reductive]* if for every $a, b, c, d \in S$ and for every $\alpha, \beta \in \Gamma$ we have:
$(aac\beta d, bac\beta d) \in \rho \Rightarrow (a, b) \in \rho$
$[(d\beta caa, d\beta cab) \in \rho \Rightarrow (a, b) \in \rho]$.
A $\Gamma-$ternary semigroup S is called *right reductive [left reductive]* if the equality in S is a right reductive congruence [left reductive congruence]. In other words:
A $\Gamma-$ternary semigroup S is called right reductive [left reductive] if for every $a, b, c, d \in S$ and for every $\alpha, \beta \in \Gamma$ the equality $aac\beta d = bac\beta d$ [$d\beta caa = d\beta cab$] implies the equality $a = b$.
A $\Gamma-$ternary semigroup is called reductive if it is right reductive and left reductive at the same time.

Theorem 2.8. *Let S be a $\Gamma-$ternary semigroup and ρ a congruence in S.*
1) A congruence ρ is right reductive if and only if S/ρ is a right reductive $\Gamma-$ternary semigroup.
2) A congruence ρ is left reductive if and only if S/ρ is a left reductive $\Gamma-$ternary semigroup.
3) A congruence ρ is reductive if and only if S/ρ is a reductive $\Gamma-$ternary semigroup.

Proof. 1) Let ρ be a right reductive congruence. If the elements $\bar{a}, \bar{b}$ of S/ρ are such that for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$ we have $\bar{a}\alpha\bar{c}\beta\bar{d} = \bar{b}\alpha\bar{c}\beta\bar{d}$, then $(a\alpha c\beta d, b\alpha c\beta d) \in \rho$ for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$. Thus, since ρ is right reductive, we have $a = b$ and consequently $\bar{a} = \bar{b}$. Thus S/ρ is a right reductive $\Gamma-$ternary semigroup.
Conversely, assume S/ρ is a right reductive $\Gamma-$ternary semigroup. Let a, b be two elements of S such that for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$ we have $\overline{a\alpha c\beta d} = \overline{b\alpha c\beta d}$. Thus $\bar{a}\alpha\bar{c}\beta\bar{d} = \bar{b}\alpha\bar{c}\beta\bar{d}$ for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$. Since S/ρ is a right reductive $\Gamma-$ternary semigroup, $\bar{a} = \bar{b}$. Thus $(a, b) \in \rho$.
2) The proof is similar to 1).
3) It follows from 1) and 2).
We define two relations ρ_l and ρ_r in a $\Gamma-$ternary semigroup S as follows:

$$\rho_l = \{(a, b) \in SxS \,/\, \forall (c, d, \alpha, \beta) \in S^2 x\, \Gamma^2, d\beta c\alpha a = d\beta c\alpha b\},$$

$$\rho_r = \{(a, b) \in SxS \,/\, \forall (c, d, \alpha, \beta) \in S^2 x\, \Gamma^2, a\alpha c\beta d = b\alpha c\beta d\}.$$

It is easy to show that the relation ρ_l is a right congruence in S whereas ρ_r is a left congruence in S.
Related to relations ρ_l and ρ_r the following two theorems are true.

Theorem 2.9. *Let S be a $\Gamma-$ternary semigroup.*
1) A $\Gamma-$ternary semigroup S is left reductive if and only if $\rho_l = id_S$
2) A $\Gamma-$ternary semigroup S is right reductive if and only if $\rho_r = id_S$

Proof. 1) Suppose that S is a left reductive $\Gamma-$ternary semigroup. Let a, b be elements of S such that $a\rho_l b$. Thus, for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$ we have $d\beta c\alpha a = d\beta c\alpha b$. Since S is left reductive, $a = b$ and consequently $\rho_l = id_S$.
Converseley, assume $\rho_l = id_S$. Let a, b be elements of S such that $d\beta c\alpha a = d\beta c\alpha b$ for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$. Thus $(a, b) \in \rho_l$. Since $\rho_l = id_S$ we have $a = b$. Thus S is a left reductive $\Gamma-$ternary semigroup.
2) The proof is similar to 1).

Theorem 2.10. *Let S be a regular $\Gamma-$ternary semigroup (it is called such when each of its elements is regular).*
1) $\rho_l \subseteq L$
2) $\rho_r \subseteq R$

Proof. 1) Let $(a, b) \in \rho_l$. Then for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$, $d\beta c\alpha a = d\beta c\alpha b$. Since $a \in S\Gamma S\Gamma a$ and $b \in S\Gamma S\Gamma b$ we have that S is regular, $(a)_l = (b)_l$ namely aLb. Thus $\rho_l \subseteq L$.
2) The proof is similar to 1).

Theorem 2.11. *Let S be a regular $\Gamma-$ternary semigroup.*
1) ρ_l is the smallest left congruence in S
2) ρ_r is the smallest right congruence in S

Proof. Let $a, b \in S$. Suppose that for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$, $(d\beta c\alpha a, d\beta c\alpha b) \in \rho_l$. Thus, for every $t_1, t_2, t_3, t_4 \in S$ and for every $\alpha, \beta, \gamma, \delta \in \Gamma$ we have

$$t_1\alpha t_2\beta t_3\gamma t_4\delta a = t_1\alpha t_2\beta t_3\gamma t_4\delta b \quad (*)$$

For every element $t' \in S$, since S is regular, there exist $x, y, z \in S$ and elements $\alpha_1, \alpha_2, \alpha_3, \alpha_4 \in \Gamma$ such that $t' = t'\alpha_1 x \alpha_2 y \alpha_3 z \alpha_4 t'$. Taking in equality (*) $t_1 \alpha t_2 = t'\alpha_1 x \alpha_2 y \alpha_3 z$ and $t_4 = t'$, $\alpha = \alpha_4$ we have $(a, b) \in \rho_l$ and consequently ρ_l is a left reductive congruence in S.

On the other side, let ρ be a left reductive congruence in S. If $(a, b) \in \rho_l$, then for every $c, d \in S$ and for every $\alpha, \beta \in \Gamma$ we have $d\beta c\alpha a = d\beta c\alpha b$. Since ρ is a reflective relation, $(d\beta c\alpha a, d\beta c\alpha b) \in \rho$. Thus $(a, b) \in \rho$ since ρ is a left reductive congruence.

2) The proof is similar to 1).

References

[1] F.M. Sioson, Ideal Theory in Ternary Semigroups, Math.Jpn. **10**, 63-84 (1965)

[2] S.Kar and B.K.Maity, Congruences on Ternary Semigroups, Journal of the Chungcheong Mathematical Society **20**, (2007)

[3] V.N.Dixit and Sarita Dewan, A Note on Quasi and Bi-Ideals in Ternary Semigroups, Internat.J.math&Math.Sci. **18**, 501-508 (1995)

[4] Dasari Madhusudhana Rao, Structure and Study of Elements in Ternary Γ-Semigroups

[5] D.H. Lehmer, A Ternary Analogue of Abelian Groups, Am.J.Math. **54**, 329-338 (1932)

[6] T. K. Dutta and S. Kar, On regular ternary semirings, Advances in Algebra, Proccedings of the ICM Satellite Conference in Algebra and Related Topics, World Scientific, new Jersey, 2003, pp. 343-355

[7] V. N. Dixit and S. Dewan, Minimal quasi-ideals in ternary semigroups, Indian j. pure Appl. Math. **28** (1997), 255-632

[8] M. K. Sen and N. K. Saha (1985), On Γ-semigroup - I, Bull. Cal. Math. Soc. **78**, 180-186 (1986)

[9] N. K. Saha, On Γ-semigroup - II, Bull. Cal. Math. Soc. **79**, 331-335 (1987)

[10] N. K. Saha, On Γ-Semigroup - III, Bull. Cal. Math. Soc. **80**, 1-12 (1988)

[11] T. K. Dutta and T. K. Chatterife, Green′s equivalences on Γ-semigroup, Bull. Cal. Math. Soc. **80**, 30-35 (1987)

[12] P. Petro and Th. Xhillari, Green′s theorem and quasi-ideals in Γ-semigroups, International Journal of Algebra Vol 5, 2011, no. **10**, 461-470

[13] Th. Xhillari, Kuazi-idealet ne Γ-gjysmegrupe, Buletini i Shkencave Natyrore nr **5**, 16-24 (2008)

ANTICANCER DRUG DISCOVERY BASED ON NATURAL PRODUCTS: FROM COMPUTATIONAL APPROACHES TO CLINICAL STUDIES

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Abstract
Globally, malignancies cause one out of six mortalities, which is a serious health problem. Cancer therapy has always been challenging, apart from major advances in immunotherapies, stem cell transplantation, targeted therapies, hormonal therapies, precision medicine, and palliative care, and traditional therapies such as surgery, radiation therapy, and chemotherapy. Natural products are integral to the development of innovative anticancer drugs in cancer research, offering the scientific community the possibility of exploring novel natural compounds against cancers. The role of natural products like Vincristine and Vinblastine has been thoroughly implicated in the management of leukemia and Hodgkin's disease. The computational method is the initial key approach in drug discovery, among various approaches. This review investigates the synergy between natural products and computational techniques, and highlights their significance in the drug discovery process. The transition from computational to experimental validation has been highlighted through in vitro and in vivo studies, with examples such as betulinic acid and withaferin A. The path toward therapeutic applications have been demonstrated through clinical studies of compounds such as silvestrol and artemisinin, from preclinical investigations to clinical trials. This article also addresses the challenges and limitations in the development of natural products as potential anti-cancer drugs. Moreover, the integration of deep learning and artificial intelligence with traditional computational drug discovery methods may be useful for enhancing the anticancer potential of natural products.

Keywords: Natural product , anticancer drug delivery ,computational drug design,clinical trails,molecular dynamics ,drug design.

GROWTH PERFORMANCE AND PROXIMATE COMPOSITION OF *CLARIAS GARIEPNUS* FED WITH COMMERCIAL AND LOCALLY FORMULATED DIET

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Abstract

This study evaluated the growth performance and proximate composition of *Clarias gariepinu*s fed with commercial and locally formulated diet. Two commercial fish feeds (Aller Aqua and Blue Crown) were used. The local fish feed was formulated using fish meal, wheat bran, soya beans, groundnut cake, red maize, lysine, methionine, premix, and salt. The feed was formulated to provide 40% crude protein using the Pearson square method of feed formulation.The experiment consists of 3 groups: -groups A, B, and C respectively. Group A was fed with a locally formulated diet, group B was fed with Aller aqua and Group C was fed with Blue Crown. Fingerlings were randomly stocked in 3 big rubber bowls of size 60L liters and fed with different diets for 12 weeks. The growth performance were determined using the standard formula by Jamabo and Ockiya 2008, Growth performance showed that fish fed with Aller aqua fish feed yielded the best (228.33+-7.70). The proximate compositions of the fish samples were determined using AOAC methods. The protein content of fish fed with locally formulated diet was higher (41.45± 0.40) than that of B (38.85± 0.20) and C (40.19± 1.16) respectively. Ash content varied among the three groups but differences were not statistically significant ($p>0.05$). The moisture content was higher in group B (73.07± 0.18) than in group A (65.64±0.10) and C (70.00+-0.20). The highest percentage of lipid composition was observed in group A with a mean value of (20± 0.40) while the least was in group C with a mean value of (11.50± 0.50%).

KEYWORDS: Growth Performance, Proximate composition, *Clarias gariepinus*, locally formulated diet

1 INTRODUCTION

African catfish (*Clarias gariepinus)* is an economical food fish cultured primarily in freshwater (FAO,2011). It is one of the most common cultured fish species consumed as food in Nigeria due to its tolerance to a wide range of temperatures (Adeyemo and Fagbenro 2016), fast growth (FAO, 2021) adaptation to diverse environments (Onwuka and Nwosu , 2010) as well as to low oxygen and high salinity levels FAO, 2011). Fish is a food with excellent nutritive value, which provides high quality protein and a large variety of vitamins and minerals i.e. vitamin A & D, magnesium and phosphorus (Sarvenaz and Sabine, 2018). The micro and macro nutrients present in fish

makes it better from other animal protein sources (Sujatha *et al.,* 2013). Apart from being food source, fish also functions to prevent human beings from variety of diseases in the world (Abraha, 2018). The vitamins, minerals, and fatty acids in fish can provide significant health benefits. The vitamin B12 found in fish is crucial for the growth of healthy red blood cells, DNA reproduction, and nerve function (National institutes of Health, 2021). Consuming enough vitamin B12 is linked to a lower risk of dementia (oulhaj *et al*., 2016) and heart disease (National Institute of Health,2021). A lack of vitamin B12 is also connected to problems like chronic fatigue and anemia (National Institute of Health, 2021). Fish are rich in a type of fat known as omega fatty acids. These fats are important for maintaining brain health. Having a low blood level of omega-3 fatty acids has been connected to accelerate brain aging, including symptoms like memory loss and cognitive impairment (University of California,Los Angeles, 2017) In fact, these low levels of omega fatty acids have been linked to brain shrinkage during aging.

Fish is an important component of human nutrition and the benefit of this meat matrix is highly associated to the quality of their lipid content (Kris-Etherton *et a*l.,2002). Fish lipids are well known to be rich in long-chain (LC) n-3 polyunsaturated fatty acids (LC n-3 PUFA), especially 20:5 n-3 eicosapentaenoic acid (EPA) and 22:6 n-3 docosahexaenoic acid (DHA). Long chain, n-3 PUFA cannot be synthesized by humans and must be obtained from the diet (Alasalvar *et al*., 2002).The recommended n-6/n-3 fatty acid ratio in human nutrition is 5:1, but this ratio (n-6/n-3) varies between 7:1 and 20:1 in wthe diets of most West Europeans and North Americans (Liu *et al*.,2021). The n-3/n-6 fatty acid ratio recommended by the World Health Organization is 1:1 or above (WHO, 2022). Fish plays an important role in the diets, constituting the main and often irreplaceable animal protein source in both urban and rural households (Beverly *et al*., 2022). It is estimated that around 60 percent of people in many developing countries depend on fish for over 30 percent of their animal protein supplies, while almost 80 percent in most developed countries obtain less than 20 percent of their animal protein from fish (FAO, 2022). The aim of this study was to determine the proximate composition and growth performance of African catfish (C*larias gariepinus*) fed with commercial and locally formulated feed.

2. MATERIALS AND METHODS

2.1 EXPERIMENTAL SITE

The research was carried out in Birnin Kebbi which lies at latitude 120 32'N and longitude 40 12'E and an altitude of 200m above the sea level in the Sudan Savannah vegetation zone in northern Nigeria. The area has a semi-arid climate that is characterized by a long dry (October-May) and a short wet June- September season, with a mean annual rainfall of 665mm. The temperature ranges between 22 to 450C (Adekunle, 2004).

2.2 Acquisition of Experimental Fish and Morphometric Measurement

C*larias gariepinus* fingerlings were obtained from Labana farm Aleiro. Upon arrival fish was stocked in 60-litre plastic tanks and acclimatized for two weeks. During acclimation, fish was fed 5% of the body weight twice a day. Individual data for fish length and weight was taken and recorded. The standard length was measured using a graduated fish measuring board. The weight was measured with a Satorious top loading electronic weighing balance, Satorious-Werke GMBH model (Type 1106/ Fabr. Nr. 2608053).

2.3 Acquisition of Fish Feed

Two (2) commercial fish feeds were purchased from the market namely: -Blue crown fish feed and Aller aqua fish feed and one (1) local fish feed was formulated which served as the control diet. The ingredients for the local fish feed include: - yellow Maize, soybeans, Fish meal, wheat bran. The feedstuffs were obtained locally from the market.

2.4 Feed Formulation

The feed was formulated to provide 40% crude protein. Pearson square method of feed formulation was used to formulate the diet (Dale and fuller, 2009). The feed stuffs were grounded separately, carefully weighed and mixed in a pelleting/mixing machine, hot water was added at

intervals to gelatinize the starch, feeds were pelleted using 2mm diameter die, air dried and packed in a polythene bag, sealed and stored until used.

2.5 Experimental design

Ninety fingerlings of *Clarias gariepinus* were divided into 3 groups namely:- Group A, B and C. The experimental setup was composed of 3 plastic bowls of 60L each. Each group consists of 30 fingerlings. The water quality parameters such as Dissolved oxygen, pH and Temperature were monitored. Fish was fed 5% body weight/day with diets with each group having a different diet at two installments between 0900-0930 and 1700-1730 for 12 weeks. Fish in each tank was counted and weighed every two weeks. Concrete tanks were drained and washed twice a week and replenished with fresh water.

2.6 Determination of Growth Parameters

The following growth performance indices were estimated using standard formulae (Jamabo and Ockiya, 2008) as follows;

Mean Weight Gain (MWG) (g) = Final Weight (g) –Initial Weight (g).

Average Daily Growth (ADG) = MWG (g)/length of feeding trial (t) (days).

Specific Growth Rate (SGR, %/day) = 100(lnW2 –lnW1)/T2-T1

Where: W2 = Weight at time T2; W1 = Weight at time T1

Survival rate (SR) = 100(Number at end of feeding trial/Number at start of feeding trial)

2.7 fish Preparation for Proximate Analysis

Each fish was dissected, gutted, cleaned, filleted and oven dried at a temperature of 40 -60ºC. The muscles of the dried samples were prepared into powdered form and labeled for the proximate and fatty acid analyses (Alam and chowdhurry, 2018)

2.8 Analysis of the Proximate Composition of Fish samples

2.8.1 Determination of the Moisture Content

A known amount of sample (10g) was weighed and placed into a mechanical oven set at 105°C for 24 h. After drying, the sample was removed and placed in a desiccator. The sample was then be reweighed. Sample weight was calculated by subtracting the weight of the empty dish from the weight of the dish plus its contents. The dry weight was divided by original sample weight and expressed in percent (AOAC, 2019).

$$\% \text{ of Moisture} = \frac{(\text{Weight of Original Sample} - \text{Weight of Dried Sample})}{\text{Weight of Original Sample}} \times 100$$

2.8.2 Determination of Ash Content

A sample weighing approximately 3 g was weighed and incinerated at 525 °C for 24 h in a muffle furnace. After this, it was placed in a desiccator for cooling and then re-weighed. The ash weight was divided by original sample weight and expressed in percent (AOAC, 2019).

$$\% \text{ of Ash} = \frac{\text{Weight of Ash}}{\text{Weight of Sample}} \times 100$$

2.8.3 Determination of protein content

The total nitrogen (crude protein) was determined using the Kjeldahl method. About 0.5 g of the fish sample was weighed on a Nitrogen-free paper. The paper was wrapped round the sample and dropped at the bottom of the Kjeldahl digestion flask together with 6-8 glass beads, 4-5 spatulas full of granular mixture of $CuSO_4$ and K_2SO_4 as catalyst and 20 ml of concentrated H_2SO_4 was carefully added. The flask was gently heated on a Gerhardt heating mantle in an inclined position in a fume cupboard until full digestion was achieved (when the liquid changed from brown to colourless). The contents of the flask were then transferred to a clean 100 ml volumetric flask, and 25 ml aliquot was used for the distillation and total nitrogen was determined calorimetrically (AOAC,2016).

2.8.4 Determination of Lipid Content

The percentage lipid content in the muscles was determined using the soxhlet extraction method of (Bolawa, *et. al.*, 2011). An empty extraction thimble was weighed and noted as W_1, about 5 g of

the sample was measured into the empty thimble, the weight of the extraction thimble plus the sample was recorded as W_2. The extraction thimble and its content was placed gently in the extractor, 110 ml of petroleum ether at 40 – 60 °C boiling point was turned into the round bottom flask and then placed in the heating mantle, the extractor was fitted onto the round bottom flask followed by the reflux condenser and connected to tapped water inlet tube with the outlet emptied in the sink.

The heating mantle was switched on and adjusted so that the solvent in the round bottom flask boils gently. During the heating process, water was allowed to run constantly through the reflux condenser to cool and condense the evaporating solvent which then collects in the extractor thus extracting the lipid from the sample in the extraction thimble of the extractor, when the extractor is filled with solvent it was then siphoned back into the round bottom flask, this process goes on continuously for 6 hours. At the end of 6 hours, the extraction thimble and its content was removed from the extractor and oven dried at 50°C to a constant weight which was recorded as W_3. The percentage lipid was calculated as follows:

$$\% \text{ Lipid Content} = \frac{W_2 - W_3}{W_2 - W_1} \times 100$$

Where:

W_1 = Weight of empty extraction thimble

W_2 = Weight of extraction thimble plus sample extraction

W_3 = Weight of extraction thimble plus sample residue after extraction.

2.8.5 Determination of Carbohydrate

The carbohydrate will be determined using

% of Carbohydrate = 100 – (moisture + ash + protein + fat)

2.9 Statistical Analysis

Data on proximate composition and growth parameters were analyzed using SPSS version 20.0. all datas were presented in mean ± standard deviation.

3 RESULTS

3.1 Growth parameters of the experimental fish

The growth parameters of the experimental fish are presented in table 3. The highest mean weight gain (228.33±7.70) was observed in group B while the least was observed in group A(40.33±4.93). The highest Average daily growth was observed in group B (2.73±0.93) and the least was in group A (0.48±0.6). The highest specific growth rate was seen in group B (5.93±0.46) and the least in group A (4.05±0.6). The highest survival rate was seen in group B (83.33±0.20) and the least was observed in group A(70.00±0.50).

Table 3: Growth Parameters of the experimental fish

Parameters	Group (A)	Group (B)	Group(C)
Iw	1.09 ± 0.07^{a}	1.06 ± 0.03^{a}	1.06 ± 0.02^{a}
Fw	42.07 ± 5.15^{a}	230.33 ± 77.09^{c}	178.67 ± 52.52^{b}
MWG	40.33 ± 4.93^{a}	228.33 ± 7.70^{c}	176.67 ± 5.25^{b}
ADG	0.48 ± 0.6^{a}	2.73 ± 0.93^{b}	2.10 ± 0.63^{b}
SGR	4.05 ± 0.6^{a}	5.93 ± 0.46^{b}	5.66 ± 0.31^{b}
SR	70.00 ± 0.50^{a}	83.33 ± 0.20^{c}	76.66 ± 0.10^{b}

n = 3. Values are expressed as Mean ± Standard deviation, Groups with similar superscript along the raw shows no significant difference at $P< 0.05$

Keys:

Iw= Initial Weight

Fw= Final weight

MWG= Mean weight gain

ADG= Average daily growth

SGR= Specific growth rate
SR= Survival rate

3.2 proximate compositions of experimental fish

The proximate composition of the experimental fish presented in Table 2 shows that the highest percentage lipid (20.00±0.40%) was observed in group A, while the least was in group C (11.00±0.10%). The highest percentage crude protein was observed in group A (41.48±0.40) while the least was in group B (38.85 ±0.20). The highest percentage moisture content was seen in group B(73.07 ±0.18) while the least was seen in group A(65.64 ±0.10). The highest percentage Ash was observed in group B(1.33 ±0.30) while the least was in group A(1.17 ±0.30).The highest percentage fibre was observed in group C(6.00 ±1.98) while the least was in group A(1.50 ±0.22).

Table 2: Proximate composition of fish samples

Parameters	Group (A)	Group (B)	Group (C)
Moisture	65.64±O.10^{a}	73.07±0.18^{c}	70.00±0.20^{b}
Ash	1.17±0.30^{a}	1.33±0.30^{a}	1.23±0.30^{a}
Lipid	20.00±0.40^{b}	11.50±0.50^{a}	11.00±0.10^{a}
C.P	41.48±0.40^{b}	38.85±0.20^{a}	40.19±1.16^{b}
Fibre	1.50±0.22^{a}	3.50±0.50^{b}	6.00±1.98^{c}
CHO	11.03±0.50^{a}	15.65±0.20^{b}	11.97±2.87^{a}

n = 3. Values are expressed as Mean ± Standard deviation, Groups with similar superscript along the raw shows no significant difference at P< 0.05.Keys: C.P= Crude protein, CHO= Carbohydrate

4. Discussion

Growth data parameters, survival and mortality are great tools for evaluating the effects of feed and its value composition on fish species. This study showed that local feed used in this research (like most other local feeds sold and used for feeding *C.gariepinus* and other fish species in Nigeria) produced poor growth response in *C.gariepinusas* compared to the imported foreign commercial feed of Aller aqua and blue crowns. These findings are however in agreement with the findings of Mustapha *et al,* (2014) and Solomon and Oyategba, (2018) who also observed lower growth rate in fish fed with local diet than fish fed with commercial diet. The good growth performance of fish fed with Aller aqua and blue crowns are as a result of the synthetic growth promoters in the feed. The poor growth response of fish in group A was due to very low level of lipid in the local feed. In the results of Agokei *et al*. (2011), significant highest growth performance of *C. gariepinus* juveniles was found in the diet that contained <2% fiber content.The low ash content found in the local feed could also be responsible for the poor growth performance of the fish in group A. This occurred as a result of necessary mineral elements such as calcium and phosphorous that promotes growth in fish lacking in the local feed. Ali and Jauncey (2004) noted a better growth performance of *C. gariepinus on* diet containing 9.3% ash content, while Alam *et al*. (2012) is of the opinion that ash content in the feed of *C. gariepinus* should not be less than 8%. High ash content of >12% in feed has been reported to produce better growth performance in Clarias species (Kiriratnikom and Kiriratnikom 2012; Corn´elio *et al*., 2014). The results obtained in this study yielded quite acceptable growth responses in fish fed different commercial diets when compared to those fed with the control diet. The growth data of *C. gariepinus* fed with local and commercial feed shows there was significant difference in the growth data among the fish fed with three kinds of feeds. Fish which were fed with imported commercial feed of Aller aqua showed significantly higher weight increase, specific growth rate (SGR) than fish which were fed with local feed. These findings were also in agreement with the findings of Hassan *et al*. (2020) and Mustapha *et al.* (2014). For the entire experimental period live weight of *C. gariepinus* fed with the commercial di*et al*ler aqua I.e group B were higher than that of other diets group A and C.

Similar trends were evident for % weight gain and specific growth rate (SGR). There was also significant difference in the survival and mortality of the fish among the groups, group B shows higher survival rate than that of group A and C.

The result of the proximate composition of the fish fillets in three groups revealed that the Moisture content of fish muscle was within previously reported range in other fishes (Gallagher *et al.,* 1991). Percentage Ash and crude protein obtained in group of fish fed with coppens where however different from the result obtained by Solomon and Oyategbe (2018). The ash content of the three groups shows that there was no significant difference between the groups. The ash content obtained from the three groups of fish is also lower than that obtained by Ayofe *et al*. (2022). Group A (fishes fed with local diet) has the highest percentage protein and lipid compared to the other two groups fed with commercial feed. Protein and lipid content are great tools for evaluating the quality of fish. The protein content in all the three groups being far greater than 15%, affirmed that the fishes belong to the high protein fish category (Fakoya *et al*., 2019). Higher values of crude protein were observed by Hussaini *et al.* (2020) and Ayofe *et al*. (2022). The percentage crude fibre of group A was similar to that obtained by Hussain *et al.* (2020). The differences in protein content could be as a result of different feed being fed to these fishes. According to the Association of Official Analytical Chemists (AOAC, 1988), proteins are a major constituent when evaluating the nutritional value of fish. Thus, high protein obtained in group A fishes makes them important candidates of good dietary protein sources. The observed range content indicated that the African catfish is a good source of minerals such as calcium, potassium, zinc, iron and magnesium. The Highest lipid composition was seen in group A however, there was significant difference between that of group B and C.

Carbohydrate is a good source of instant energy that helps in the body's development and growth. The result of this study shows that the various groups of fish are good sources of carbohydrate. Group B has the highest carbohydrate composition; there was no significant difference between that of group A and C. The values of carbohydrate in both groups were due to high moisture and high protein content.

5 Conclusion

According to the findings of this study, fish fed with Aller aqua feed showed higher percentage of moisture, ash, fibre and carbohydrate however, fish fed with locally formulated feed showed higher percentage of lipid and protein. In addition to this, the fish fed with commercial feeds are much bigger in size compared to those fed with local feed at the end of the feeding trial. The larger sizes of fish in group B and C however might be attributed to the growth hormones in the feeds.

6 Recommendations

1. From the result obtained from this study, it can be deduced that fish fed with locally formulated feed is of more quality as it contain higher percentage of protein and lipid than group B and C.
2. Alternative for growth promoters that are safe can be research on with proximate and fatty acid composition in focus.

References

Adekunle, T.O. (2004). Determining Rainfall Onset and Retreat Dates in Nigeria,J.um. *Ecol*., **16**(4): Pp. 239-247.

Adeyemo, O. K., & Fagbenro, O. A. (2016). Comparative performance of Clarias gariepinus (Burchell, 1822) and Heterobranchus longifilis (Valenciennes, 1840) cultured in concrete tanks at ambient temperature in Ibadan, Nigeria. Journal of Aquaculture Research & Development, 7(6), 1-5.

Agokei, E. O., Oparah, C. A., Aranyo, A. and Apapa, U. (2011). Growth of *Clarias gariepinus* juveniles fed five commercial feed. *Continental Journal of Fish and Aquatic Science* **5**(3): 1-5.

Alam, M. A., and Chowdhury, M. A. K. (2018). Nutritional composition of some commercially important fish species of Bangladesh. *Journal of Aquaculture Research & Development*, **9**(7), 541. doi:10.4172/2155-9546.1000541

Alam, M. K., Habib, M. A. B., and Tahmid, M. S. (2012). A survey on commercial fish feed used at Fulpur area in Mymensingh District. *Journal of Bangladesh Agricultura*l University **10**(1): 175-178. DOI: 10.3329/jbau.v10i1.12111

Alasalvar, C., Taylor, K. D. A., Zubcov, E., Shahidi, F., and Alexis, M. (2002). Differentiation cultured and wild sea bass (*Dicentrarchuslabrax*) total lipid content, fatty acid and trace mineral composition. *Food Chemistry,* **79**(2):145-150. Doi: 10.1016/S0308-8146 (02)00122-X6

Ali, M. Z. and Jauncey, K. (2004). Effect of feeding regime and dietary protein on growth and body composition of *Clarias gariepinus* (Burchell, 1822). *Indian Journal of fisheries*, **51**(4): 407-416

Association of Official Analytical Chemists (AOAC) (2019). Official Methods of Analysis of AOAC International (21st ed.). AOAC International.

Beverly, S. Khan et al. (2022). Fish for Food Security in Low-Income Countries: Demand, Trade, and Access. Frontiers in Nutrition, 9: 803242. https://doi.org/10.3389/fnut.2022.803242

Bolawa, R. E., Cibenle, G. O., Ayodele, S. O. A., Lewis, O. R., Mosuro, A. O. and Apata, O. S. (2011). Proximate composition properties of different fish species obtained from Lagos, Nigeria. *Internal journal of food safety*. **13:** 342-344.

Corn'elio, F. H. G., Cunha, D. A., Silveira, J., Alexandre, D., Silva, C. and Fracalossi, D. M. (2014). Dietary protein requirement of juvenile Cachara Catfish, Pseudoplatystoma reticulatum. Jo*urnal of the World Aquaculture Society* **45**(1): 45-54. DOI: 10.1111/ jwas.12090

Dale, N., and Fuller, M. (2009). The Pearson Square: A Tool for More Precise Animal Feeding. University of Tennessee Extension, Institute of Agriculture. Available online: https://extension.tennessee.edu/publications/Documents/PB1802.pdf

FAO. (2011). Clarias gariepinus. Retrieved from http://www.fao.org/fishery/culturedspecies/Clarias_gariepinus/en

FAO. (2021). Cultured aquatic species information programme - Clarias gariepinus. Retrieved from http://www.fao.org/fishery/culturedspecies/Clarias_gariepinus/en

FAO (2022). The State of World Fisheries and Aquaculture 2022. Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/documents/card/en/c/cb4634en

Gallagher, M. L., Harrell, M. L., and Rulifson, R. A. (1991). Variation in Lipid and Fatty Acid Contents of Atlantic Croakers, Striped Mullet, and Summer flounder. *Transactions of the American Fisheries Society*, **120**, 614 - 619. https://doi.org/10.1577/1548 8659

Hussaini, I., Ishaku, A. H., Garba, K. A., and Shinkafi, N. S. (2020). Proximate composition of Claras gariepinus (Burchell, 1822) from cultured and wild environment. *International journal of fisheries and aquaculture studies* .**8**(2): 140-149.

Jamabo, N. A., and Alfred-Ockiya, J. F. (2008). Effects of Dietary Protein Levels on the Growth erformance of *Heterobranchus bidorsalis* Fingerlings from Niger Delta. *African Journal of Biotechnology,* **7**(14), 2483-2485.

Kiriratnikom, S. and Kiriratnikom, A. (2012). Growth, feed utilization, survival and body composition of fingerlings of Slender walking catfish, *Clarias nieuhofii*, fed diets containing different protein levels. Songklanakarin. *Journal of Science and Technology* **34**(1): 37-43

Kris-Etherton, P. M., Harris, W. S., & Appel, L. J. (2002). Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. Circulation, 106(21), 2747-2757.

Liu, X., Kris-Etherton, P. M., West, S. G., and Lamarche, B. (2021). Associations between dietary fatty acids and cardiovascular disease risk factors: a narrative review. *Nutrition Reviews*, **79**(6), 591-614. https://doi.org/10.1093/nutrit/nuab016

Mustapha, M. K., Oladokun, T. T., Salman, M. M., Adeniyi, I. A, and Ojo, D. (2014). Does light duration (photoperiod) have an effect on the mortality and welfare of cultured *Oreochromis niloticus* and *Clarias gariepinus*. *Turkish Journal of Zoology **38**: 1-5.*

National Institutes of Health. (2021). Vitamin B12: Fact Sheet for Health Professionals. Retrieved from https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/

Obaroh, I. O., Haruna, M. A. And Ojibo, A. (2015). Comparative studies on proximate and mineral elements composition of *Clarias gariepinus* from the cultured and wild sources. *European journal of Basic and Applied Science.* Vol. 2 No, 2

Onwuka, C. F. I., & Nwosu, C. O. (2010). Effects of water quality on the growth and survival of African catfish (Clarias gariepinus) larvae and juveniles. African Journal of Biotechnology, 9(7), 1072-1079.

Otubusin, S. O. (2011). Water, Everywhere-An Enigma! (Inaugural Lecture Series). The University of Agriculture Abeokuta, Nigeria series No **32**

Oulhaj, A., Refsum, H., Beaumont, H., Williams, J., King, E., Jacoby, R., ... & Smith, A. D. (2016). Omega-3 fatty acid status enhances the prevention of cognitive decline by B vitamins in mild cognitive impairment. Journal of Alzheimer's Disease, 50(2), 547-557.

Sarvenaz, K. T. and Sabine, S. (2018) Nutritional Value of Fish: Lipids, Proteins, Vitamins, and Minerals, *Reviews in Fisheries & Aquaculture Science*, **26**:2, 243-253, DOI: 10.1080/23308249.2017.1399104

Simopoulos, A. P. (1991). Omega-3 fatty acids in health and disease and in growth and development. A review. *The American Journal of Clinical Nutrition*. **54**:438-463.

Solomon, J. R., and Oyategbe, O. H. (2018). Proximate analysis of *Clarias Gariepinus* fed with three local formulated fish feed. Jo*urnal of public health and environmental technology.* **3** (1), pp. 1-8ISSN 4372-2603DO1: https://doi.org/10.26765/DRIPHET.2018.4792

Sujatha, k., AnithaJoice A., and Senthilkumaar, P. (2013) Total protein and lipid content in edible tissues of fishes from Kasimodu fish landing centre, Chennai, Tamilnadu. *European Journal of Experimental Biology,* **3**(5):252-257

University of California, Los Angeles. (2017). Low omega-3 fatty acid levels in blood may identify early signs of accelerated brain aging. Retrieved from https://www.uclahealth.org/news/low-omega-3-fatty-acid-levels-in-blood-may-identify-early-signs-of-accelerated-brain-aging

FACTORS INFLUENCING CAREER CHOICES OF COLLEGE STUDENTS WITH SPECIAL REFERENCE TO NEURAL BEHAVIOUR

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ABSTRACT
Career choice is a crucial stage in every student's life. The process of choosing a career is complex and influenced by a number of factors, such as personal, social, cultural, and cognitive factors. Career choice greatly influences future professional and personal fulfilment and is a significant, decisive decision for students and graduates. In the context of Barak Valley, Assam (India), where socio-cultural dynamics are diverse, understanding these factors is crucial for educators, career counsellors, and policymakers. Recent developments in neuroscience have shed light on the complex interactions between neural behaviour and decision-making processes. This study aims to explore the influence of traditional factors such as family, peer group, socio-economic, and cultural factors that play a crucial role in taking career-related decisions. In addition, the study delves into the influence of neural behaviour, examining how cognitive processes, emotional regulation, and neural mechanisms influence decision-making. Although recent research has highlighted the importance of neural behaviour in decision-making, there is a noticeable research gap that remains unexplored in the context of career choices. This research is based on a mixed-method approach, qualitative and quantitative, including questionnaires, surveys, and interviews to gather data from students and graduates of different colleges in three districts of Barak Valley, Assam (India). The findings suggest that factors like personal, family, peer group, and socio-economic and cultural factors remain crucial; neural behaviour also plays a significant role in career choices, including cognitive biases and emotional regulation. This study provides new insights by integrating neuroscience into career-related decision-making frameworks, providing valuable implications for educators, career counsellors, and policymakers in support of informed career choices.

Keywords: Career Choice, Neural Behaviour, Socio-economic Factors, Cultural Influence, Cognitive Factors

INTRODUCTION
Career selection is one of several significant decisions that students will make in determining future plans. This decision will affect them for the rest of their lives, as the core of their identity will center on what they choose to pursue in their lifelong career. It is possible to say that choosing one's ideal career is everyone's top priority. However, college students seem to be more concerned about their future careers. The career choices of college students are profoundly influenced by a variety of factors, that shape their aspirations, goals, and professional paths. In the Barak Valley region of Assam, India, these influences take place due to the region's diverse cultural heritage, economic landscape, and educational opportunities. Understanding the factors that shape career decisions among college students in this region is crucial for designing effective educational and career development initiatives tailored to their specific needs and aspirations. The Barak Valley region, includes districts such as Cachar,
Karimganj, and Hailakandi, is characterized by its diverse population, rich cultural traditions, and a combination of urban and rural commun

ities.

Neural Basis of Decision Making & Career Choice

The decision-making process is a complex and multifaceted phenomenon that has been the subject of extensive research in various fields, including neuroscience, psychology, and cognitive science. Understanding how the brain processes information and guides behaviour can provide valuable insights into human decision making and the factors that influence it. Recent studies have highlighted the impact of neural behavior on decision-making, especially in the context of adolescent development (Blakemore & Robbins, 2012). The neural mechanisms underlying decision-making have been a focal point in cognitive and behavioral neuroscience research. Researchers have shed light on the cognitive processes underlying human decisions by pinpointing particular brain networks and areas that are engaged in decision-making using real-time brain activity observation.

The neural basis of decision-making involves the interaction of various brain regions and neurotransmitter systems, with the amygdala, basal ganglia, and prefrontal cortex playing key roles. The prefrontal cortex facilitates planning and reasoning and is in charge of making conscious, logical decisions. Through reward processing and habit formation, the basal ganglia impact subconscious decision making. The amygdala incorporates emotional data and influences decisions by balancing cognitive and emotional impulses. Neurotransmitters that affect mood, motivation, reward signalling, impulse control, and mood regulation, such as dopamine and serotonin, impact these processes. Gaining knowledge of these brain processes can help us better understand how and why decisions are formed.

Need and Importance of both Conscious and Sub-conscious Mind in Decision-making & Career Choice

Decision-making, an essential cognitive function, relies on the intricate interaction between the conscious and subconscious minds. Rational analysis and purposeful cognitive processes are characteristic of the conscious mind, which forms the foundation of logical decision making. It enables people to critically analyze situations by comparing different solutions to preset standards and long-term goals. By employing logical reasoning and cognitive assessments, individuals can make informed decisions that reduce risks and maximize outcomes through deliberate analysis facilitated by the conscious mind.

On the other hand, the subconscious mind, which functions below the level of conscious awareness, provides implicit knowledge and intuitive insights that have a significant effect on decision-making. Subconscious insights, which provide immediate and instinctive responses to stimuli, influence decision-making. They are derived from emotions, acquired associations, and past experiences. Due to the inherent automaticity and speed of these subconscious processes, individuals can swiftly make decisions under pressure or in time-sensitive situations, circumventing conscious thought and depending on intuitive judgments to effectively address problems.

Understanding the functions of the conscious and subconscious minds is essential for making effective decisions. The conscious mind provides analytical rigor to decision-making, assisting in choice evaluation, outcome prediction, and alignment with long-term objectives. The subconscious mind shapes perceptions and risk-taking behavior by offering emotional guidance and intuitive insights. Integrating conscious reasoning with subconscious insights allows for a balanced approach, considering both rational and emotional factors.

REVIEW OF LITERATURE

Review of earlier research works related to Factors Influencing Career Choices

Hadiyati, M. A., & Astuti, B. (2023) explored the factors influencing students' career choices, emphasizing the significance of career decisions during adolescence. Factors such as

intelligence, special talents, interests, personality, and family background play crucial roles in shaping career preferences. The study's qualitative approach through interviews, observations, and documentation provides valuable insights for educational institutions and career practitioners to enhance career guidance programs. However, the paper acknowledges limitations in considering all relevant factors that may influence career choices, highlighting the complexity of this decision-making process.

K.G. Priyashantha, W.E. Dahanayake & M.N. Maduwanthi. (2023) conducted a systematic literature review to investigate factors influencing career indecision over the last two decades. Through the analysis of 118 articles, the study identified four main determinants of career indecision and highlighted eight factors/areas for future research. The paper provides theoretical and practical implications for practitioners and policymakers, emphasizing the importance of addressing individual, contextual, and social factors in understanding and addressing career indecision.

Andrea S. Gubik (2021) explored the factors influencing Hungarian students' entrepreneurial career decisions using the 2018 GUESSS database. It investigates the impact of positive entrepreneurial attitudes, knowledge about entrepreneurial processes, family entrepreneurial backgrounds, and the university environment on students' career aspirations. The study provides comprehensive understanding of entrepreneurial intentions, offering a broad analysis of individual characteristics, family backgrounds, and the students' self-assessments on various influencing factors, contributing significantly to the understanding of entrepreneurial career choices in Hungary.

Gregory Hennessy and Jeffrey (2021) discussed the complexities of career decision making, emphasizing the evolving challenges in today's dynamic work environment, such as increased career mobility and contingent employment. It highlights the need for a shift towards understanding career decisions as heuristic-driven processes, advocating for real-time data capture methods to unravel how individuals navigate uncertain career landscapes. The paper calls for a broader perspective that considers not only individual traits but also decision-making environments and social influences, offering valuable insights for future research directions.

S. Saranapala and U. M. Devadas. (2020) studied the crucial aspect of career choice among management and commerce undergraduates in Sri Lankan national universities. By exploring various factors influencing career decisions, such as personal and job-related factors, the study enlightens the level of career awareness among students. The findings emphasize the significant impact of personal factors on career choices, suggesting the need for enhanced career development activities within university curricula to better align students with suitable career paths.

Islam et al. (2020) have studied a comprehensive analysis of college students' perceptions regarding nursing as a career choice. The study, conducted with 164 respondents using a descriptive cross-sectional approach, reveals that a majority of students view nursing as a respectful and honourable profession, with a significant portion perceiving it as a female-only career choice. The findings underscore the growing demand for nursing globally, emphasizing the need to address factors influencing students' career choices in the healthcare sector. Thus, the paper elucidates the perception of nursing among college students, highlighting the importance of understanding and promoting nursing as a viable and esteemed career option.

Nimra Sharif, Nawaz Ahmad & Sami Ullah Sarwar (2019) explored the various factors influencing career choices among young students in Pakistan, focusing on influencers such as mothers, fathers, tutors, future income, future status, and societal differences. Through data analysis using one sample t-test and one-way repeated Measure ANOVA, the study highlights the significant impact of these influencers on career decisions. The literature review analyses the roles of parents, particularly mothers, in shaping students' career aspirations. Additionally, the discussion emphasizes the importance of fathers in career development and the influence of future

income and status on career decisions. As a result, the study offers useful information on the complex factors that shape young students career choices in Pakistan.
Humayon et al., (2018) investigated the impact of family influence, personal interest, and economic considerations on the career choices of undergraduate students in Vehari, Pakistan. Utilizing a quantitative research design with cross-sectional data, the study reveals that these factors significantly influence students' career decisions. Despite limitations in sample size and generalizability, the paper provides valuable insights for understanding the dynamics of career choice among undergraduate students in higher educational institutions in Pakistan. Thus, study concluded that each of these variables significantly influences career choice in a positive way.
Kamalpreet Kaur & Navneet Kumari., (2018) have pondered the comparison of career decision making, achievement motivation, and self-efficacy among senior secondary school students from Punjab based on gender and stream. The study reveals insignificant differences in achievement motivation across gender and stream, with males reporting higher self-efficacy than females. Also, the research highlights the importance of personal factors in career decision-making and the role of achievement motivation in striving for success. The methodology employed enriches the study by providing valuable insights into the levels of career decidedness and self-efficacy among students, contributing to the existing literature on adolescent development and educational psychology.
Shahzad et al., (2018) have evaluated the factors influencing students' career choices, highlighting variables like socioeconomic background, environment, personality, educational background, opportunity, and motivation. Through Confirmatory Factor Analysis (CFA) and Structure Equation Modelling, the study establishes the connections between these factors and career selection. The cross-sectional design and sample selection from various educational levels contribute to a comprehensive understanding of the determinants shaping students' career decisions, offering valuable insights for educational and career counselling professionals.

Review of earlier research works related to Influence of Neural Behaviour on Decision-making

Krishanu Kumar Das (2021) in his article examined the connection between consciousness and the subconscious mind, investigating how consciousness evolved and its role in guiding molecular reactions. It also explores the subconscious mind, discussing its potential power and autonomy. By reviewing different sources, the paper aims to clarify the functions of both the conscious and subconscious mind, while also touching on unilateral neglect in patients with brain damage and the three domains of the mind: conscious, subconscious, and unconscious. Swami Vivekananda's spiritual insights on consciousness are also referenced, adding a unique perspective to the scientific exploration of the mind.

Priya, Shreya Sureka, Dr. Divya Jain. (2021) analyses the profound influence of the subconscious mind on human behavior and life, highlighting its enigmatic and powerful nature. It emphasizes how individuals are often unaware of the subconscious forces shaping their actions and beliefs. Drawing from historical and contemporary research, the paper underscores the significance of understanding and harnessing the potential of the subconscious mind. It suggests that a deeper understanding of the subconscious could drive humanity forward at an exceptional rate, possibly unlocking connections to the universe through phenomena like dreams and déjà vu. The conclusion emphasizes the importance of belief in leveraging the power of the subconscious for personal growth and achievement, echoing the sentiments found in motivational literature.

Lei Zhang and Jan Glascher. (2020) explores how individuals navigate decision-making amidst conflicting personal experiences and social influences. Through real-time multiplayer reward learning tasks and advanced brain imaging techniques, they reveal that while people often

conform to group decisions in the face of dissent, their confidence surges when encountering confirming information. This research reveals distinct neural pathways: the ventromedial prefrontal cortex is responsible for direct valuation through personal experience, while the anterior cingulate cortex manages vicarious valuation through observation, emphasizing the integration of social information processing within decision-making circuits. The discovery of a novel social prediction error in the putamen underscores the pivotal role of brain networks in mediating social influence on decision-making.

Mubarak Ali (2019) examines the rising trend of neuromarketing, where retailers aim to influence consumers', subconscious minds using various persuasion techniques. Brands employ tactics like nudging and baiting to create irresistible choices in appealing environments, shifting away from traditional purchasing methods. Contemporary consumers are swayed by engaging displays both online and offline, driven by factors such as likeability and scarcity**.** The study explores the psychological intricacies of modern buying behavior, emphasizing the transition from rational decision-making to subconscious manipulation. While neuroimaging tools reveal insights into consumer behavior, ethical concerns persist regarding subconscious manipulation. However, understanding these cognitive processes through neuroscience enables the development of customized marketing strategies that harness emotional connections.. The paper advocates for empirical analysis to objectively evaluate the impact of brands on the subconscious mind, suggesting broader applications beyond product marketing.

H.S. Azman, M.K.M. Amin1 and S. Wibirama (2019) investigates the connection between cognitive consumer purchasing behaviours and their impact, with a focus on the growing field of neuromarketing. employing objective tracking of gazing behavior via the Tobii TX300 eye tracker. Contrary to traditional survey-based methods, this study quantitatively analyses subconscious decision-making processes. Using online clothing collections as stimuli, the research shows that participants' gaze is strongly influenced by bold, prominent, and large elements, suggesting subconscious decision-making. Notably, the duration of eye fixation on a product does not consistently correlate with purchasing decisions, suggesting the complexity of consumer behavior beyond visual attention. In conclusion, the study underscores the importance of understanding the eye-mind relationship in consumer decision-making, offering insights for marketers and entrepreneurs to enhance product usability and address consumer preferences effectively.

Daeyeol Lee and Hyojung Seo (2016) in their research, investigated human decision-making within social interactions, focusing on deviations from game theory predictions and underlying neural mechanisms attributed to cognitive limitations and dynamic changes during iterative encounters. The study suggests that some brain circuits used for decision-making are general and work the same for both individual and social decisions. But specific brain regions like the medial prefrontal cortex (mPFC) and temporal parietal junction (TPJ) might be specialized for social decision-making. Additionally, this research addresses challenges in studying neural basis of strategic decision making, proposing integration of computational tools and exploring overlap between neural systems in social and non-social decision making to enhance understanding of human behaviour.

The research paper by Botvinick and Braver (2015) explores the intricate relationship between motivation and cognitive control, emphasizing the impact of motivational factors on decision-making processes. Through an interdisciplinary approach encompassing cognitive psychology, social cognition, and neuroscience, the authors advocate for a reward-based decision-making framework to understand control functions. The paper highlights the crucial role of neuroscientific evidence in elucidating the mechanisms underlying the interaction between motivation and

cognitive control, paving the way for further integration of behavioral and neuroscientific research.

The study by Chang et al. (2015) investigates the neural mechanisms of social decision-making in the primate amygdala by recording extracellular activity from amygdala neurons in rhesus macaques. They found that a subset of neurons in the basolateral amygdala (BLA) showed value-dependent modulations during decision-making tasks involving rewards for self, others, or both. The research utilized hierarchical Bayesian models to infer population statistics, providing robust insights into the neural processes underlying social decisions.

The study by J.M. Martínez-Selva et al. (2014) provides a comprehensive overview of the somatic marker hypothesis and its application in understanding decision-making processes, particularly through the Iowa Gambling Task (IGT). The main findings suggest that ventromedial prefrontal cortex plays a central role in decision-making by integrating sensory, mnemonic, and emotional information relevant to the task. Alongside the involvement of other key brain regions such as the amygdala and cingulate cortex. Bechara's proposition of two interacting system, is discussed, emphasizing the critical role of the ventromedial prefrontal cortex and its subsystems in integrating affective, executive, and inhibitory processes essential for decision-making.

Travis A. Jarrell et al. (2012). The research paper delves into the intricate neural connectivity of the C. elegans male mating network, emphasizing the importance of a comprehensive structural description for understanding nervous system function. By employing spectroscopy to analyze the O star population of nearby Galactic open stellar clusters, the study achieves a more complete binary detection, shedding light on intrinsic multiplicity properties. The paper also discusses attractor dynamics in the male mating network, highlighting how decision-making and behavioral switching are intertwined, showcasing the genetic specificity and reproducibility of neural connectivity

OBJECTIVES

The specific objectives of this study are as follows:

1. To investigate personal, family, and peer group influence on the career choices of college students in Barak Valley.
2. To study how socio-economic and cultural factors influence the career choices of college students in Barak Valley.
3. To study the influence of neural behaviour on the career choices of college students in Barak Valley.

1.2.

HYPOTHESES

1. Personal, family, and peer group have no influence on the career choices of college students in Barak Valley, Assam.
2. Socio-economic and cultural factors have no influence on the career choices of college students in Barak Valley.
3. Neural behaviour has no influence on the career choices of college students in Barak Valley.

METHODOLOGY

The study is descriptive in nature and is based on primary data collected from 207 students and graduates across various colleges in the three districts of Barak Valley, Assam, India. Barak Valley comprises of Karimganj, Hailakandi, and Cachar districts. An appropriate sample size at a 95% confidence level was considered for the study. The respondents were selected using Simple

Random Sampling, and data was gathered through a structured questionnaire. The data was analysed using one-sample t-tests to evaluate the influence of various factors on career choices.

DATA ANALYSIS AND RESULTS

In order to fulfil the objective of this research a structured questionnaire was prepared and distributed to college students. The Demographic profile of the respondents is given below:

Demographic Profile:

Gender

Sl. No	Gender	Frequency	Percent
1.	Male	124	59.9
2.	Female	83	40.1
3.	**Total**	**207**	**100.0**

(Table 1- Gender of the respondents)

Age Group

Sl. No	Age Group	Frequency	Percent
1.	18-21	59	28.5
2.	21-24	101	48.8
3.	24 and above	47	22.7
4.	**Total**	**207**	**100.0**

(Table 2- Age of the respondents)

Current Academic Qualification

Sl. no	Academic Qualification	Frequency	Percent
1.	Under Graduate	150	72.5
2.	Post Graduate	57	27.5
3.	**Total**	**207**	**100.0**

(Table 3- Academic Qualification of the respondents)

Findings- Objective 1 *- Personal, family, and peer group Influence on the career choices of college students in Barak Valley, Assam.*

Table 4- Shows Influence of Personal, Family and Peer group

Sl. No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1.	I consider my own interests and passions when making my career choice.	88	102	13	3	1
2.	My own strengths and weaknesses significantly influence my career choice.	82	106	14	3	2
3.	My career choices are influenced by my personality type.	70	89	37	7	4
4.	I consider my skills and abilities when choosing a career.	86	89	26	5	1
5.	My parents have a great influence in deciding my career.	60	72	53	20	2
6.	My family's expectations have a significant influence on my career choice.	61	75	50	18	3
7.	My family’s professional background significantly influences my career aspirations.	52	70	47	30	8
8.	The opinion of friends or peers have a significant influence on my career choices.	28	64	61	43	11
9.	The influence of teachers, mentors, or role models significantly influence my career decision.	45	86	55	16	5
10.	The role of career counselling is important in shaping my career decisions.	53	89	43	18	4

The above table shows that personal, family, and peer group significantly influences college students' career choices in Barak Valley, Assam. A substantial number of students either strongly agree or agree with these influences. They consider their interests, strengths, and skills, along with family expectations and friends' opinions, when making career decisions. Teachers, mentors, and career counselling also play important roles. Thus, the responses highlight the significant role of personal, familial, and social influences in shaping the career choices of students in Barak Valley.
Now, to test these hypotheses, one-sample t-test was conducted using data collected from 207 respondents. The results are summarized as follows:

Hypothesis-1 Personal, family, and peer group have no influence on the career choices of college students in Barak Valley, Assam.

Table – 6.5 Hypothesis Testing of Objective 1

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Personal/Family/Peer Group Influence	**207**	**3.8923**	**0.53175**	**0.03696**

Table-6.6 T-test on the influence of Personal/Family/Peer Group

One-Sample Test						
	T	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Personal/Family/Peer Group Influence	**105.313**	**206**	**0.000**	**3.89227**	**3.8194**	**3.9651**

Interpretation- The above table shows the results of the one-sample t-test with a high t-value of 105.313 and a p-value of 0.000, which strongly reject the null hypothesis *Personal, family, and peer group have no influence on the career choices of college students in Barak Valley, Assam,* suggesting that Personal, family, and peer group have a significant influence on the career choices of college students in Barak Valley, Assam. Furthermore, the mean difference of 3.89227, along with the 95% confidence interval (3.8194 to 3.9651), further supports this conclusion. Therefore, it is evident that these factors significantly influence the career choices of college students in Barak Valley, Assam.

4.3 Findings: Objective 2 – *Influence of socio-economic and cultural factors on the career choices of college students in Barak Valley*

Table-6.7 Shows Influence of Socio-economic and Cultural Factors

Sl No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1.	I feel pressured to choose a particular career path due to societal expectations.	32	87	43	38	7
2.	Societal expectations regarding prestige and status significantly influence career choice.	45	79	47	33	3
3.	Societal expectations about gender roles significantly influence career choices in our community.	38	71	58	33	7
4.	My cultural background affects my career choices.	30	62	36	71	8
5.	My family's financial support greatly influences my career choice.	69	82	36	12	8

The above table shows a clear consensus among college students in Barak Valley regarding the significant influence of societal expectations, particularly regarding prestige, status, and gender roles, on their career choices. A substantial number of respondents agree that these factors play a pivotal role in shaping their career decisions. However, opinions are divided regarding the influence of cultural background and family financial support, with some agreement but also a notable portion expressing neutrality or disagreement on these factors.

Hypothesis-2 Socio-economic and cultural factors have no influence on the career choices of college students in Barak Valley.

Table-6.8 Hypothesis Testing of Objective 2

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Socio-economic and Cultural Factors	207	3.5372	0.76737	0.05334

Table-6.9 T-test on the influence of Socio-economic and Cultural Factors

	T	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Socio-economic and Cultural Factors	66.320	206	0.000	3.53720	3.4320	3.6424

Interpretation- The above table depicts that the results from the one-sample t-test, with a t-value of 66.320 and a p-value (Sig. 2-tailed) of 0.000, strongly reject the null hypothesis that *socio-economic and cultural factors have no influence on the career choices of college students in Barak Valley*. Therefore, it can be concluded that socio-economic and cultural factors indeed have a significant influence on the career choices of college students in Barak Valley.

Findings: Objective 3- *Influence of neural behaviour on the career choices of college students in Barak Valley.*

Table-6.7 Shows the Influence of Neural Behaviour

Sl No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1.	My career choice is largely influenced by the External Environment i.e. Crowed behaviour	50	91	44	20	2
2.	My career choice is largely influenced by the information stored in my mind i.e. subconscious mind	43	101	51	8	4
3.	My career choice is largely influenced by the success and failure of others	52	104	38	10	3
4.	My career choice is largely influenced by emotional factors.	46	90	54	15	2
5.	My career choice is largely non-cognitive	50	105	41	8	3
6.	My career choice is largely influenced by stress, uncertainty & risk associated with it.	54	83	44	21	5
7.	My career choice is largely influenced by efforts required and rewards	57	91	40	16	3

The above table shows a clear consensus among college students in Barak Valley regarding the significant influence of neural behaviour on their career choices. A substantial number of respondents agree that these factors play an important role in shaping their career decisions. Thus, the responses highlight the significant role of neural behaviour in shaping the career choices of students in Barak Valley.

Hypothesis-3: Neural behaviour has no influence on the career choices of college students in Barak Valley

Table-6.8 Hypothesis Testing of Objective 3

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Neural behaviour	207	3.8468	0.65374	0.04544

Table-6.9 T-test on the Influence of Neural behaviour on Career Choices

One-Sample Test						
	T	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Neural behaviour	84.660	206	0.000	3.84679	3.7572	3.9364

Interpretation-From the above table, the result of the one-sample t-test indicate a significant influence of neural behaviour on the career choices of college students in Barak Valley, Assam. The high t-value of 84.660 and a p-value (Sig. 2-tailed) of 0.000, indicates that the null hypothesis *neural behaviour has no influence on the career choices of college students in Barak Valley is rejected*. Therefore, it can be concluded that neural behaviour indeed has a significant influence on the career choices of college students in Barak Valley.

CONCLUSION

The study on factors influencing career choices of college students with special reference to neural behaviour in Barak Valley, Assam, concludes that all the factors including – personal interest, family, peer group, Socio-economic and cultural backgrounds, significantly influence career choices. Additionally, the study highlights that neural behaviour such as cognitive processes, emotional factors, and decision-making patterns significantly influences career choices of college students. The statistical analyses strongly reject the null hypotheses, underscoring the substantial impact of these diverse factors. Thus, the career choices of college students in Barak Valley are influenced by a combination of personal, social, economic and neural factors. Recognizing these influences is crucial for modifying more effective educational programs and career counselling services that address the specific needs and aspirations of students in this region.

REFERENCES

Abdo, A. A., Majid, A., Auf, M., & Abdulrazak, A. (2016). Factors affecting career choice among undergraduate students in Univeritas Indonesia. *International Journal of Economic Perspectives*, *10*(1), 630-644.

Abe, E. N., & Chikoko, V. (2020). Exploring the factors that influence the career decision of STEM students at a university in South Africa. *International Journal of STEM Education*, *7*, 1-14.

Agarwala, T. (2008). Factors influencing career choice of management students in India. *Career Development International*, *13*(4), 362-376.
Ahmed, K. A., Sharif, N., & Ahmad, N. (2017). Factors influencing students' career choices: empirical evidence from business students. *Journal of Southeast Asian Research*, *2017*(2017), 1-15.
Akosah-Twumasi, P., Emeto, T. I., Lindsay, D., Tsey, K., & Malau-Aduli, B. S. (2018). A Systematic Review of Factors That Influence Youths Career Choices—the Role of Culture. Frontiers in Education, 3 (58), 1–15.
Albion, M. J., & Fogarty, G. J. (2002). Factors influencing career decision making in adolescents and adults. *Journal of Career Assessment*, *10*(1), 91-126.
Ali, M. (2019). Influence of the sub conscious mind in consumer psychology of buying in contemporary ERA. *Shanlax International Journal of Commerce*, *7*(3), 1-10.
Anojan, V., & Nimalathasan, B. (2013). Factors influencing in career choice of second year undergraduate students: A case study of faculty of management studies and commerce. *International journal of social science and Interdisciplinary research*, *2*(11), 16-25.
Auyeung, P., & Sands, J. (1997). Factors influencing accounting students' career choice: a cross-cultural validation study. *Accounting Education*, *6*(1), 13-23.
Azman, H. S., Amin, M. K. M., & Wibirama, S. (2019). Exploring the subconscious decision making in neuromarketing research using eye tracking technique. *Journal of Advanced Manufacturing Technology (JAMT)*, *13*(2 (2)).
Bhat, S., d'Souza, L., & Fernandez, J. (2012). Factors influencing the career choices of medical graduates. *J Clin Diagn Res*, *6*(1), 61-4.
Blakemore, S. J., & Robbins, T. W. (2012). Decision-making in the adolescent brain. *Nature neuroscience*, *15*(9), 1184-1191.
Borchert, M. (2002). Career choice factors of high school students.
Botvinick, M., & Braver, T. (2015). Motivation and cognitive control: from behavior to neural mechanism. *Annual review of psychology*, *66*, 83-113.
Broche-Pérez, Y., Jiménez, L. H., & Omar-Martínez, E. (2016). Neural substrates of decision-making. *Neurología (English Edition)*, *31*(5), 319-325.
Chang, L. J., & Sanfey, A. G. (2008). Emotion, decision-making and the brain. *Neuroeconomics*, 31-53.
Chang, S. W., Fagan, N. A., Toda, K., Utevsky, A. V., Pearson, J. M., & Platt, M. L. (2015). Neural mechanisms of social decision-making in the primate amygdala. *Proceedings of the National Academy of Sciences*, *112*(52), 16012-16017.
Das, K. K. (2021). Consciousness and its relation with subconscious mind: The mystery probed.
Edwards, K., & Quinter, M. (2011). Factors influencing students career choices among secondary school students in Kisumu municipality, Kenya. *Journal of emerging trends in educational research and policy studies*, *2*(2), 81-87.
Eremie, M. D. (2014). Comparative analysis of factors influencing career choices among senior secondary school students in Rivers State, Nigeria. *Arabian Journal of Business and Management Review (OMAN Chapter)*, *4*(4), 20.
Gedam, M. R. K., & Mehta, N. K. (2019). Career Decision-Making (1991-2018): A Systematic Literature Review and Prospect for Future Research. *International Journal of Indian Psychology*, *7*(3).
Gold, J. I., & Heekeren, H. R. (2014). Neural mechanisms for perceptual decision making. In *Neuroeconomics* (pp. 355-372). Academic Press.
Greenbank, P. (2012). Career decision-making by business school students: A British case study. *International journal of management*, *29*(4), 543.
Gubik, A. S. (2021). Entrepreneurial career: Factors influencing the decision of Hungarian students. *Entrepreneurial Business and Economics Review*, *9*(3), 43-58.

Gui, X. U. E., Chuansheng, C. H. E. N., Zhong-Lin, L. U., & Qi, D. O. N. G. (2010). Brain imaging techniques and their applications in decision-making research. *Xin li xue bao. Acta psychologica Sinica*, *42*(1), 120.

Güroğlu, B., van den Bos, W., & Crone, E. A. (2009). Neural correlates of social decision making and relationships: A developmental perspective. *Annals of the New York Academy of Sciences*, *1167*(1), 197-206.

Hadiyati, M. A., & Astuti, B. (2023). Student Careers: What Factors Influence Career Choice? *Journal of Education Research and Evaluation*, *7*(4).

Hartley, C. A., & Phelps, E. A. (2012). Anxiety and decision-making. *Biological psychiatry*, *72*(2), 113-118.

Heekeren, H. R., Marrett, S., & Ungerleider, L. G. (2008). The neural systems that mediate human perceptual decision making. *Nature reviews neuroscience*, *9*(6), 467-479.

Hennessy, G., & Yip, J. (2021). Career decision making. In *Handbook of research methods in careers* (pp. 103-119). Edward Elgar Publishing.

Humayon, A. A., Raza, S., & Khan, R. A. (2018). Effect of Family Influence, Personal Interest and Economic Considerations on Career Choice amongst Undergraduate Students in Higher Educational Institutions of Vehari, Pakistan. *International Journal of Organizational Leadership*, *7*(2).

Islam, A., Shafique, K. M. A., Islam, T., & Rajib, S. I. (2020). Perception of college students towards nursing as a career choice. *Asian Journal of Research in Nursing and Health*, *3*(3), 1-9.

James, O. J., & Denis, O. (2015). Factors influencing career choice among undergraduate Students in an African university context: The Case of Agriculture Students at Makerere University. *Uganda. Journal of Dynamics in Agricultural Research*, *2*(2), 12-20.

Jarrell, T. A., Wang, Y., Bloniarz, A. E., Brittin, C. A., Xu, M., Thomson, J. N., ... & Emmons, S. W. (2012). The connectome of a decision-making neural network. *science*, *337*(6093), 437-444.

Kamalpreet, K., & Navneet, K. (2018). Career Decision Making, Achievement Motivation and Self-Efficacy among Adolescents. *International Journal of Creative Research Thoughts (IJCRT)*, *6*(2), 2320.

Koech, J., Bitok, J., Rutto, D., Koech, S., Okoth, J. O., Korir, B., & Ngala, H. (2016). Factors influencing career choices among undergraduate students in public universities in Kenya: A case study of university of Eldoret. *International Journal of Contemporary Applied Sciences*, *3*(2), 50-63.

Kristan, W. B. (2008). Neuronal decision-making circuits. *Current Biology*, *18*(19), R928-R932.

Lee, D., & Seo, H. (2016). Neural basis of strategic decision making. *Trends in neurosciences*, *39*(1), 40-48.

Lent, R. W., Brown, S. D., Talleyrand, R., McPartland, E. B., Davis, T., Chopra, S. B., ... & Chai, C. M. (2002). Career choice barriers, supports, and coping strategies: College students' experiences. *Journal of Vocational behavior*, *60*(1), 61-72.

Lupas Jr, S. B., & Farin, E. N. (2021). Factors Influencing Career Choices Among High School Students in Zambales, Philippines. *International Journal of Research in Engineering, Science and Management*, *4*(10), 141-146.

Martinez-Selva, J. M., Sánchez-Navarro, J. P., Bechara, A., & Roman, F. (2006). Brain mechanisms involved in decision-making. *Revista de neurologia*, *42*(7), 411.

McCoy, A. N., & Platt, M. L. (2005). Expectations and outcomes: decision-making in the primate brain. *Journal of Comparative Physiology A*, *191*, 201-211.

Mirzanaveedshahzad, S., & Ahmed, M. (2018). Factors influencing on students' career choices: Multivariate analysis. *International Journal of Contemporary Applied Researches*, *5*(6).

Mutekwe, E., Modiba, M., & Maphosa, C. (2011). Factors affecting female students' career choices and aspirations: A Zimbabwean example. *Journal of Social Sciences*, *29*(2), 133-141.

Mwaa, A. (2016). *Parental factors influencing career choice among high school students in Nairobi County* (Doctoral dissertation, University of Nairobi).
Najar, I. A., & Yousuf, M. (2019). Career Selection & its Various Determinants. *IJRAR: International Journal of Research and Analytical Reviews*, *6*(1), 61-64.
Olamide, S. O., & Olawaiye, S. O. (2013). The factors determining the choice of career among secondary school students. *The International Journal of Engineering and Science*, *2*(6), 33-44.
Omar, M. K., Zaman, M. D. K., & Aziz, M. H. (2021). Factors influencing career choice among final semester undergraduate students of a business management faculty in a malaysian public university. *International Journal of Academic Research in Business and Social Sciences*, *10*(2), 361-373.
Peters, J., & Büchel, C. (2011). The neural mechanisms of inter-temporal decision-making: understanding variability. *Trends in cognitive sciences*, *15*(5), 227-239.
Polezzi, D., Sartori, G., Rumiati, R., Vidotto, G., & Daum, I. (2010). Brain correlates of risky decision-making. *Neuroimage*, *49*(2), 1886-1894.
Priya, S. S., & Jain, D. (2021). The potentials of subconscious mind. *Int. J. Sci. Res*.
Priyashantha, K. G., Dahanayake, W. E., & Maduwanthi, M. N. (2023). Career indecision: a systematic literature review. *Journal of Humanities and Applied Social Sciences*, *5*(2), 79-102.
Rilling, J. K., & Sanfey, A. G. (2011). The neuroscience of social decision-making. *Annual review of psychology*, *62*, 23-48.
Rolls, E. T. (2006, June). Brain mechanisms of emotion and decision-making. In *International congress series* (Vol. 1291, pp. 3-13). Elsevier.
Rolls, E. T. (2010). Consciousness, decision-making and neural computation. In *Perception-Action Cycle: Models, Architectures, and Hardware* (pp. 287-333). New York, NY: Springer New York.
Rolls, E. T., Grabenhorst, F., & Deco, G. (2010). Decision-making, errors, and confidence in the brain. *Journal of neurophysiology*, *104*(5), 2359-2374.
Rorie, A. E., & Newsome, W. T. (2005). A general mechanism for decision-making in the human brain? *Trends in cognitive sciences*, *9*(2), 41-43.
Saranapala, I. S., & Devadas, U. M. (2020). Factors Influencing on Career Choice of Management and Commerce Undergraduates in National Universities in Sri Lanka. *Kelaniya J. Hum. Resour. Manag*, *15*, 108.
Selvanathan, M., Ali, R., Mariadas, P., Perumal, G., & Tan, P. (2016). Factors influencing career choice amongst undergraduate students in Malaysia. *European Journal of Business Research*, *16*(1), 7-20.
Shahid, Z., Fatima, K., Siddiqui, F., & Panhwar, G. (2022). Association of career choice and motivation with academic performance. *J Xi'an Shiyou Univ*, *18*(9), 125.
Shahzad, M. N., Zahra, S. T., & Ahmed, M. A. (2014). Determinants and influences on student's career choice. *Universal Journal of Management and Social Sciences*, *4*(3), 9-30.
Shanks, D. R., & Newell, B. R. (2014). The primacy of conscious decision making. *Behavioral and Brain Sciences*, *37*(1), 45-53.
Sharif, N., Ahmad, N., & Sarwar, S. (2019). Factors influencing career choices. *IBT Journal of Business Studies*, *15*(1), 33-46.
Shumba, A., & Naong, M. (2012). Factors influencing students' career choice and aspirations in South Africa. *Journal of Social Sciences*, *33*(2), 169-178.
Singaravelu, H. D., White, L. J., & Bringaze, T. B. (2005). Factors influencing international students' career choice: A comparative study. *Journal of Career Development*, *32*(1), 46-59.
Takezawa, M. (2009). The subconscious decision: A study of the influence of organizational culture on strategic decisions Bouwke Franssen Tilburg University.
Tang, M., Fouad, N. A., & Smith, P. L. (1999). Asian Americans' career choices: A path model to examine factors influencing their career choices. *Journal of vocational behavior*, *54*(1), 142-157.

Temkin, A. Y. (2011). Consciousness, subconsciousness, theory of states of mind and its applications. *NeuroQuantology*, *9*(4).
van Gaal, S., De Lange, F. P., & Cohen, M. X. (2012). The role of consciousness in cognitive control and decision making. *Frontiers in human neuroscience*, *6*, 121.
Venkatraman, V., Payne, J. W., Bettman, J. R., Luce, M. F., & Huettel, S. A. (2009). Separate neural mechanisms underlie choices and strategic preferences in risky decision making. *Neuron*, *62*(4), 593-602.
Wang, X. J. (2008). Decision making in recurrent neuronal circuits. *Neuron*, *60*(2), 215-234.
Wunderlich, K., Rangel, A., & O'Doherty, J. P. (2009). Neural computations underlying action-based decision making in the human brain. *Proceedings of the National Academy of Sciences*, *106*(40), 17199-17204.
Zhang, L., & Gläscher, J. (2020). A brain network supporting social influences in human decision-making. *Science advances*, *6*(34), eabb4159.

FACTORS INFLUENCING ENTREPRENEURIAL INTENTION AMONG COLLEGE STUDENTS

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ABSTRACT
Entrepreneurial intention refers to an individual's desire to start a business; studying entrepreneurial intention has long been an important topic in the field of entrepreneurship. Understanding the factors that influence entrepreneurial intentions among college students is essential, particularly in regions like Barak Valley, Assam (India), where entrepreneurship can be a key solution to unemployment and economic challenges. This study aims to explore how personal, family, and peer groups, along with socio-economic and cultural factors, influence entrepreneurial intentions among college students in the three districts of Barak Valley. Furthermore, it also examines the influence of psychological and neural factors in shaping these intentions. However, research in this area, especially focussing on these factors in the context of Barak Valley, remains limited. This research is based on a mixed-method approach, qualitative and quantitative, including questionnaires, surveys, and interviews to collect data from students and graduates of different colleges in three districts of Barak Valley, Assam (India). Findings suggest that socio-economic background, family support, and psychological traits, particularly risk-taking behaviour, significantly influence students' entrepreneurial intentions. These insights will help educators and policymakers to take initiatives that support entrepreneurial mindsets and activities among the students in the Barak Valley region.

Keywords: Entrepreneurial Intention, Socio-economic Factors, Psychological and Neural Factors

INTRODUCTION
Entrepreneurship plays a vital role in economic development, job creation, and innovation, particularly in emerging economies. As the global landscape continues to evolve, fostering entrepreneurial intentions among the youth has become increasingly important. College students, in particular, represent a significant demographic that can contribute to the entrepreneurial ecosystem, as they possess the skills, creativity, and potential to drive new business ventures. Barak Valley, located in Assam, India, encompasses the districts of Karimganj, Hailakandi, and Cachar. Despite its rich cultural heritage and resources, the region faces various socio-economic challenges that can impact the entrepreneurial landscape. Understanding the factors influencing the entrepreneurial intentions of college students in this area is essential for promoting entrepreneurship and economic growth. Various studies have highlighted a range of factors that can shape an individual's entrepreneurial intentions. These include personal attributes, family background, socio-economic status, cultural influences, and psychological traits. Additionally, emerging research has begun to explore the role of neural behaviour in decision-making processes related to entrepreneurship.
This study aims to investigate the specific factors influencing the entrepreneurial intentions of college students in Barak Valley, focusing on personal, socio-economic, cultural, psychological, and neural factors. The research seeks to provide valuable insights into how these factors

collectively and independently affect students' intentions to pursue entrepreneurship. By identifying these influences, the study aims to contribute to the development of targeted interventions and policies that can nurture and support the entrepreneurial aspirations of students in the region.

Need and Importance of Entrepreneurial Mindset

An entrepreneurial mindset refers to a specific set of attitudes, skills, and behaviours that enable individuals to identify opportunities, take risks, and innovate effectively. Cultivating an entrepreneurial mindset is crucial in today's dynamic and competitive environment, impacting not only entrepreneurs but also employees, organizations, and society as a whole. The following points illustrate the significance of developing an entrepreneurial mindset:

Opportunity Recognition: Individuals with an entrepreneurial mindset possess a heightened ability to identify opportunities in various contexts. This mindset encourages proactive thinking, enabling individuals to spot gaps in the market and develop innovative solutions, whether in business or other fields.

Resilience and Adaptability: The entrepreneurial journey is often fraught with challenges and setbacks. An entrepreneurial mindset fosters resilience, allowing individuals to persevere in the face of adversity. This adaptability is essential for navigating changing market conditions and overcoming obstacles, making it a valuable trait in both entrepreneurship and the workforce.

Innovation and Creativity: An entrepreneurial mindset promotes a culture of creativity and innovation. Individuals are encouraged to think outside the box, challenge the status quo, and generate new ideas. This spirit of innovation is vital for driving progress in industries and improving existing products and services.

Risk-Taking and Decision-Making: Entrepreneurs often face uncertainty and risk. Those with an entrepreneurial mindset are more comfortable with taking calculated risks, making informed decisions based on data and intuition. This ability to evaluate risks and make sound judgments is essential in any professional setting.

Leadership and Collaboration: An entrepreneurial mindset nurtures leadership qualities such as vision, influence, and teamwork. Entrepreneurs often need to lead diverse teams and collaborate with others to achieve their goals. By developing these skills, individuals can become effective leaders in their respective organizations, regardless of their role.

Continuous Learning and Improvement: A core aspect of the entrepreneurial mindset is the commitment to lifelong learning. Individuals are encouraged to seek feedback, learn from failures, and continuously improve their skills and knowledge. This growth-oriented attitude is essential in a rapidly evolving job market.

Societal Impact: Entrepreneurs with an entrepreneurial mindset often aim to create value not just for themselves but for their communities and society as a whole. They are more likely to engage in social entrepreneurship, addressing pressing social issues and contributing to sustainable development.

Economic Development: Promoting an entrepreneurial mindset among individuals, especially youth, can lead to increased entrepreneurial activity, which in turn stimulates economic development. By fostering a culture of entrepreneurship, societies can create jobs, drive innovation, and enhance overall prosperity.

LITERATURE REVIEW

Yushun Su et al. (2021) explored the factors influencing entrepreneurial intention among university students in China, integrating perceived university support with the theory of planned behavior. The study highlights the significant role of perceived university support in shaping students' attitudes toward entrepreneurship and their perceived behavioral control. It employs a

robust online survey method, ensuring a wide reach despite pandemic challenges. The findings suggest that a well-structured entrepreneurship education system is crucial for fostering entrepreneurial intentions. The research methodology, including the use of SEM-PLS for data analysis, is appropriate for the complex relationships examined. Overall, the paper contributes valuable insights into how educational institutions can enhance entrepreneurial spirit among students, aligning with China's emphasis on innovation and entrepreneurship.

M.H. Mahmoud et al. (2019) investigated the factors influencing entrepreneurial intention among university students in Nigeria, utilizing the Theory of Planned Behaviour (TPB) as its framework. It identifies three key components: attitude, subjective norms, and perceived behavioural control, with a focus on how these elements affect students' intentions to engage in entrepreneurship. The study reveals that while attitude significantly correlates with entrepreneurial intention, subjective norms and perceived behavioural control do not show a significant relationship. The findings suggest that enhancing students' entrepreneurial attitudes should be a priority in educational curricula to foster entrepreneurship and address unemployment issues in Nigeria. Overall, the research underscores the importance of understanding psychological factors in promoting entrepreneurial behaviour among youth.

S.A. Kadir et al. (2017) explored the factors influencing entrepreneurial intention among Malaysian youth, emphasizing the need for achievement, market opportunities, and self-efficacy. It highlights that a strong need for achievement is a significant predictor of entrepreneurial behavior, as it motivates individuals to pursue entrepreneurial ventures. The study also discusses the role of the university environment and family background in shaping entrepreneurial intentions. Furthermore, it suggests that government support is crucial in providing opportunities for youth engagement in entrepreneurship to combat unemployment. The paper effectively combines theoretical insights with practical implications, making it relevant for policymakers and educators. Overall, it contributes valuable knowledge to the field of entrepreneurship studies in Malaysia.

Edwin Tarapuez (2015), in his paper investigated the factors influencing the entrepreneurial intention (IE) of college students in Quindio, Colombia, utilizing the Theory of Planned Behavior as a framework. The research identifies a diverse range of intrinsic and extrinsic factors affecting IE, such as the type of college attended, having entrepreneurial friends, and societal norms favouring entrepreneurship over employment. Additionally, it highlights significant obstacles faced by students, including insufficient capital, lack of institutional support, and academic commitments. The study employs a quantitative approach, analysing data from a validated questionnaire administered to 297 students, and utilizes various statistical methods, including Logistic Regression and Confirmatory Factor Analysis. Overall, the findings contribute valuable insights into the entrepreneurial landscape among youth in the region, suggesting that fostering supportive environments and addressing barriers could enhance entrepreneurial intentions.

Dr. Namu Lunavath (2015). This paper provided a comprehensive analysis of the factors influencing entrepreneurial intentions among students in professional courses, particularly in Engineering and Management in Andhra Pradesh. Utilizing a structured questionnaire, the study gathered data from 300 students, revealing that a significant portion of respondents come from families employed in the private and public sectors, which may limit their entrepreneurial aspirations. The findings highlight the importance of entrepreneurial education in enhancing self-confidence and mitigating societal pressures that hinder students' entrepreneurial pursuits. The paper suggests that continuous programs should be implemented to foster entrepreneurial activities among students, emphasizing the need for greater awareness and support from educational institutions. Overall, the research underscores the critical role of personal factors, such as self-efficacy and family background, in shaping students' entrepreneurial intentions

Kenneth Agbim et al. (2013), in his paper explored the factors influencing entrepreneurial intentions among graduates of Nigerian tertiary institutions, highlighting the shortcomings of the

current education system in fostering self-employment and entrepreneurship. It identifies creativity as the most significant factor affecting entrepreneurial intentions and notes that these intentions tend to increase with age. The study employs a purposive sampling technique with a diverse group of 307 graduates, ensuring a comprehensive analysis of various demographics. Recommendations include adopting entrepreneurial learning methods and mixing students in programs based on their creativity levels to enhance engagement and outcomes. Overall, the paper underscores the need for a more effective approach to entrepreneurship education in Nigeria to combat rising unemployment among graduates.

The paper by the Liqiang Chen (2013), investigated the underexplored area of IT entrepreneurial behavior among college students, utilizing the social cognitive career theory (SCCT) as a framework. It highlights the significant role of expected outcomes, social influence, and self-efficacy in shaping students' entrepreneurial intentions in the IT sector. The study emphasizes the need for more research in IT entrepreneurship, which has been largely neglected in both Information Systems and entrepreneurship disciplines. The findings suggest that formal education and prior technology knowledge are crucial for fostering innovation among technology entrepreneurs. Overall, this empirical study contributes valuable insights into the factors influencing IT entrepreneurial intentions, advocating for enhanced IS education in business schools.

Xue Tong, David Yoon, Kin Tong, Chen Liang & Loy (2011), investigated the factors influencing entrepreneurial intentions among university students, highlighting the significant roles of need for achievement, family business background, and subjective norms, while noting that the desire for independence does not contribute to these intentions. The study emphasizes the importance of understanding students' perceptions and suggests future research should explore the impact of family background on entrepreneurial intentions more deeply. Overall, it contributes valuable insights into the motivations of future entrepreneurs in Malaysia, addressing a gap in existing literature.

OBJECTIVES

The specific objectives of this study are as follows:

1. To investigate personal, family, and peer group influence on the entrepreneurial intentions of college students in Barak Valley
2. To study how socio-economic and cultural factors influence the entrepreneurial intentions of college students in Barak Valley.
3. To study the influence of psychological and neural factors on the entrepreneurial intentions of college students in Barak Valley.

HYPOTHESES

4. Personal, family, and peer group have no influence on the entrepreneurial intentions of college students in Barak Valley, Assam.
5. Socio-economic and cultural factors have no influence on the entrepreneurial intentions of college students in Barak Valley.
6. Psychological and neural factors have no influence on the career choices of college students in Barak Valley.

METHODOLOGY

The study is descriptive and based on primary data collected from 288 students across different colleges in the three districts of Barak Valley, Assam, India, which includes Karimganj, Hailakandi, and Cachar. The sample size was determined based on a 95% confidence level. The respondents were chosen using Simple Random Sampling, and data was collected through a structured questionnaire. The data analysis was conducted using both simple regression analysis and multiple regression analysis.

DATA ANALYSIS AND RESULTS

In order to fulfil the objective of this research a structured questionnaire was prepared and distributed to college students. The Demographic profile of the respondents is given below:

Demographic Profile:

Gender

Sl. No	Gender	Frequency	Percent
1.	Male	168	58.3%
2.	Female	120	41.7%
3.	**Total**	**288**	**100%**

(Table 1- Gender of the respondents)

Age Group

Sl. No	Age Group	Frequency	Percent
1.	18-21	108	37.5%
2.	21-24	74	25.7
3.	24 and above	106	36.8%
4.	**Total**	**288**	**100%**

(Table 2- Age of the respondents)

Current Academic Qualification

Sl. no	Academic Qualification	Frequency	Percent
1.	Under Graduate	155	53.8%
2.	Post Graduate	133	46.2%
3.	**Total**	**288**	**100%**

(Table 3- Academic Qualification of the respondents)

Findings: Objective 1- *To investigate personal, family, and peer group influence on the entrepreneurial intentions of college students in Barak Valley*

Ho *- Personal, family, and peer group have no influence on the entrepreneurial intentions of college students in Barak Valley, Assam.*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.622[a]	.387	.385	.554

Table – 4

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	55.192	1	55.192	179.999	.000[b]
	Residual	87.387	285	.307		
	Total	142.578	286			

Table -5

Interpretation: In the objective the researcher wanted to investigate personal, family, and peer group influence on the entrepreneurial intentions of college students in Barak Valley. Previous research has shown that these factors significantly influence entrepreneurial intentions. In this study, the following hypothesis was tested: *Ho: Personal, family, and peer group have no influence on the entrepreneurial intentions of college students in Barak Valley, Assam.* A simple linear regression analysis was carried out using IBM SPSS 26. The Model Summary in Table -4 presents the findings for Objective 2. In this table, the R value is .622, indicating a strong relationship between Personal, family, and peer group and entrepreneurial intentions. The R^2 value is 0.387, indicating that 38.7% of the entrepreneurial intentions of college students can be influenced by socio-economic and cultural factors. Further, the ANOVA table i.e. Table -5 shows that the p-value of the regression analysis is 0.000, which is highly significant ($p < 0.05$), confirming that the regression model is statistically significant. As a result, the null hypothesis is rejected. Therefore, it can be concluded that Personal, family, and peer group significantly influence the entrepreneurial intentions of college students in Barak Valley.

Findings: Objective 2- *To study how socio-economic and cultural factors influence the entrepreneurial intentions of college students in Barak Valley.*

Ho - *Socio-economic and cultural factors have no influence on the entrepreneurial intentions of college students in Barak Valley.*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.664[a]**	**.441**	**.439**	**.529**

Table -6

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	**Regression**	**62.877**	**1**	**62.877**	**224.841**	**.000[b]**
	Residual	**79.701**	**285**	**.280**		
	Total	**142.578**	**286**			

Table -7

Interpretation: The objective 2 aimed to analyze the influence of socio-economic and cultural factors on the entrepreneurial intentions of college students in Barak Valley. A simple linear regression analysis was conducted using IBM SPSS 26 to test the hypothesis: *Ho: Socio-economic and cultural factors do not significantly influence the entrepreneurial intentions of college students in Barak Valley.*

The Model Summary (Table-6) shows an R value of 0.664, indicating a strong relationship between socio-economic and cultural factors and entrepreneurial intentions. The R^2 value of 0.441

suggests that 44.1% of the variance in entrepreneurial intentions can be influenced by these factors. The ANOVA table (Table-7) presents a p-value of 0.000, confirming that the model is statistically significant. Consequently, the null hypothesis is rejected, indicating that socio-economic and cultural factors have a significant influence on the entrepreneurial intentions of college students in Barak Valley

Findings: Objective 3- *To study the influence of psychological and neural factors on the entrepreneurial intentions of college students in Barak Valley.*

Ho *- Psychological and neural factors have no influence on the career choices of college students in Barak Valley.*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.611[a]	.373	.371	.560

Table- 8

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	53.230	1	53.230	169.790	.000[b]
	Residual	89.349	285	.314		
	Total	142.578	286			

Table -9

Interpretation: The third objective aimed to analyze the influence of psychological and neural factors on the entrepreneurial intentions of college students in Barak Valley. A simple linear regression analysis was conducted using IBM SPSS 26 to test the hypothesis: *Ho: Psychological and neural factors do not significantly influence the entrepreneurial intentions of college students in Barak Valley.*

The Model Summary (Table-8) shows an R value of 0.611, indicating a moderate relationship between psychological and neural factors and entrepreneurial intentions. The R^2 value of 0.373 suggests that 37.3% of the variance in entrepreneurial intentions can be influenced by these factors. The ANOVA table (Table-9) presents a p-value of 0.000, confirming that the model is statistically significant. Consequently, the null hypothesis is rejected, indicating that psychological and neural factors have a significant influence on the entrepreneurial intentions of college students in Barak Valley.

Summary of findings

The analysis presented above clearly indicates that all factors independently influence the entrepreneurial intentions of college students. The researcher aimed to examine whether these factors also collectively influence entrepreneurial intentions. To assess this, a multiple regression analysis was conducted, and the findings are presented below:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.707[a]	.500	.495	.502

Table - 10

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	71.274	3	23.758	94.294	.000[b]
	Residual	71.304	283	.252		
	Total	142.578	286			

Table - 11

Interpretation: The results from the Model Summary (table-10) and ANOVA tables (table-11) provide significant insights into the collective influence of Objectives 1, 2, and 3 on the entrepreneurial intentions of college students in Barak Valley, with an R value of 0.707. The R^2 value of 0.500 suggests that approximately 50% of the variance in entrepreneurial intentions is influenced by these objectives. The ANOVA results further confirm the model's significance, as evidenced by a p-value of 0.000 ($p < 0.05$), indicating that at least one of the predictors significantly influences entrepreneurial intentions. This analysis collectively supports the conclusion that the combined influence of the factors outlined in the objectives plays a crucial role in shaping the entrepreneurial intention among students in Barak Valley.

CONCLUSION

This study on factors influencing the entrepreneurial intentions of college students in Barak Valley, Assam concludes that personal, family, peer group, socio-economic, cultural, psychological, and neural factors, all these significantly influence students' entrepreneurial intention. The analysis shows that personal influences, particularly from family and peers, are pivotal in shaping students' intentions to pursue entrepreneurship. Additionally, socio-economic and cultural factors were found to play a crucial role, reflecting the unique challenges and opportunities faced by students in the Barak Valley region. The results of the regression analyses indicated strong relationships between these factors and entrepreneurial intentions, with significant p-values confirming the validity of hypotheses tested. The findings underscore the need for targeted interventions to foster an entrepreneurial mindset among students, particularly in underdeveloped regions like Barak Valley. Thus, the study contributes to a deeper understanding of the dynamics influencing entrepreneurship among young adults, suggesting that addressing these factors can enhance entrepreneurial activity and economic development in the region.

REFERENCES

Adeyonu, A., Balogun, O., & Obanıyı, K. (2019). Factors influencing entrepreneurial intentions of undergraduate agricultural students in Nigeria. *Yuzuncu Yıl University Journal of Agricultural Sciences*, *29*(4), 669-676.

Agbim, K. C., Oriarewo, G. O., & Owocho, M. (2013). Factors influencing entrepreneurial intentions among graduates of Nigerian tertiary institutions. *International Journal of business and management invention*, *2*(4), 36-44.

Ali, J., Jabeen, Z., & Burhan, M. (2023). Measuring factors influencing entrepreneurial intention across gender in India: evidence from Global Entrepreneurship Monitor (GEM) Database. *Journal of Research in Marketing and Entrepreneurship*, *25*(1), 63-82.

Al-Qadasi, N., Zhang, G., Al-Awlaqi, M. A., Alshebami, A. S., & Aamer, A. (2023). Factors influencing entrepreneurial intention of university students in Yemen: The mediating role of entrepreneurial self-efficacy. *Frontiers in Psychology*, *14*, 1111934.

Alzamel, S., Nazri, M., & Omar, S. (2020). Factors influencing e-entrepreneurial intention among female students in Saudi Arabia. *International Journal of Criminology and Sociology*, *9*, 1996-2003.

BUI, T. H. V., NGUYEN, T. L. T., TRAN, M. D., & Nguyen, T. A. T. (2020). Determinants influencing entrepreneurial intention among undergraduates in universities of Vietnam. *The Journal of Asian Finance, Economics and Business*, *7*(7), 369-378.

Buschow, C., & Laugemann, R. (2020). What makes a media entrepreneur? Factors influencing entrepreneurial intention of mass communication students. *Journalism & Mass Communication Educator*, *75*(3), 321-334.

Fu, X., Yan, T., Tian, Y., Niu, X., Xu, X., Wei, Y., ... & Wu, X. (2022). Exploring factors influencing students' entrepreneurial intention in vocational colleges based on structural equation modeling: evidence from China. *Frontiers in Psychology*, *13*, 898319.

Gaddi, J. A. G., Osorio, I. M. A., Geotina, A. E., Plaza, S. F., Orillaneda, E. M. R., Alentajan, J. M., & Maarat, J. C. (2024). Factors Influencing Entrepreneurial Intention of the Senior High School Students. *International Journal of Science and Management Studies (IJSMS)*, *7*(1), 10-24.

Kör, B., Wakkee, I., & Mutlutürk, M. (2020). An investigation of factors influencing entrepreneurial intention amongst university students. *Journal of Higher Education Theory and Practice*, *20*(1), 70-86.

Liñán, F., Rodríguez-Cohard, J. C., & Rueda-Cantuche, J. M. (2011). Factors affecting entrepreneurial intention levels: a role for education. *International entrepreneurship and management Journal*, *7*, 195-218.

Lee, S., Kang, M. J., & Kim, B. K. (2022). Factors influencing entrepreneurial intention: Focusing on individuals' knowledge exploration and exploitation activities. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 165.

Nsahlai, V. K., Zogli, L. K. J., Lawa, E., & Dlamini, B. I. (2020). Factors influencing entrepreneurial intention: a case of students in a South African University. *Academy of Entrepreneurship Journal, Vol. 26, Issue 1*.

Mahmoud, M. A., & Garba, A. S. (2019). Factors influencing entrepreneurial intention of university students in Nigeria. *Covenant Journal of Entrepreneurship*.

Martins, J. M., Shahzad, M. F., & Xu, S. (2023). Factors influencing entrepreneurial intention to initiate new ventures: evidence from university students. *Journal of Innovation and Entrepreneurship*, *12*(1), 63.

Masoomi, E., Zamani, N., Bazrafkan, K., & Akbari, M. (2016). An investigation of the factors influencing entrepreneurial intention of senior agricultural students at shiraz university, Iran. *International Journal of Agricultural Management and Development (IJAMAD)*, *6*(4), 431-437.

Mohd, N., Maat, S. M., & Mat, S. C. (2014, January). Factors influencing entrepreneurial intention among engineering technology students. In *Proceedings of the 8th International Conference on Ubiquitous Information Management and Communication* (pp. 1-6).

PHAN TAN, L. (2021). Factors affecting entrepreneurial intention: a case study of university students in Vietnam. *The Journal of Asian Finance, Economics and Business*, *8*(12), 203-210.

Shamsudin, S. F. F. B., Mamun, A. A., Nawi, N. B. C., Nasir, N. A. B. M., & Zakaria, M. N. B. (2017). Factors influencing entrepreneurial intention and the moderating role of entrepreneurship education: A conceptual model. *Advanced Science Letters*, *23*(4), 3006-3008.

Su, Y., Zhu, Z., Chen, J., Jin, Y., Wang, T., Lin, C. L., & Xu, D. (2021). Factors influencing entrepreneurial intention of university students in China: integrating the perceived university support and theory of planned behavior. *Sustainability*, *13*(8), 4519.

Tong, X. F., Tong, D. Y. K., & Loy, L. C. (2011). Factors influencing entrepreneurial intention among university students. *International journal of social sciences and humanity studies*, *3*(1), 487-496.

Torres-Ortega, J., Loyola-Campos, J., Ibarra-Pérez, D., & Hernández-Muñoz, V. (2024). Factors influencing entrepreneurial intentions among Chilean secondary vocational students. *Academia Revista Latinoamericana de Administración*.

Tran, A. T., & Korflesch, H. V. (2017, October). Factors influencing social entrepreneurial intention: A theoretical model. In *Proceedings of ISERD 89th International Conference* (pp. 51-57).

Xu, X., Ni, H., & Ye, Y. (2016). Factors influencing entrepreneurial intentions of Chinese secondary school students: an empirical study. *Asia Pacific Education Review*, *17*, 625-635.

Yu, T., Khalid, N., & Ahmed, U. (2021). Factors influencing entrepreneurial intention among foreigners in Kazakhstan. *Sustainability*, *13*(13), 7066.

A CRITICAL OVERVIEW OF REGIONAL DISPARITIES IN GEORGE ELIOT'S *SILAS MARNER*

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ABSTRACT

This article aims at examining the regional disparities through a critical overview of George Eliot's *Silas Marner*. Pointing out the effect of industrial revolution in the nineteenth century, *Silas Marner* depicts the regional disparities observed in the world, particularly in the United Kingdom. To wit, regional disparities appear to be the distinguishing features of regions. Thus, the dominance of the south-east of England (centred on London) over the rest of the United Kingdom, the notable differences between the southern regions and most other parts of the country, are based on historical, geographical, socio-political, administrative and economic origins. The zonal specialization according to geomorphology, climatic and economic assets, led to centres of low or high regional densities depending on human needs (employment, underemployment, production). To achieve my goal, qualitative method has been applied with *Sillas Maner* as primary source. Then, psychoanalysis and New Historicism are the appropriate literary theories that help to better understand the real reasons that impel the protagonist's movement in the novel under analysis. As well as Sillas who leaves Lantern Yard to Raveloe, the results show that many people migrate from one region to another not only to discover the different features of their landscapes and to deepen their knowledge about sociological and cultural values but also to seek for a good job that could help them to have a better life. Apart from migration, the results reveal that the living conditions and social pressures change from one region to another.

Keywords : regional disparity, industrial revolution, populations, psychoanalysis, country.

Introduction

The question of regional disparities becomes more and more obvious so that it raises many worldwide conflicts. Indeed, it is difficult to meet many similar regions in the same country encompassing the same geographical features, geomorphological faces or topographical base, sociological, political, economic factors, environment, as well as the vegetable covert.

The composition of the soil also appears to be another reality. The composition of soils within the same country or region varies from one place to another. Soils rich in oil or mining resources in the same country are opposed to soils rich in industrial agricultural products, in food crops or sometimes very poor for agriculture. The same goes for the presence of rivers or bodies of water.

All of these aforementioned factors play a leading role in human distribution. Thus, areas of high human concentrations are opposed to areas of low human concentrations. Because processing industries are setting up in areas producing raw materials, absorbing an increasing number of workers. Shopping centres, refreshment bars and industries selling manufactured products are setting up in areas of high consumption. They appear as nodal points and attract more people in search of well-being. This creates a new aspect in the socio-economic organization of men in the city.

In George Eliot*(1861)* the regional disparities is noticeable. The novel is notable for its strong realism and treatment of a related issue inducing many factors such as natural conditions and industrialisation. This industrialisation played a tremendous role in the regional disparities in

England in the 19th century. In the novel under study, the protagonist Silas Marner leaves Lantern Yard and the city for a rural area where he is unknown in Northern England and travels south to the Midlands and settles near the rural village of Raveloe in Warwickshire where he lives isolated to experience regional disparities realities. The grand theme is the way that George Eliot portrays the regional disparities in *Silas Marner*. This is proved through the protagonist movement in search of well-being according to the variety of the regional disparities that England is composed of. The results show that places in the world are never similar with permanent features; then, every region contains its own potentialities.

For the achievement of this research work, documentary research has been applied as methods while the psychoanalysis and New Historicism are chosen as adequate literary theories. Then, this research work has been subdivided into three (03) chapters. The first chapter talks about the introduction to the study, the second chapter discusses the background of the study and the third chapter focuses on the regional disparities as seen in George Eliot's *Silas Marner*.

I-INTRODUCTION TO THE STUDY

1.1 CONCEPTUAL CLARIFICATION

Before developing the different aspects of regional disparities, trying to explain the meaning of the key concepts become an imperative. Then, it is worth reminding people that the term "regional disparities" is made of two words.

First of all, the adjective regional comes from the word region. A region is an area, especially part of a country or the world having definable characteristics but not always fixed boundaries[1]. Disparity is the condition of being unequal. It is a difference, especially one connected with unfair treatment[2]. Regional disparity is used to describe things which relate to a particular area of a country or of the world. Dictionaries play a vital role in understanding regional disparity by providing concise definitions that help grasp the concept more comprehensively. Understanding regional disparity requires a clear conceptual framework that encompasses various dimensions and perspectives.

Regional disparity refers to the unequal distribution of resources, wealth, and opportunities across different geographic areas, often leading to significant economic and social differences[3]

For instance, when there is a disparity, certain regions may experience higher levels of prosperity, while others lag behind in terms of economic growth and living standards. These disparities can arise due to various factors, including differences in infrastructure, resources, investment, and government policies.

As far as Silas Marner is concerned, ‘’regional disparities’’ appears as a pivotal theme that plays a tremendous role in the narrative life of the protagonist of the novel under study. He exiles from his religious community and travels from the south to the Midlands and settles near the rural village of Raveloe in Warwickshire. Then, he experiences the regional realities in Lantern yard and Raveloe..

1.2-PROBLEM STATEMENT

Out of the different aspects related to the harsh treatments faced by many people under Victorian period and discussed by many critics, the question of regional disparities represents a real puzzle for British citizens. In front of this issue, many people migrate from the north to the south, looking for better life. When London is full of greatest industries, workplaces and goods roads, some regions are not yet developed. This issue is not a personal problem that is only related to the United Kingdom, it is a topical problem. When some regions are blessed with rains and good seasons, other regions are in the lack of water. When farms produces are cultivated in some

[1] https://www.google.com/search?q=A+region+is+an+area%2C+especially+part+ofTF-8; 15/09/2024 at 09 :34
[2] https://www.oxfordlearnersdictionaries.com/definition/american_english/disparity. 15/09/2024 at 10 :54
[3] https://library.fiveable.me/key-terms/ap-hug/regional-disparity; 16/09/2024 at 17 :12

regions with a high stock of foods, the climate changes of some regions prevent them from producing the appropriate quantity of foods to satisfy the needs of the population. Though some regions are blessed with raw materials, it is worth revealing that they lack the appropriate machines to turn them into finished goods. However, regional disparities include the ways that people live in every region. When in some regions, people are isolated, solidarity is promoted in other regions. That's is the case of Silas Marner who after being rejected from Lantern Yard, decides to live lonely in Raveloe but he has been surprised by their solidarity. The question of regional disparities becomes more and more obvious so that it raises many worldwide conflicts. It affects one living conditions and that it does not exist similar regions with the same geographical, geomorphological faces, sociological, political, and economic features.

1.3 SIGNIFICANCE AND PURPOSE OF THE STUDY

This research work is crucially important because it provides a bridge to nowadays discussions around phenomena like regional disparities. Out of economic aspects developed by many researchers, this work intends to emphasize the influence of regional disparities in Silas Marner's narrative life. Thereafter, this research work may serve as a compass to discover how regional disparities of Victorian England can lead many people to migration and social problems.

1-4- SCOPE OF THE STUDY

The current article tackles the issue of regional disparities. This research highlights the issue of regional disparities in the United Kingdom and particularly the similarities and difference between the region of Lantern Yard and Raveloe, starting from the climatic field to social aspects. This research discusses how regional disparities may be viewed as one of the main causes of Molly Farren's death in the novel. As far as social aspects are concerned, the findings of this research depict how the wickedness and dishonesty of Lantern Yard's citizens affect Sillas's living conditions in Raveloe.

II- BACKGROUND OF THE STUDY

2.1 LITERATURE REVIEW

George Eliot's novel, *Silas Marner*, has captivated readers for generations with its vivid portrayal of regional disparities and its harrowing effects on the protagonist. This literature review aims to delve into the theme of regional disparities and explore how this unevenness influences Silas Marner's psychological development.

Jun Koo and Heechul Lee (2015) discuss the notion of regional disparity through their article entitled ‘*’Regional capability and regional disparity: a conceptual framework and applications within Korea”*. They bellowed that the performance of a regional disparity is discussed only in monetary terms such as per capita income or gross regional domestic product, with little attention paid to the life satisfaction of residents in the region. The proposed capability-based analysis of regional disparity emphasizes five aspects of life that may influence residents' ability to pursue what they want to do or to be. In addition, the results of the proposed simple regression analysis indicate that the marginal effect of income on life satisfaction may be augmented according to the levels of regional capabilities.

Holger Floerkemeier and Nikola Spatafora (2021), notice that many countries are characterized by significant regional disparities in economic performance and living standards, as reflected in income, education, or health outcomes**.** The regional disparities raise equity concerns: they contribute to overall within-country inequality, and they are linked to inequality of opportunity, as measured by, say, intergenerational mobility. As solution, appropriate policy mix will be country- and context-specific. It must depend on the characteristics of a country's leading and lagging regions, and the key drivers of regional disparities. Ultimately, policy makers must strike the right balance between fostering rapid but regionally uneven growth on the one hand, and promoting more inclusive regional development outcomes on the other.

Talking about the regional disparity in the Victorian Age, historians refer to the industrial North England. The regional differences between the North and the South is as clear as George Orwell (1996) observed in *The Road to Wigan Pier* that:

> You are conscious, quite apart from the scenery, of entering a strange country. This is partly because of certain real differences which do exist, but still more because of the North-South antithesis which has been rubbed into us for such a long past. (George O, 1996),

In the regional stereotypes described by Orwell, the Northern was grim, plucky, warm-hearted, and democratic, the Southerner snobbish, effeminate, and lazy, gritty, ugly and smoky the North certainly was, but only in the North did one find 'real life'. The South had had 'beautiful villages', but they were ruined by the presence of 'rotten people'-parasitic lounge-lizards living off their capital and useless bishop's nieces playing up their plummy accents. Although the northern businessman was no longer prosperous in the nineteen -thirties the legend persisted that he had an innate talent for 'getting on' that his Southern neighbour lacked.

In the twentieth century the fact of regional disparity was obvious in England in the health care field, Ian Leck (1989) shows that the Standardized Mortality Ratio (SMR) for the northern half of England has recently increased from 113 to 115 per cent of the SMR for the South, and that the north is at least as disadvantaged in respect of morbidity and material deprivation and uses much less private medical care than the south.

In *Inequalities in England: Regional Differences and New Perspectives on a Geopolitical Issue*, Mark Bailoni (2018) declares that the North/South divide is an image frequently used to depict the territorial structure and the economic dynamism of England, and thus to describe the social and economic geography of the country. He shows that this image distinguished a post-industrial North, which still faces economic and social difficulties, from a tertiary, rich and powerful South. He augments that disparity separated a central space (the South) from a periphery (the North). However, the recent economic changes in Britain question the relevance of this image, which is perhaps too simplistic to describe accurately the economic and social geography and the spatial disparities in the country.

The evidence of regional disparities in England goes across the times. Therefore, from twentieth to twenty-first century, Iain E Buchan and al (2017) focus on the North-South disparities in English mortality from 1965 to 2015. They come to the results that from 1965 to 2010, premature mortality (deaths per 10 000 aged inferior 75 years) declined from 64 to 28 in southern versus 72 to 35 in northern England. From 2010 to 2015 the rate of decline in premature mortality plateaued in northern and southern England. For most age groups, northern excess mortality remained consistent from 1965 to 2015. For 25–34 and 35–44 age groups, however, northern excess mortality increased sharply between 1995 and 2015. This was due to northern mortality increasing (ages 25–34) or plateauing (ages 35–44) from the mid-1990s while southern mortality mainly declined.

2.2 GEORGE ELIOT AND THE ISSUE OF REGIONAL DISPARITIES IN THE UNITED KINGDOM

George Eliot**,** a British novelist whose real name is Mary Anne Evans, is a remarkable finger of British literature. Born on November 22, 1819 in the civil parish of Chilvers Coton, near Nuneaton in Warwickshire she died on December 22, 1880, in London, the city capital of England. She is an English Victorian novelist known for the psychological depth of her characters

and her descriptions of English rural life. After her father's death, George Eliot migrates to the capital city of England, London, where she has been employed as editor of Westminster Review.
Though, she is one of the greatest novelists of British literature, she has been saddened by religious leaders' behaviours. In this novel, the biography of George Eliot and the historical background of the novel have been depicted. Through a perusal of this part, one could understand that George Eliot life is comparable to the one of the protagonists of this novel. According to this part of the novel, George Eliot who was a devoted Christian become a non-believer. Even if the reason of this rejection of God is not mentioned, one could blatantly notice that Sillas is not an ordinary character. Sillas reflect indirect the image of the narrator. For instance, Eliot migrates to London in the real life while Sillas Migrates from Lantern Yard to Raveloe in Elliot's fictional work.
Moreover, the place where the protagonist of the novel, Silas Marner finds solace. Silas Marner travels south to the Midlands and settles near the rural village of Raveloe in Warwickshire where he lives isolated and alone, choosing to have only minimal contact with the residents beyond his work as a linen weaver. A vast proportion of properties in the region benefit from larger internal footprints as well as bigger private gardens, making it ideally suited for those with children. Plus, Warwickshire has a lower crime rate than the average county in England, perfect for buyers seeking a safe environment to raise a family. Nestled in the English countryside, Warwickshire is the birthplace of the world's most famous playwright, William Shakespeare, who spent his early years in nearby Stratford-Upon-Avon.
George Eliot (1861) describes the England physical landscape, the people, and the environment she noticed in the country particularly in *Silas Marner*, in the Victorian era :

> In the days when the spinning-wheels hummed busily in the farmhouses-and even great ladies, clothed in silk and thread lace, had their toy spinning-wheels of polished oak- there might be seen in districts far away among the lanes, or deep in the bosom of the hills, certain pallid undersized men, who, by the side of the brawny country-folk, looked like the remnants of a disinherited race.(Geore Eliot,1861)

England[4] is a country that is part of the United Kingdom. The country is located on the island of Great Britain, of which it covers roughly 62%, and over 100 smaller adjacent islands. It has land borders with Scotland to the north and Wales to the west, and is otherwise surrounded by the North Sea to the east, the English Channel to the south, the Celtic Sea to the south-west, and the Irish sea to the west. Continental Europe lies to the south-east, and Ireland to the west. The population was 56,490,048 at the 2021 census. London is both the largest city and the capital. England's topography[5] is low in elevation but, except in the east, rarely flat. Much of it consists of rolling hillsides, with the highest elevations found in the north, northwest, and southwest. This landscape is based on complex underlying structures that form intricate patterns on England's geologic map. England is by far the most populous country of the United Kingdom, accounting for 84% of the combined total[6] But I notice an unequal distribution of population, towns, infrastructure and superstructure as well as the geomorphological base of the space between the North and the South of England.
The south of the county is largely rural and sparsely populated, and includes a very small area of the Cotswolds, at the border with northeast Gloucestershire. The plain between the outlying Cotswolds and the Edgehill escarpment is known as the Vale of Red Horse. The only town in the south of Warwickshire is Shipston-on-Stour

[4] https://en.wikipedia.org/wiki/England#Demography, 27/03/2024 at 02 :01 :
[5]https://www.google.com/search?q=What+is+the+geography+of+the+North+of+England%3F&sca_esv= =gws-wiz-serp,27/03/2024 at 01 :41
[6] https://en.wikipedia.org/wiki/England#Demography. 27/03/2024 at 01 :54

Imagining England in terms of disparities between North and South marked by the River Trent dates back to the reign of King John. His supporters used ‘Northerner’ to refer to the barons who rebelled against him[7]. It was the rise of industry which gave the North-South antithesis its ‘’peculiar slant’’.

Northern England in 1891 was one of the most economically productive regions, being geographically close to the textile industries of Lancashire and Yorkshire that defined the Industrial Revolution. By contrast, southern and eastern England lagged behind, having suffered from agricultural depression since the 1870s. Northern England is culturally and economically distinct from both the Midlands and the South of England. The area's northern boundary is the border with Scotland, its western the Irish Sea and a short border with Wales, and its eastern the North Sea. Its southern border is often debated and there has been a significant challenge in defining what geographies precisely constitutes the 'North of England.

Many Industrial Revolution innovations[8] began in Northern England, and its cities were the crucibles of many of the political changes that accompanied this social upheaval, from trade unionism to Manchester Liberalism. In the late 19th and early 20th centuries, the economy of the North was dominated by heavy industry. Centuries of immigration, invasion, and Labour have shaped Northern England's culture, and it has retained countless distinctive accents and dialects, music, arts, and cuisine. Industrial decline in the second half of the 20th century damaged the North, leading to greater deprivation than that of the South. Although urban renewal projects and the transition to a service economy have resulted in strong economic growth in parts of the North, the North–South divide remains in both the economy and culture of England

Men were more likely to receive workhouse offers than women, as they were perceived as less domesticated. Pauperism was fairly limited in northern England; one key reason for this may be the high presence of male farmers running smallholdings in places such as Yorkshire and Cumbria. Furthermore, an elderly person living among their offspring and extended relatives minimized the risk of pauperism. By contrast, elderly couples and widows living on their own were more likely to utilize the New Poor Law.

III- REGIONAL DISPARITIES AS SEEN IN GEORGE ELIOT'S *SILLAS MARNER*

3.1 THEORETICAL FRAMEWORK

A novel may be studied by many researchers in different ways. Then, the application of literary theories becomes a necessity for all researchers because it helps them to narrow in the author's imagination in order to find detail information related to the field of the research. Then, reading a novel through the lens of psychoanalytic theory calls the researchers to focus on the psychological effects produced by each character in the novel. In the frame of this research work, the psychoanalytic theory helps to better understand Silas Marner's reaction. It helps to highlight the psychological effect of social pressure in his life. His rejection from Lantern Yard sinks him in a psychological prison manifested by his isolation once in Raveloe. Thanks to this theory, one could also deepen his knowledge about the impact of regional disparities in human lives.

Out of the psycho-analysis, new historicism helps to get a large number of information related to the historical context that impel the narrator to produce such work. Historians reveal that the novel is set in the early years of the 19th century. Silas Marner, a weaver, is a member of a small Calvinist congregation in Lantern Yard, a slum street in Northern England. Northern England includes the Pennines ("the backbone of England") and the Cheviot Hills, is a cool, wet, and cloudy region of England[9]. Whereas the rural village of Raveloe in Warwickshire where the protagonist of the novel Silas Marner travels to, the Southern England, also known as the South of

[7] https://www.google.com/search?q=%E2%80%98Northerner &ie=UTF-827/03/2024 at 01 :59
[8] https://www.google.com/search?q=Many+Industrial+Revolution+innovations+ &ie=UTF-827/03/2024 at 01 :54
[9] https://www.google.com/search=Description+of+Northern+England&sca_gw-serp, 25/03/2024 at 5 :34

England or the South, is a sub-national part of England with cultural, economic and political differences from both the Midlands and the North.

Economic historians and geographers have recognised a 'dualism' in the economic development of the UK a divide between the northern and southern parts of the country - dating back over several centuries. The Industrial Revolution of the late 18th and 19th centuries began in the Midlands and North West of England. It was based initially on textiles and then other sectors such as coal-mining, iron and steel, heavy engineering and shipbuilding, with manufacturing coming to dominate the employment structure across much of Northern England, Western Scotland and South Wales. The south of England (with the exception of London) tended to be more reliant on agriculture, subject to cyclical fluctuations in prices, and was generally less affluent. Even over the 1840-1920 period, when 'northern' prosperity was at its greatest, South-East England was performing much better in terms of manufacturing employment growth (as well as growth in service sector jobs)[10].

3.2 REGIONAL DISPARITIES BETWEEN LANTERN YARD AND RAVELOE

3.2.1 CLIMATE DIVERSIFICATION

As mentioned above, the main objective behind the choice of the present research work is to underline the similarities and the differences between the two fictional regions such as Lantern Yard and Raveloe. Even if there are all fictional regions, they are used as a symbol to caricature the different inequalities related to regional features.

As far as environmental aspects are concerned, Eliot does not hesitate to point out some differences between both regions. Human environment includes trees, vegetables, animals, water and climate. In this novel, George Eliot sheds light on climate change from region to region. To highlight these disparities, George Eliot puts Molly Farren in the position of someone who is traveling to the region of Raveloe while suddenly she has been surprised by snowstorm. She writes:

She had set out at an early hour, but had lingered on the road, inclined by her indolence to believe that if she waited under warm shed the snow would cease to fall. She had waited longer than she knew, and now that she found herself belated in the snow hidden ruggedness of the long lanes, even the animation of the vindictive purpose could not keep her spirit from failing. (George Eliot 1861)

From this passage, anyone could notice that there no snowstorm in the region from where Molly Farren was coming otherwise, she could take her precaution. She does not know that it was the period of snow before taking the way. This passage shows clearly that the climate of Lantern Yard is different from the one of Raveloe. As direct consequences of this regional disparities, Molly Farren died on the way:

She had arrived at the spot where her footsteps were no longer checked by a hedgerow, and she had wandered vaguely, unable to distinguish any objects, notwithstanding the wide whiteness around her ...But the complete torpor came at last: the fingers lost their tension, the arms unbent; then the little head fell away from the bosom, and the blue eyes opened wide on the cold starlight. (George Eliot 1861)

After her death, her daughter Eppie has been adopted by Sillas. Eppie golden-haired child changes Silas's life completely. the skeleton of Dunstan Cass still clutching Silas's gold is found at the bottom of the stone quarry near Silas's home, and the money is duly returned to Silas. Silas's actions through the years in caring for Eppie have apparently provided joy for everyone, and the extended family celebrates its happiness.

Furthermore, Sillas used tree's leaf to cure someone who is sick in the novel. Trees are also part of the environmental. Even if, the narrator has not described if Lantern is surrounded by trees or not,

[10] https://www.google.com/search?q=Even+over+the+1840-1920+period% 2C+when& sourceid= chrome &ie=UTF-8, 14/09/2024 at 20 :48

she proves the presence of trees in Raveloe because it is a rural village. There are a lot of trees in villages.

He had inherited from his mother some acquaintance with medicinal herbs and their preparation- a little store of wisdom which she had imparted to him as a solemn bequest-but of late years he had had doubts about the lawfulness of applying this knowledge that herbs could have no efficacy without prayer, and that prayer might suffice without herbs. (George Eliot, 1861)

3.2.2 SOCIAL DIFFERENTIATION

While dealing with comparative study, it is worth revealing the common points before pointing out the differences between both regions. While looking back to the reason of Silas Marner's rejection from Lantern Yard, one could understand that stealing and lack of honesty is part of their daily habits if not William Dane would not take such steps. Silas Marner faces the similar situation in Raveloe when his bag of money has been stolen. This shows that there are people who steal both in Lantern and in Raveloe.

Unlikely to Lantern where true solidarity is not promoted, Raveloe is a region where people's relationship is based on true love and solidarity. Unlikely to Lantern, people do not consider Silas Marner's case as personal hardship that he should face alone. That is why Eliot finds some characters who help Silas Marner to take care of the little Eppie.

Community: However, he aids Marner in caring for Eppie with occasional financial gifts. More practical help and support in bringing up the child is provided by Dolly Winthrop, Dolly's help and advice assist Marner not only in bringing up Eppie, but also in integrating them into village society. (Eliot 1961)

Moreover, when Sillas's money has been stolen, people of Raveloe take it as their common problem. That is why they all help to investigate the thief whereas Silas Marner founds no support in Lantern Yard. Through the time allotted to the investigation in Raveloe, George Eliot would like to disclose the weakness of religious beliefs according to which the thief may be identified through money casting. This religious ways of finding the author of a wrong deeds differ from region to region. That is certainly why the narrator does not let people of Raveloe do the same thing. So this way of identifying the culprit is not verified.

Comparing the religious beliefs of both regions may help to better understand how George Eliot depicts the issue of social disparities between Lantern Yard and Raveloe. These societies are drastically opposed to each other. By the end of the novel, Lantern Yard is a large town filled with factories, busy men, strangers, and travelers. Silas Marner, a weaver, is a member of a small Calvinist congregation in Lantern Yard, a slum street in Northern England. Lantern Yard and Raveloe were two different towns, both religiously and socially. People in Lantern Yard were more inclined toward religiousness but not friendly whereas people in Raveloe were more friendly but not that religious.

Silas Marner leaves his original home in Lantern Yard because the leaders in his church accuse him of stealing from one of the church's recently departed deacons. Lantern Yard is a community of faith, held together by a narrow religious belief that Eliot suggests is based more on superstition than any sort of rational thought. The town of Lantern Yard symbolizes the change that Silas Marner undergoes when he is betrayed and loses his faith in his home community and in God. Early in the book, the parish at Lantern Yard is a tight-knit, devote community, representative of the type of faith Silas Marner exhibits.

Silas Marner's early faith is distinctly different from the faith he regains in later years. As a young man, Marner lives in Lantern Yard and his faith depends on the community and worship. Silas Marner believes in an unseen, benevolent God and in following only those practices that reflect faith in this God. Silas has ended up in Raveloe because the members of his religious sect in Lantern Yard, an insular neighborhood in a larger town, falsely accused him of theft and he was

forced to leave his hometown in the north. Silas Marner is an outcast from his original home and church.

Most of the characters of Raveloe did not take going to church seriously. They thought it was only necessary when they wanted to be neighborly or to get involved in programs, celebrations, feasts, and the sacraments. The protagonist, Silas Marner, a reclusive weaver, encapsulates the novel's themes of transformation and redemption. His journey from the betrayal by his friend William Dane to his isolated life in Raveloe is marked by despair and seclusion.

Finally, Raveloe is described as a village where many of the old echoes lingered, undrowned by new voices. Not that it was one of those barren parishes lying on the outskirts of civilisation-inhabited by meagre sheep and thinly-scattered shepherds: on the contrary, it laying the rich central of what we are pleased to call Merry England, and held farms which speaking from a spiritual point of view, paid highly-desirable tithes. It was an important looking village, with a fine old church and large brick-and stone homesteads, with well-walled orchards and ornamental weathercocks, standing close upon the road, and lifting more imposing fronts than the rectory, which peeped from among the trees on the other side of the churchyard :-a village which showed at once the summits of its social life and told the practiced eye that there was no great park and manor-house in the vicinity, but that there were several chiefs in Raveloe who could farm badly quite at their ease, drawing enough money from their bad farming, in those war times, to live in a rollicking dashion, and keep a jolly Christmas, Whitsun, and Easter tide.

From the beginning of this novel till the end, the narrator uses several characters to convey his message. From place to place, the attitudes of some characters change. In one word, people's behaviours changes from one region to another according to the people they meet and the experience they get. . While looking at the way Silas behaves in Lantern Yard and Raveloe, anyone could read a kind of changes. That is why from open-minded person, he changes to someone who lives lonely. Though, he was open to William and many other characters in Lantern Yard, Silas decides to live apart in order to avoid the same problem he faced with William once in Raveloe. In this region he becomes wealthy.

Apart from that, from Lantern to Raveloe, some bad behaviours are depicted. Out of the issue of betrayal of William Dane as well as Sarah, In Raveloe we notice the presence of an opium addict, Molly Farren. In this novel, some characters are known as Raveloe's citizens. Among them, l could list: Eppie, Dolly Winthrop, Mr. Macey, Aaron Winthrop, Mr. Lammeter, Jem Rodney, Mr. Kimble, Mr. Dowlas, Mr. Snell, The peddler, Bryce, and Miss Gunns.

As far as Lantern Yard is concerned, Sarah, William Dane, and religious leaders are some of the main characters that makes the story interesting. Like Silas Marner, Molly Farren migrates from one region to another. They may be considered as adventurers.

CONCLUSION

Regional disparities appear to be the distinguishing features of regions. Presented as an evident reality that characterizes the world, the issue of regional disparities is depicted by George Eliot’s *Silas Marner* through her fictional world in order to prove its importance in human narrative life. As a matter of fact, the issue of regional inequalities is one of the causes of Molly Farren's death and the changing behavior of Silas Marner. To achieve my goal, qualitative method, psychoanalysis and New Historicism have been applied. My analysis reveals that regional disparities are a topical issue that affects human living condition. Indeed, it is unreal to meet in the world similar regions presenting the same geographical, geomorphological faces, sociological, political, and economic features.

WORKS CITED

Anyadike Danes, & al. (2001*): Labour's New Regional Policy: An Assessment. Working Party on Regional Economic Policy*. Regional Studies Association. London

Bachtler, John (2004), *Regional disparities in the United Kingdom*, In: Karl, Helmut Rollet,Philippe (Ed.): Employment and regional development policy: Market efficiency versus policy intervention, ISBN 3-88838-231-9,

Bachtler, John. (1994): *Regional Problems and Policies in the United Kingdom. Organization for Economic Co-operation and Development*. Paris

Bailoni Mark (2018) *Inequalities in the UK : new discourses, evolutions and actions**, Inequalities** in England: Regional Differences and New Perspectives on a Geopolitical Issue, David Fée,* France *Université de LorraineEA7304 (413289) ISBN 978-1-78714-480-4*

Buchan E Iain and Al. (2017) *North-South disparities in English mortality1965-2015: longitudinal population study* . https://pubmed.ncbi.nlm.nih.gov/28790164/

Cabinet Office (1999): *Sharing the Nation's Prosperity – Variation in Economic and Social Conditions across the UK, A Report to the Prime Minister by the Cabinet Office. London.* December 1999.

Fothergill, S. (2002): *The True Scale of the Regional Problem in the UK. In: Regional Studies*, Regional Studies 35(3):241-246DOI:10.1080/00343400123960

Huggins, R. (2003):*Creating a UK Competitiveness Index: Regional and Local Benchmarking. In: Regional Studies* https://doi.org/10.1080/0034340022000033420

Leck Ian (1989), *The North-South Divide in England: Implications for Health Resource Allocation*. https://repository.library.georgetown.edu/handle/10822/831394

Martin, R. (1988): *The Political Economy of Britain's North-South Divide*. In: Transactions of the Institute of British Geographers, N.S. 13, 389-418.The Political Economy of Britain's North-South Divide on JSTOR

Martin R. (1989): *The New Economics and Politics of Regional Restructuring*. In: L. Albrechts; F. Moulaert; P. Roberts; E. Swyngedouw (Editors) Regional Policy at the Crossroads: European Perspectives. Jessica Kingsley Publishers. London. 27-51.

Turok, I.; Edge, N. (1999): *The Jobs Gap in Britain's Cities: Employment Loss and Labour Market Consequenc*es. Policy Press. Bristol.

Jun Koo & Heechul Lee,(2015) *Regional capability and regional disparity: a conceptual framework and applications within Korea*, https://doi.org/10 .1080/1229 4659.2014.1003456

Holger Floerkemeier & Nikola Spatafora,(2021*) Regional Disparities, Growth, and Inclusiveness,* eISBN: 9781513569505,

Orwell George (1861) *Animal Farm : A Fairy Story*, Publisher: Signet United Kingdom

Mark Bailoni (2018) *Inequalities in the UK : new discourses, evolutions and actions**, Inequalities in England: Regional Differences and New Perspectives on a Geopolitical Issue, David Fée,* **,Centre d'Etude et de Recherche en Géographie de l'Aménagement des Paysages et de l'Environnement, Nancy / Metz - France** ***Université de LorraineEA7304 (413289) ISBN 978-1-78714-480-4***

WEBSITES

https://www.google.com/search?q=A+region+is+an+area%2C+especially+part+ofTF-8; 15/09/2024 at 09 :34

https://www.oxfordlearnersdictionaries.com/definition/american_english/disparity. 15/09/2024 at 10 :54

https://library.fiveable.me/key-terms/ap-hug/regional-disparity; 16/09/2024 at 17 :12

https://www.google.com/search?q=Even+over+the+1840-1920+period% 2C+when& sourceid=

chrome &ie=UTF-8, 14/09/2024 at 20 :48
https://www.google.com/search=Description+of+Northern+England&sca_gw-serp, 25/03/2024 at 5 :34
https://en.wikipedia.org/wiki/England#Demography, 27/03/2024 at 02 :01 :
https://www.google.com/search?q=What+is+the+geography+of+the+North+of+England%3F&sca_esv= =gws-wiz-serp,27/03/2024 at 01 :41
https://en.wikipedia.org/wiki/England#Demography. 27/03/2024 at 01 :54
https://www.google.com/search?q=%E2%80%98Northerner &ie=UTF-827/03/2024 at 01 :59
https://www.google.com/search?q=Many+Industrial+Revolution+innovations+ &ie=UTF-827/03/2024 at 01 :54

EVALUATING USER EXPERIENCES BASED ON UN-HABITAT INDICATORS IN KIZILBAS PARK

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ABSTRACT

A public space is an area that is open and accessible to all people, regardless of gender, race, ethnicity, age or socio-economic level. Public spaces play an important role in city life. From historical times to the present, public spaces have supported a variety of human activities, promoting interactions among people and between people and their environment. Public spaces are designed to accommodate diverse daily activities such as walking, shopping, conversing, relaxing and entertainment as well as periodic events. Public spaces have experienced periods of neglect due to the prioritization of modernist planning, which emphasized vehicular needs over pedestrian needs. This shift has led to a decline in the quality of urban life, diminishing the vitality of public spaces that are essential for social and cultural activities. The contemporary challenge is to reinvigorate these spaces, making them safe, attractive, and vibrant for diverse social interactions. This research aims to assess the perception of users of Kızılbaş Park in light of UN Habitat indicators. The results will enable more understanding of user's needs in Public Spaces in Nicosia. The methodology is a quantitative survey method using questionnaires created and distributed using Google forms and analyzed using SPSS frequencies. The results show that users of Kızılbaş Park perceive some aspects of the park to be good and others as average. However, there are two aspects where the park is lacking and needs improvement.

Keywords: Public Spaces, UN-Habitat Indicators, User experience, Kızılbaş Park.

1. INTRODUCTION

There are various definitions of public space distinguished by issues of ownership, control, access and use. Some authors define it as the "space that is not controlled by private individuals or organizations, and hence is open to the general public". Others base their definitions on issues of access and use, and public space is defined as "publicly accessible places where people go for group or individual activities" (Mehta, 2013). According to YUNESCO, ''A public space refers to an area or place that is open and accessible to all people, regardless of gender, race, ethnicity, age or socio-economic level" (UNESCO, 2017).
The UN-Habitat defines Public Spaces as "all spaces publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive" (UN Habitat, 2018).
Public spaces obtain their value from their ability to meet users' needs and their contribution to people's physical and mental well-being. They can improve the quality of life (Alwah, A. et.al, 2021). Public spaces are understood as places of social encounters and interactions, opportunities, and exchange of ideas and busiĞ+XDDCFness whether indoors or outdoors. They are a key part of a city's identity (Souza E, 2024).

Public spaces play an important role in city life. From historical times to the present, public spaces have supported a variety of human activities, promoting interactions among people and between people and their environment. Public spaces are designed to accommodate diverse daily activities such as walking, shopping, conversing, relaxing and entertainment as well as periodic events (Jalaladdini, Oktay, 2011). They deliver numerous benefits to individuals and communities alike (Szczepanska, A. et.al, 2020).

Public spaces reflect the interaction between space and society, which makes them essential components of everyday urban life. Streets facilitate travel; playgrounds and parks facilitate playing, sports and relaxation. Good public spaces are multi-purpose, well-connected, and high-quality. They cater to a diverse population of different classes, gender, age, and ethnicity. These spaces provide relaxation, reduce stress, and mitigate aggressive behavior. Well-designed public spaces foster social interaction and community cohesion and also improve the quality of life (Alnaim, Noaime, 2023).

High-quality public spaces are also key to economic growth and urban revitalization. Well-designed parks, gardens and squares can attract different kinds of businesses, consumers, workers, and services. This can boost local economies and property values. This, in turn, increases local government revenue and enables the provision of more and better services (Alnaim,Noaime, 2023). Public spaces have the potential to mitigate root economic stress especially among the weak by enabling community support and providing assets (Huaroc C, 2024).

Urban planners view public spaces as essential nodes of interaction, rest, and play. They reflect the social, economic, and environmental characteristics of their neighborhoods. Public spaces express the unique personality of their surroundings andare increasingly seen as vital to the quality of urban life (Alnaim, Noaime, 2023).

1.1 Research Problem

Public spaces have historically been a focal point for urban planners, exemplified by the management of the Greek agora and Roman forum. Despite their importance, these spaces have experienced periods of neglect due to the prioritization of modernist planning, which emphasized vehicular needs over pedestrian needs. This shift has led to a decline in the quality of urban life, diminishing the vitality of public spaces that are essential for social and cultural activities. The contemporary challenge is to reinvigorate these spaces, making them safe, attractive, and vibrant for diverse social interactions (Jalaladdini, Oktay, 2011).

1.2 Research Aim/ Purpose of the Study

This research aims to assess the perception of users of Kızılbaş park in light of UN Habitat indicators. The results will enable more understanding of user's needs in Public Spaces in Nicosia.

1.3 Research Questions and Hypothesis

a. What are the indicators used by UN Habitat for assessing public spaces?
b. How do users perceive Kızılbaş park in light of UN Habitat indicators?

Thus, the research hypothesis that this paper will test is that "users perceive different aspects of Kızılbaş Park differently, with some aspects better than others".

2. LITERATURE REVIEW

2.1 User Needs

User needs are the necessary requirements of space users in order to inhabit that space. These include;

- Comfort; Comfort is achieved in a park by providing good quality seating, shade and shelter as well as creating an environment that makes people feel safe (Carr et.al, 2006).
- Relaxation; Relaxation is achieved by creating a calming environment that protects people from the hustle and bustle of urban life. This can be achieved by the use of natural elements such as trees, flowers, water etc. (Carr et.al, 2006).
- Passive Engagement; Passive engagement means individuals should be able to observe activities in the park without necessarily participating in the activity. These can include watching volleyball, art illustration or any kind of game (Carr et.al, 2006).
- Active Engagement; Active engagement means that individuals should be able to directly participate in several kinds of activities such as sports, cultural activities etc. A good park design should make these activities possible by a diverse group of people (Carr et.al, 2006). Public spaces should be "associated with pleasure, recreation, human interactions and communal celebration (Bejtullahu, F. 2013).
- Social Interaction; Public spaces represent places of sociability and direct interactions (Catell, V. et.al. 2008). Social interactions are communications and actions between individuals or groups. This can be achieved by introducing different kinds of activities into the park that bring people with common interest together. This includes sports, art exhibitions etc (Carr et.al, 2006). Many factors affect social interactions between park users such as physical, psychological and behavioral factors as well as security, types of activities and vitality of environment (Khaleghimoghaddam, N. 2023).

2.2 Public Spaces

There are various definitions of public space distinguished by issues of ownership, control, access and use. Some authors define it as the “space that is not controlled by private individuals or organizations, and hence is open to the general public”. Others base their definitions on issues of access and use, and public space is defined as “publicly accessible places where people go for group or individual activities” (Mehta, 2013). A public space is “the place where all activities related to civic life can be manifested in a common ground shared amongst citizens in terms of freedom and equality” (Hadjichristou, et.al. 2013). An appropriately designed environment should enable positive experiences for all users (Poldma, T. et.al, 2014).
According to UNESCO, ‘‘A public space refers to an area or place that is open and accessible to all people, regardless of gender, race, ethnicity, age or socio-economic level”
The UN-Habitat defines Public Spaces as “all spaces publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive” (UN Habitat, 2018).
Real public spaces are those that share meaning, invite and encourage all types of people to participate and are held dearly by the users (Francis M. 1988). There are four main types of public spaces, these are; *Streets, Open public spaces, public facilities and Public commercial spaces* (UN Habitat, 2018). Parks are classified under *Open public spaces.*
Public spaces serve many functions such as the following;

- They enable vehicular and pedestrian mobility
- They provide accessibility hence making services possible
- They serve as recreational areas for relaxation

- They serve as playgrounds for children
- The beautify the environment
- They provide a sense of belonging and identity
- They enable socialization
- They enable trade and boost the economy
- They facilitate knowledge
- They encourage tourism thereby generating revenue for the government in charge

(UN Habitat, 2018).

2.3 UN Habitat Indicators

Several public space assessment tools have been developed in different countries. These include; The project of public space (PPS), CABE (Space shaper), Gehl Assessment toolkit, UN-Habitat Indicators for assessment, The Good Public Space (GPSI) Index, Place Standard Tool (PST) and Great Public Space toolkit (GPST) etc. (Tawfik, S. 2023). In this study, the UN-Habitat indicators are used to evaluate the public space.

UN-Habitat indicators are the assessment criteria used by the UN-Habitat to evaluate public spaces. These are;

Use and User Dimension

This focuses on who uses the space and how it is used. A good quality public space is one that is designed to accommodate everyone including weak people. Through this dimension, one can analyze how inclusive the space is in terms of serving variety of users and the type of activities taking place (UN Habitat, 2018).

Accessibility

This focuses on the perception of the access to the site and the physical aspect as well. A public space should be easily reached by walking, cycling or using public transport, especially by the weak people (UN Habitat, 2018).

Amenities & Furniture

Amenities and furniture make public spaces more usable and attractive. Amenities and furniture should be inclusive, catering to the needs of people. This can include, facilities to play, rest, eat and drink as well as lighting, waste bins and toilets etc. This dimension looks at their availability and quality (UN Habitat, 2018).

Comfort & Safety

Peoples' perception of comfort and safety can have a great impact on their wellbeing and the time they spend in a public space. This dimension looks at how people perceive a public space even though perception of safety is subjective. Places that are well maintained are often perceived as comfortable and safe, while vandalized and poorly-cared spaces are not. Smell, sound, sight and physical condition of a space can really affect perception of comfort (UN Habitat, 2018).

Green Environment

This dimension is concerned with environmental aspects that can improve health and wellbeing of the park users. Public spaces with adequate green coverage and water management can have a great impact on air, noise and temperature (UN Habitat, 2018).

2.4 Related Research

2.4.1 Evaluating Public Space, by Vikas Mehta, 2014

"*Evaluating Public Space*" by Vikas Mehta explores the essential elements for assessing public spaces. The focus is on understanding how public spaces function, their impact on the community and how they affect the quality of life of users.
Vikas Mehta framed the problem as the need for a comprehensive framework to assess the quality of public spaces. The absence of a holistic approach that encompasses the multiple factors contributing to the functionality and user experience of public spaces hinders the ability to create and maintain effective public spaces for the community.
The aim of the research was to develop and apply a multidimensional framework for evaluating public spaces. The framework aimed to include all the various factors that influence functionality of public spaces. This was applied to 4 public spaces in Tampa, Florida namely; Franklin Street, Poe Plaza, Bank of America plaza and Gaslight Park. The result of which would provide urban planners and policy makers in designing and improving urban areas (Mehta, 2014).



Figure 1: Four public spaces in downtown Tampa, Florida. Clockwise from top left, Gaslight Park, Bank of America Plaza, Franklin Street and Pedestrian only Franklin Street (Poe Plaza). (Source: Mehta,2014)

The authors first identified the Key Evaluation Criteria which he termed as; *accessibility, comfort, activities, and sociability*. He then structured an approach that incorporates both quantitative and qualitative methods to assess public spaces. These include; observational studies, surveys, questionnaires, interviews and case studies. The author then examined the data collected to identify common patterns, strengths, and weaknesses in the evaluated public spaces. The results of the evaluation are summarized in the figure below;

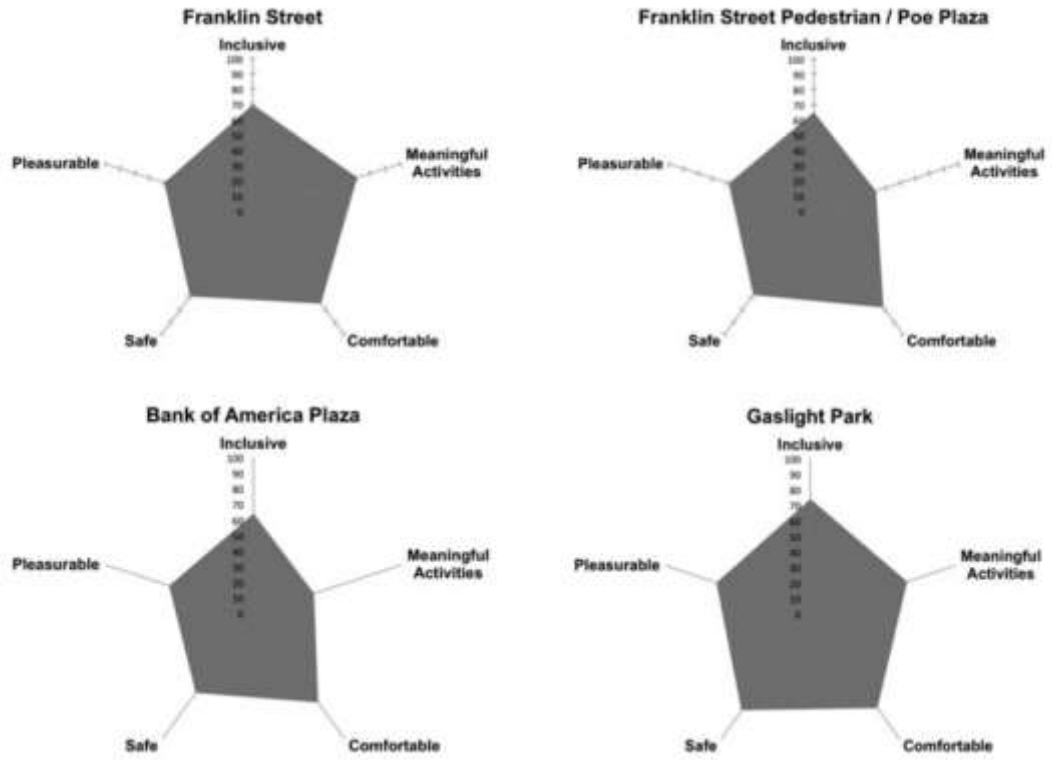


Figure2: Summary of the results of the 4 public spaces evaluated. (Source: Mehta, 2014)

The author found that the factors that contribute the most to success of public spaces are; variety of activities, accessibility & inclusivity, regular maintenance and proper management and also community involvement (Mehta, 2014).

2.4.2 Evaluating Public Spaces in Hail, Saudi Arabia: A Reflection on Cultural Changes and User Perceptions, 2023

In "*Evaluating Public Spaces in Hail, Saudi Arabia: A Reflection on Cultural Changes and User Perceptions*" by Mashary Alnaim et.al, the paper investigates how public spaces in Hail, Saudi Arabia, have evolved in response to cultural changes and the perception of users of these public spaces. It considers the influence of Saudi Arabia's strategic plan for modernization and urban development (Vision 2030) on public space utilization. It also investigates how recent cultural transformations, including greater gender inclusion and relaxed social restrictions, have affected the design, management, and use of public spaces in Hail (Alnaim, Noaime, 2023).

The authors' objectives were to find out how residents of Hail perceive public spaces in terms of safety, accessibility, amenities, and overall satisfaction and the differences in perceptions and utilization patterns among various demographic groups, including gender, age, and socio-economic status. This was done on the foundation of 6 dimensions namely;

- *Comfort & Outdoor Space*
- *Activity and Uses*
- *Accessible and Linked*
- *Amenity*
- *Attractiveness and Appeal*
- *Safety*

The author examines three parks in Hail namely; Al Yasamen Park, Alsalam Park and Iqdah Park (Alnaim, Noaime, 2023).



Figure 3: Al Yasamen Park Panoramic view. (Source: Alnaim, Noaime, 2023).

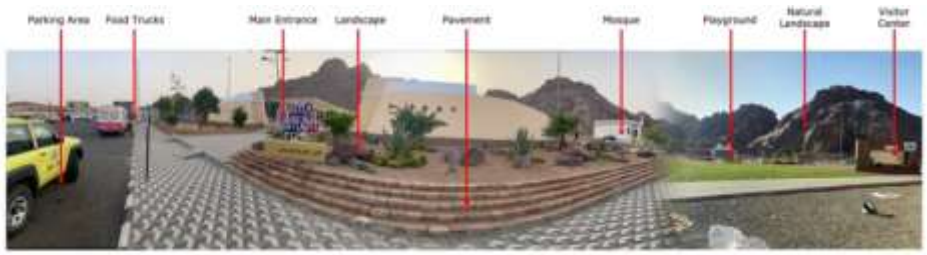


Figure 4: Alsalam Park Panoramic view. (Source: Alnaim, Noaime, 2023).



Figure 5: Iqdah Park Panoramic view. (Source: Alnaim, Noaime, 2023).

The paper employs a mixed-methods approach to evaluate the public spaces. The authors made systematic observations of selected public spaces in Hail in order to understand the patterns of use, types of activities, and user demographics and also made use of surveys and questionnaires distributed to a diverse group of people in order to understand the perception and satisfaction of the users (Alnaim, Noaime, 2023).

The authors also conducted interviews with local government officials and community leaders in order to understand the management of the public spaces and also reviewed policy documents, urban planning guidelines and Vision 2030 reports in order to understand the overall policy framework. The author utilized statistical analysis method to analyze the quantitative data and thematic analysis method to analyze the qualitative data (Alnaim, Noaime, 2023). The results are summarized in figure 6 below;



Figure 6: Users' Perception Related to the 6 dimensions. (Source: Alnaim, Noaime, 2023).

Regarding cultural changes and their impact on the design of public spaces, the author discovered that cultural changes, including increased gender inclusion and relaxed social restrictions, have significantly impacted the design and usage of public spaces. The transformations have resulted in more inclusive environments where women and different demographic groups feel more welcome and safer (Alnaim, Noaime, 2023).
Regarding the perception of users, the author discovered that factors such as cleanliness, safety, and the availability of facilities like seating, lighting, and green areas are important for user satisfaction. Also, spaces that encourage social interactions and cultural activities by different age groups and interests are highly valued by the community (Alnaim, Noaime, 2023).

3. METHODOLOGY

In this section, the research design is going to be explained as well as the data collection and evaluation methods.

3.1 Research Design

The methodology used in this paper is a quantitative survey method. This method involves the use of a structured questionnaire to gather data from participants. The survey is created based on indicators and sub-indicators from the United Nations Human Settlements Programme (UN-Habitat), specifically designed for assessing parks. The sub- indicators are transformed into question formats that can be easily comprehended and answered by participants.
The study targets a sample of adults who are familiar with the Kızılbaş Park. These participants are required to answer the questionnaire, providing insights into their experiences and perceptions of the park's features. The collected data is then analyzed using a Statistical Inference analysis method. This analysis helps in determining the areas where park users are satisfied with and identifies aspects that may require improvements.

3.2 Data Collection Tool

The primary tool used for data collection in this research is a structured survey questionnaire. This tool is designed to capture the necessary data in a systematic and standardized manner. The questionnaire includes questions derived from the indicators and sub-indicators related to parks. This ensures that the data collected is relevant. The questionnaire is distributed using Google Forms to participants in order to collect and arrange the data automatically and coherently.

3.3 Population & Sample Analysis

The population targeted for this study consists of adults who are familiar with the park. The criteria for selecting participants include:

1. *Age Requirement*: The respondent must be an adult, ensuring that they have a mature and developed perspective.
2. *Familiarity with the Park*: Participants must have prior experience with the park, allowing them to provide informed responses based on their personal experiences.

The sample group is thus composed of adults of any gender, religion, or nationality, provided they meet the above criteria. This diversity in the sample helps to capture a wide range of perspectives and experiences. This will contribute to a more comprehensive evaluation and analysis of the park.

3.4 Data Analysis Method

The data collected through the survey is analyzed using a Statistical Inference method. This method is crucial for making predictions or informed decisions about the broader population based on the sample data. This will be done by the use of SPSS to generate frequencies and other important information. By employing statistical techniques, the study can infer the general satisfaction levels and identify specific areas of the park that may need improvement. This method allows for the quantification of relationships between different variables and provides a scientific basis for understanding user satisfaction and areas for potential enhancement in the park.

4. FINDINGS OF THE STUDY

4.1 General Information of Kızılbaş Park

Kızılbaş Park is located in Nicosia, North Cyprus. Some of its features include a wide walking path, children's playgrounds, sports areas, basketball and beach volleyball courts, a skateboard track and food and beverage shops. It also has an amphitheatre where concerts and shows can be held. People of all ages can spend time and get away from the hustle and bustle of the city. The amenities are available for use to everybody. The park has a much larger scope and function than a neighborhood park and it stands on a total area of 20 thousand square meters (Nicosia Turkish Municipality, 2022).



Figure 7: Kızılbaş Park**.** (Source: Michaela Buresova, 2023).



Figure 8: Kızılbaş Park. (Source: Ulus Karaosmanoglu, 2022).



Figure 9: Kızılbaş Park. (Source: Michaela Buresova, 2023).



Figure 10: Kızılbaş Park. (Source: Huseyin Ongun, 2024).

4.2 Results of Kızılbaş Park

The results of the survey are presented and evaluated firstly providing the general information about the respondents and then presenting the results under each of the UN-Habitat indicators namely; Use & User dimension, Accessibility, Amenities & Furniture, Comfort & Safety and Green Environment dimension. A total of 62 responses from individuals of different nationalities, gender and age group will be evaluated in this section.

4.2.1 General Information

The majority of the respondents are students between 18 and 40 years old. These include predominantly Nigerian people and Congolese people as well as Cypriot, Sudanese etc. Most of the respondents are quite familiar with the park and go there for relaxation and fun. Most of the respondents don't go to the park frequently and mostly travel a distance of 800-2500 metres. This can be seen from figures 11 to 18.

Out of the 62 respondents, 38 of them are male making up 61% of respondents, 23 of them are female making up 37% and one person is uncategorized. This can be seen in figure 11 below;



Figure 11: Gender of Respondents. (Source: Author, 2024)

An overwhelming majority of the respondents (74%) are between the ages of 18 and 24 years. Another 19% are between the ages of 24 and 40. Only about 5% are over 40 years old. This can be seen in figure 12;



Figure 12: Age Group of Respondents. (Source: Author, 2024).

Out of 62 respondents, only 3 are Turkish and Cypriot. The other 59 respondents (95.2%) are Africans. Nigeria has the highest number of respondents (31), followed by Congolese (11) and then Sudanese (9). All the other nations have only one individual. This can be seen in figure 13 below;



Figure 13: Nationality of Respondents. (Source: Author, 2024)

Majority of the respondents are students (87%). Unemployed respondents are 4 in number. There are only 2 entrepreneurs, one public servant and one civil servant. This can be seen in figure 14.



Figure 14: Occupation of Respondents. (Source: Author, 2024)

With regard to familiarity with the park, majority of the respondents (51) are only “Quite familiar” with the park. 4 respondents are very familiar while 6 repondents are not familiar with the park. This can be seen in figure 15.



Figure 15: Level of familiarity of respondents with the park. (Source: Author, 2024)

50% of respondents go to the park for relaxation. Another 30% go for fun. Only few people go to the park for study or business. This can be seen in figure 16.



Figure 16: Respondents reasons for park visit. (Source: Author, 2024).

On a scale of 1-10, with 1 being “I don’t visit the park at all” and 10 being “I visit the park everyday”, most of the respondent’s frequency of visit is 2, 3 and 4 on the scale. This can be interpreted as meaning that most respondents visit the park every few weeks. This can be seen in figure 17.



Figure 17: Frequency of park visit by respondents. (Source: Author, 2024).

69% of respondents travel between 800 and 2500 metres to the park. This can be walked, travelled by bicycle or by car. About 15% of respondents walk between 400 to 800 metres to the park while 16% walk less than 400 metres to the park. This can be seen from figure 18.



Figure 18: Distance travelled to park by respondents. (Source: Author, 2024).

4.2.2 Use & User Dimension

According to most respondents, there is presence of different inclusive activities in the park for children, elderly and disabled people. There is also presence of non-designed temporary activities organized by the community. There are also rules in place for some activities in the park. Almost all respondents observed social interactions between people in the park as well as economic activities. This can be seen in figures 19 – 23.

Most respondents claim that there is presence of different inclusive activities in the public space for children, elderly and disabled people. A good number of respondents have not witnessed these activities while 2 respondents claim that there aren't. This can be seen in figure 19.



Figure 19: Presence of inclusive activities as witnessed by respondents. (Source: Author, 2024).

Most respondents claim that there is presence of non-designed, temporary activities organized by the government or community. A good number of respondents have not witnessed these activities while 1 respondent claim that there aren't. This can be seen in figure 20.



Figure 20: Presence of temporary activities organized by community. (Source: Author, 2024).

Most respondents claim that there is presence of restrictions and rules against certain activities. A good number of respondents have not witnessed these rules in place while 2 respondents claim that there aren't. This can be seen in figure 21.



Figure 21: Presence of rules as witnessed by respondents. (Source: Author, 2024).

An overwhelming majority of respondents (97%) have witnessed or engaged in social interactions while 3% of respondents are not sure. This can be seen in figure 22.



Figure 22: Presence of social interactions as witnessed by respondents. (Source: Author, 2024).

An overwhelming majority of respondents claim that there is presence of economic activities. A good number of respondents have not witnessed these rules in place while 2 respondents claim that there aren't. This can be seen in figure 23.



Figure 23: Presence of economic activities as witnessed by respondents. (Source: Author, 2024).

4.2.3 Accessibility

From observation, there are no areas reserved for car movement because the size of the park does not require that. However, there are parking lots. There is also an area reserved for bike movement and it is of good quality. There is also a track for pedestrian movement and it is of good quality. There is no need for ramps because the park is relatively flat. The overall perception of accessibility is good. This can be seen from figures 24-31.
Majority of respondents (38) claim that there is no reserved area for private vehicle movement. A good number (14) claim that there is while 10 respondents are agnostic. This can be seen in figure 24.



Figure 24: Presence of areas for vehicle movement as witnessed. (Source: Author, 2024).

Majority of respondents (48) claim that there is presence of parking lots for vehicles. 12 respondents are agnostic about it. This can be seen in figure 25.



Figure 25: Presence of parking lots as witnessed by respondents. (Source: Author, 2024).

66% of respondents claim that there is an area reserved for bike movement. 8% claim that there is not while 26% are not sure. This can be seen in figure 26.



Figure 26: Presence of area for bike movement as witnessed. (Source: Author, 2024).

Most respondents consider the quality of the bike areas to be good, with most scores at 8, 9 and 10 out of 10. This can be seen in figure 27.



Figure 27: Quality of bike area according to respondents. (Source: Author, 2024).

An overwhelming majority of respondents claim that there is an area reserved for pedestrian movement. A few respondents claim no knowledge. This can be seen in figure 28.



Figure 28: Presence of pedestrian movement area as witnessed. (Source: Author, 2024).

Most respondents consider the quality of the pedestrian areas to be good, with most scores at 7, 8, 9 and 10 out of 10. This can be seen in figure 29.



Figure 29: Quality of pedestrian area as witnessed by respondents. (Source: Author, 2024).

76% of respondents are not sure whether there is presence of ramps for wheelchairs. 11% claim there is while 11% claim that there is not. This can be seen from figure 30.



Figure 30: Presence of ramps as observed by respondents. (Source: Author, 2024).

Most respondents perceive the overall accessibility as quite good. With most scores being 6, 7, 8 and 9. This can be seen in figure 31.



Figure 31: Overall perception of accessibility by respondents. (Source: Author, 2024).

4.2.4 Amenities & Furniture

Majority of the respondents perceive the level of lighting to be adequate during both day and night. They consider the quality of facilities and seating as average. There are waste bins, sign boards and public toilets present in the park. This can be seen from figures 32-39.

44 out of 62 respondents perceive the level of natural lighting as adequate, 14 consider the brightness too much while 4 respondents consider the lighting inadequate. This can be seen in figure 32.



Figure 32: Perception of quality of natural lighting. (Source: Author, 2024).
45 out of 62 respondents perceive the level of artificial lighting as adequate while 17 respondents consider the lighting inadequate. This can be seen in figure 33.



Figure 33: Perception of quality of artificial lighting. (Source: Author, 2024).

A lot of the respondents consider the quality of inclusive recreational outdoor structures to be above average, with most scores at 6, 7 and 8. This can be seen in figure 34.



Figure 34: Quality of inclusive recreational outdoor structures. (Source: Author, 2024).

Most of the respondents consider the quality of primary and secondary seating to be above average, with most scores at 6, 7 and 8. This can be seen in figure 35.



Figure 35: Quality of primary and secondary seating. (Source: Author, 2024).
Most respondents (84%) believe that the waste bins in the park are adequate in number. 15% of respondents are not sure while 1% claim that the waste bins are not adequate. This can be seen in figure 36.



Figure 36: Perception of quantity of waste bins in Kızılbaş Park (Source: Author, 2024).

35 respondents have observed sign boards in the park, 24 respondents are not sure there are while 3 respondents claim that there are no sign boards in Kızılbaş Park. This can be seen in figure 37.



Figure 37: Presence of sign boards as observed by respondents. (Source: Author, 2024).

38 respondents have observed or used public toilets in the park, 21 respondents are not sure there are while 3 respondents claim that there are no public toilets in Kızılbaş Park. This can be seen in figure 38.



Figure 38: Presence of public toilets as observed by respondents. (Source: Author, 2024).

An overwhelming majority (81%) of respondents don't know whether there are emergency facilities or not. 14% claim there are while 5% claim there are not. This can be seen in figure 39.



Figure 39: Presence of emergency facilities as observed. (Source: Author, 2024).

4.2.5 Comfort & Safety

The respondents consider the social behavior of people in the park to be good. They feel mostly safe or very safe during daytime and night time. They also consider the park to be clean overall. The views from the park are average as well as the sounds, but the smells are considered nice. However, the shading against rain and heat is poor while the overall aesthetics of the park are perceived as average. This can be seen from figures 40-48.

Most respondents consider the social behavior of people in the park to be good, with most scores at 7, 8 and 9 out of 10. This can be seen in figure 40.



Figure 40: Perception of social behavior in the park. (Source: Author, 2024).

Most people feel very safe in the park during daytime. A good number of respondents feel safe while one individual feel very unsafe. This can be seen in figure 41.



Figure 41: Perception of safety during daytime. (Source: Author, 2024).

Most people feel very safe in the park at night. A good number of respondents feel safe while one individual feel very unsafe. This can be seen in figure 42.



Figure 42: Perception of safety at night. (Source: Author, 2024).
Majority of respondents perceive the neatness of the park as good. Most scores are at 7, 8 and 9 out of 10. This can be seen in figure 43.



Figure 43: Perception of neatness of Kızılbaş Park (Source: Author, 2024).

Majority of respondents perceive the views from the park as average. Most scores are at 5, 6 and 7 out of 10. This can be seen in figure 44.



Figure 44: Perception of views from the park (Source: Author, 2024).

Majority of respondents perceive the sounds in the park as quite good. Most scores are at 6, 7 and 8 out of 10. This can be seen in figure 45.



Figure 45: Perception of sounds in the park (Source: Author, 2024).
Majority of respondents perceive the smells in the park as very good. Most scores are at 8, 9 and 10 out of 10. This can be seen in figure 46.



Figure 46: Perception of smells in the park. (Source: Author, 2024).

Majority of respondents perceive the shading against sun and rain in the park as poor. Most scores are at 3, 4 and 5 out of 10. This can be seen in figure 47.



Figure 47: Perception of shading in the park. (Source: Author, 2024).

Majority of respondents consider the furniture, facades and pavements of the park to be quite aesthetic. Most scores are at 6, 7 and 8 out of 10. This can be seen in figure 48.



Figure 48: Perception of aesthetics in the park. (Source: Author, 2024).

4.2.6 Green Environment

There is not much greenery in the park and there are no water bodies, but the air quality is good. This can be seen from figures 49-51.

43 respondents are not satisfied with the quantity of greenery in the park. 17 respondents are satisfied while one individual is unsure. This can be seen in figure 49.



Figure 49: Perception of greenery in the park. (Source: Author, 2024).

Most respondents (69%) have not seen any water bodies in the park. 13% know while 15% claim there is. This can be seen in figure 50.



Figure 50: Presence of water bodies as observed by respondents. (Source: Author, 2024).

Majority of respondents perceive the air quality in the park as very good. Most scores are at 8, 9 and 10 out of 10. This can be seen in figure 51.



Figure 51: Perception of air quality. (Source: Author, 2024).

4.3 Discussions

The majority of the respondents are students between 18 and 40 years old. These include predominantly Nigerian people and Congolese people as well as Cypriot, Sudanese etc. Most of the respondents are quite familiar with the park and go there for relaxation and fun. Most of the respondents don't go to the park frequently and they mostly travel a distance of 800-2500 metres. According to most respondents, there is presence of different inclusive activities in the park for children, elderly and disabled people. There is also presence of non-designed temporary activities organized by the community. There are also rules in place for some activities in the park. Almost all respondents observed social interactions between people in the park as well as economic activities. From observation, there are no areas reserved for car movement because the size of the park does not require that. However, there are parking lots. There is also an area reserved for bike movement and it is of good quality. There is also a track for pedestrian movement and it is of good quality. There is no need for ramps because the park is relatively flat. The overall perception of accessibility is good. Majority of the respondents perceive the level of lighting to be adequate during both day and night. They consider the quality of facilities and seating as average. There are waste bins, sign boards and public toilets present in the park. The respondents consider the social behavior of people in the park to be good. They feel mostly safe or very safe during daytime and night time. They also consider the park to be clean overall. The views from the park are average as well as the sounds, but the smells are considered nice. However, the shading against rain and heat is poor while the overall aesthetics of the park are perceived as average. There is not much greenery in the park and there are no water bodies, but the air quality is good.

5. CONCLUSION AND RECOMMENDATIONS

In this section, the matter is concluded and recommendations are given as well as gaps for future research.

5.1 Conclusion

The research hypothesis is confirmed. “Users perceive different aspects of Kızılbaş Park differently, with some aspects better than others”. Overall, the quality of Kızılbaş Park is good in some aspects and average in other aspects. In terms of the first dimension, Use & User dimension, the park has a good level of quality. The accessibility dimension is also rated highly by park users. The Amenities and Furniture dimension is adequate but average. The Comfort and Safety dimension of the park has the safety in good quality while the comfort is relatively poor. The main aspect that is lacking however is the Green Environment dimension.

5.2 Recommendations

The two fundamental problems that need fixing as soon as possible are connected to one another. These are primarily shading and landscaping. The shading against the summer sun and rain can make it impossible to use the park at certain periods. The recommendation is to provide more shading amenities such as canopies as well as natural shading (Trees). Trees and greenery are considered by most people to be aesthetically and psychologically important (Carr, S. 1992). Introduction of large trees and water bodies can also make the park more comfortable and eco-friendlier. It is also known that green spaces have “positive effects on health, security, good social relations, freedom of choice and action” (Reyes-Riveros, R. et.al. 2021).

5.3 Recommendations for Future Studies

The UN-Habitat indicators are a good set of criteria for assessing parks. In this study, Kızılbaş Park has been evaluated using those indicators and recommendations for improvements have been provided. There are many other parks in Nicosia that can be evaluated using the UN-Habitat indicators in order to identify challenges and provide solutions.

REFERENCES

Alwah, A.Q. Abdulfattah, Li, W., Alwah, A.Q. Mohammed, Shahrah, S. (2021). Developing a quantitative tool to measure the extent to which public spaces meet user needs. *Urban Forestry & Urban Greening, Volume 62, 127152, ISSN 1618-8667.* Accessed on 12th May, 2024. URL:https://www.sciencedirect.com/science/article/pii/S1618866721001771

Alnaim, M. M., Noaime, E., (2023). Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions. *Alexandria Engineering Journal*. Accessed on 17th July, 2024. URL<(PDF) Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions (researchgate.net)

Bejtullahu, F. (2013). Creating user-friendly public spaces in Cities (Prishtina), between public interest and private rights. *International Conference on Architecture and Urban Design.* Accessed on 14th August, 2024.URLhttps://dspace.epoka.edu.al/bitstream/handle/1/268/135-607-1-PB.pdf?sequence=1&isAllowed=y

Carr, S., Francis, M., Rivlin, L., Stone, A., (2006). Needs in Public Spaces (Book chapter from "Public Space"). *Cambridge University Press*. Accessed on 11thAugust,2024. URLhttps://www.researchgate.net/publication/283326819_Needs_in_Public_Space#:~:text=The%20requirements%20of%20public%20space,variety%20of%20opportunities%20%5B7%5D%20.

Carr, S. (1992). Public Space. *Page 11. Cambridge University Press*. Accessed on 12th August, 2024.
URL:https://books.google.com.cy/books?hl=en&lr=&id=pjo4AAAAIAAJ&oi=fnd&pg=PR9&dq=user+needs+in+public+spaces&ots=eAr92R2vd9&sig=KziQSiuS84YX7roDmrPRDdKUWP4&redir_esc=y#v=onepage&q=user%20needs%20in%20public%20spaces&f=false

Cattell, V., Dines, N., Gesler, W., & Curtis, S. (2008). Mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations. *Health & place, 14(3), 544-561*. Accessed on 14th May, 2024. URL: https://www.sciencedirect.com/science/article/abs/pii/S1353829207000913

Francis, M. (1988). Changing values for public spaces. *Landscape Architecture, 78(1), 54-59*. Accessed on 12th August, 2024. URLhttps://www.researchgate.net/profile/Mark-Francis-6/publication/283340569_Changing_Values_for_Public_Space/links/5634e72408aeb786b702c1f2/Changing-Values-for-Public-Space.pdf

Hadjichristou, Y., & Antoniou, V. (2013, June). Site and users generate new public spaces. *International Conference on Architecture and Urban Design*. Accessed on 11th August, 2024.URL:http://92.119.236.203/bitstream/handle/1/270/137-626-1-PB.pdf?sequence=1&isAllowed=y

Huaroc, C. (2024). Public Spaces and Their Key Role in Building Climate Resilience in the US, *Archdaily*. Accessed on 14th August, 2024.URL:https://www.archdaily.com/1015899/public-spaces-and-their-key-role-in-building-climate-resilience-in-the-us?ad_source=search&ad_medium=search_result_articles

Jalaladdini S., Oktay D., (2011). Urban Public Spaces and Vitality: A Socio-Spatial Analysis in the Streets of Cypriot Towns. Accessed on 18th July, 2024. URL<Urban Public Spaces and Vitality: A Socio-Spatial Analysis in the Streets of Cypriot Towns - ScienceDirect

Khaleghimoghaddam, N. (2023). Analyzing design factors affecting users' interactions in public spaces. *Megaron*, 18(4). Accessed on 14th August, 2024.URL:https://jag.journalagent.com/megaron/pdfs/MEGARON-31384-ARTICLE-KHALEGHIMOGHADDAM.pdf

Mehta, V. (2014). Evaluating Public Space. *Journal of Urban Design, 19:1, 53-88*. Accessed on 7th August, 2024. DOI: 10.1080/13574809.2013.854698

Nicosia Turkish Municipality, 2022. LTB Kızılbaş Opens. Accessed on 10th August, 2024. URLhttps://lefkosabelediyesi-org.translate.goog/haberler/ltb-kizilbas-parki-aciliyor?_x_tr_sl=tr&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc

Poldma, T., Labbé, D., Bertin, S., De Grosbois, È., Barile, M., Mazurik, K., ... & Artis, G. (2014). Understanding people's needs in a commercial public space: About accessibility and lived experience in social settings. *Alter, 8(3), 206-216*. Accessed on 12th August, 2024. URL<https://www.sciencedirect.com/science/article/pii/S1875067214000418

Reyes-Riveros, R., Altamirano, A., De La Barrera, F., Rozas-Vásquez, D., Vieli, L., & Meli, P. (2021). Linking public urban green spaces and human well-being: A systematic review. *Urban forestry & urban greening, 61, 127105*. Accessed on 15th August, 2024. URL<https://www.sciencedirect.com/science/article/abs/pii/S1618866721001308

Souze E. (2024). How to Bring Comfort and Warmth to the Design of Public Spaces. *Archdaily*. Accessed on 12th August, 2024. URL<https://www.archdaily.com/1012247/how-to-bring-comfort-and-warmth-to-the-design-of-public-spaces?ad_source=search&ad_medium=search_result_articles

Szczepańska, A., & Pietrzyk, K. (2020). An evaluation of public spaces with the use of direct and remote methods. *Land, 9(11), 419*. Accessed on 10th August, 2024.URL<https://www.mdpi.com/2073-445X/9/11/419
Tawfik M. S., Mandour A., Baker H. (2023). A Critical Review of Quality Assessment Tools for Public Spaces. *Engineering Research Journal, 177, 255-274*. Accessed on 13th August, 2024.URL:https://erj.journals.ekb.eg/article_289998_ac26a2442c09192761d6a6b545f60559.pdf
UNESCO, Inclusion Through Access to Public Spaces, 2017. Accessed on 21st July, 2024; Available from: Inclusion Through Access To Public Space - United Nations Educational, Scientific and Cultural Organization | PDF | Unesco | Social Exclusion (scribd.com)
UN-Habitat (2018). SDG Indicator 11.7.1 Training Module: Public Space. *United Nations Human Settlement Programme (UN-Habitat), Nairobi.* Accessed on 17th July, 2024.URL:https://unhabitat.org/sites/default/files/2020/07/indicator_11.7.1_training_module_public_space.pdf

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Figure 4: Alnaim M. M., Noaime E., (2023), Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions. (Photograph). *Alexandria Engineering Journal*. URL:(PDF) Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions (researchgate.net)
Figure 5: Alnaim M. M., Noaime E., (2023), Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions. (Photograph). *Alexandria Engineering Journal*. URL:(PDF) Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions (researchgate.net)
Figure 6: Alnaim M. M., Noaime E., (2023), Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions. (Photograph). *Alexandria Engineering Journal*. URL:(PDF) Evaluating public spaces in Hail, Saudi Arabia: A reflection on cultural changes and user perceptions (researchgate.net)
Figure 7: Buresova, M. (2023). Kızılbaş Park (Photograph). *Google Maps*. URL: Kızılbaş Park - Google Maps
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Figure 10: Ongun, H. (2024). Kızılbaş Park (Photograph). *Google Maps*. URL: Kızılbaş Park - Google Maps

A DECADE ANALYSIS OF ARTIFICIAL INTELLIGENCE RELATED ARTICLES REGARDING JOURNAL QUERTILE RANKINGS IN OPHTHALMOLOGY

OFTALMOLOJİDE YAPAY ZEKA İLE İLGİLİ YAYINLANAN MAKALELERİN DERGİLERİN QUERTILE DEĞERLERİNE GÖRE ON YILLIK ANALİZİ

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ABSTRACT

Artificial intelligence has made increasing progress in medicine in recent years, as in many other fields. The use of many digital imaging methods in ophthalmology, such as optical coherence tomography, visual field testing, and color fundus photography, provides a very suitable basis for the development of machine learning and artificial intelligence. Today, artificial intelligence has been used mostly in the diagnosis and follow-up of common diseases such as diabetic retinopathy, age-related macular degeneration, and glaucoma.
The terms of "artificial intelligence" and "ophthalmology" were searched on Pubmed.
Among these, randomized controlled trials, clinical trials, observational studies, and meta-analyses published between 2013 and 2024 were filtered and included in the study. Of the 128 articles, 68 were excluded from the study because they were published in journals other than ophthalmology journals or due to their irrelevant contents. A total of 60 articles were included in the study.
It was determined that 51 of the 60 articles were published in Q1, 7 in Q2, and 2 in Q3 journals. No articles were found published in Q4 journals. 66.6% of the published studies were related to retinal diseases. This was followed by glaucoma (13.3%), other topics (10%), cataract and refractive surgery (5%), cornea (3.3%), and neuro-ophthalmology (1.66%). It was determined that 90% of the articles included in the study were published in the last 5 years.
When the content of the studies is evaluated, it is predicted that artificial intelligence-based diagnosis and follow-up models will be mostly used in retinal diseases. Studies on artificial intelligence, which have become increasingly popular in recent years, are followed with interest by the health community and are increasingly featured in journals with high impact factors.

Keywords: Article, artificial intelligence, impact factor, journal, ophthalmology.

ÖZET

Yapay zeka çoğu alanda olduğu gibi tıp alanında da son yıllarda hızla ilerleme göstermiştir. Oftalmolojide optik koherens tomografi, görme alanı testi, renkli fundus fotoğrafi gibi birçok dijital görütüleme yöntemlerinin varlığı; makina öğrenimi ve yapay zekanın geliştirilmesi için oldukça uygun bir zemin hazırlamaktadır. Günümüzde yapay zeka en çok diyabetik retinopati, yaşa bağlı maküla dejenerasyonu ve glokom gibi sık görülen hastalıkların tanısında ve takibinde kullanılmıştır.
Pubmed üzerinde "artificial intelligence" ve "ophthalmology" kelimeleri ile arama yapıldı. Bunların arasından 2013-2024 yılları arasında yayınlanan, randomize kontrollü çalışmalar, klinik deneyler, gözlemsel çalışmalar ve meta analizler filtrelenip çalışmaya dahil edildi. Elde edilen 128

makalenin 68 tanesi oftalmoloji dergisi haricindeki dergilerde yayınlandığı veya içeriğinin ilgisiz olmasından dolayı çalışma dışı bırakıldı. Toplam 60 makale çalışmaya dahil edildi.
60 makalenin 51 tanesinin Q1, 7 tanesinin Q2, 2 tanesinin ise Q3 kapsamındaki dergilerde yayınlandığı saptandı. Q4 dergi kapsamında yayınlanan makale bulunamadı. Yayınlanan çalışmaların %66,6'sı retinal hastalıklar ile ilgiliydi. Bunu, glokom (%13,3), diğer konular (%10), katarakt ve refraktif cerrahi (%5) kornea (%3,3) ve nörooftalmoloji (%1,66) takip ediyordu. Çalışmaya dahil edilen makalelerin %90' ının son 5 yıl içerisinde yayınlandığı saptandı.
Yapılan çalışmaların içeriğine bakıldığında yapay zeka tabanlı tanı ve takip modellerinin en fazla retinal hastalıklarda yer bulacağı öngörülmektedir. Popülerliği son yıllarda giderek artan yapay zekayı konu alan çalışmalar, sağlık camiası tarafından ilgi ile takip edilmekte ve impact faktörü yüksek dergilerde daha fazla yer bulmaktadır.

Anahtar kelimeler: Dergi, makale, oftalmoloji, yapay zeka.

GİRİŞ

Çoğu alanda olduğu gibi tıp alanında da son yıllarda hızla ilerleme göstermekte olan yapay zekanın, özellikle oftalmoloji alanında yaygın kullanıma sahip olacağı öngörülmektedir.

Yapay zeka, bir bilgisayarın, olayları belirli sebeplerle ilişkilendirebilmek, genelleme yapabilmek, tecrübelerden ders almak gibi özellikleri barındıran insana özgü zeka yapısını taklit edebilmesidir (Copeland B.J., 2019). Ancak bu zekanın düzeyi ve güvenilirliği ile belirsizlikler mevcuttur.

Yapay zeka türleri üç başlık altında toplanmıştır:
1) Dar yapay zeka: Günümüzde kullanılan yapay zeka yazılımlarının büyük çoğunluğunun dahil olduğu gruptur. Sınırlı bir bilgi havuzu içerisinde çalışır.
2) Genel yapay zeka: teorik olarak insanlarla aynı entellektüel kapasiteye sahiptir. Bir insanın yapabileceği sebep sunmak, strateji geliştirmek, plan yapabilmek, öğrenme kapasitesine sahip olmak, bir dil vasıtasıyla iletişim kurabilmek ve belirli bir amaç doğrultusunda tüm bunları sentezleyebilmek gibi görevleri yerine getirebilmesi beklenmektedir (Russell S.J. ve ark, 2010).
3) Süper yapay zeka: Bilim ve teknoloji ile ilgili önde gelen bilim insanlarının üzerinde gelecek ile ilgili komplo teorileri geliştirdikleri, en zeki insan beyninden daha üstün yeteneklere sahip olacağı beklenmekte olan türdür.

Yapay zekanın öğrenme çeşitleri:
1) Makine öğrenmesi: Bilgisayarlara belli bir miktarda girilen veriler üzerinden algoritma oluşturmak ve bu sayede cihazın tahminlerini geliştirmesi amaçlanır.
2) Derin öğrenme: Aynı anda birçok katmanda işlem yaparak birkaç makine öğrenmesi tekniğini aynı anda kullanan, tek seferde sonuca ulaşan daha gelişmiş bir tekniktir. Daha fazla veri ile daha fazla çıkarım elde edilebilir ve her çıkarımda kendini geliştirerek kendi algoritmasını yaratabilir.

Teknoloji ile iç içe olan oftalmolojide kullanılan optik koherens tomografi, görme alanı testi, renkli fundus fotoğrafi gibi birçok dijital görütüleme yöntemleri, makine öğrenimi ve yapay zekanın geliştirilmesi için uygun bir kaynak oluşturmaktadır.

Diyabetik retinopati, yaşa bağlı maküla dejenerasyonu ve glokom tüm dünyada önlenebilir görme kaybının en yaygın sebepleridir. Bu hastalıkların erken tanı ve tedavisinde yapay zekanın önemi

oldukça fazladır. Bahsi geçen hastalıklar ile ilgili yapılan yapay zeka çalışmalarında %90'ın üzerinde duyarlılık ve özgüllük oranları tespit edilmiştir (Burlina, P.M. ve ark, 2017 , Ting, D. S. W. ve ark, 2017, Grassmann, F. ve ark, 2018).

Yapay zekanın oftalmologlar tarafından merakla takip edilen bir konu olması nedeniyle yapay zeka ile ilgili yapılan çalışmalar her geçen gün artmakta olup alanında prestijli dergilerde yayınlanmaktadır. Çalışmanın amacı, son on yılda yapay zeka üzerine yayınlanan makalelerin ilgili olduğu konu ve yayınlandığı dergi analizini yapmaktır.

Journal citation reports'ta impact faktöre bağlı sıralamaya göre dergiler; Q1, Q2, Q3 ve Q4 olarak dört "quartile" diliminde gruplanmaktadır.

Q1	$0.0 < Z \leq 0.25$	En yüksek dereceli dergiler
Q2	$0.25 < Z \leq 0.5$	
Q3	$0.5 < Z \leq 0.75$	
Q4	$0.75 < Z$	En düşük dereceli dergiler

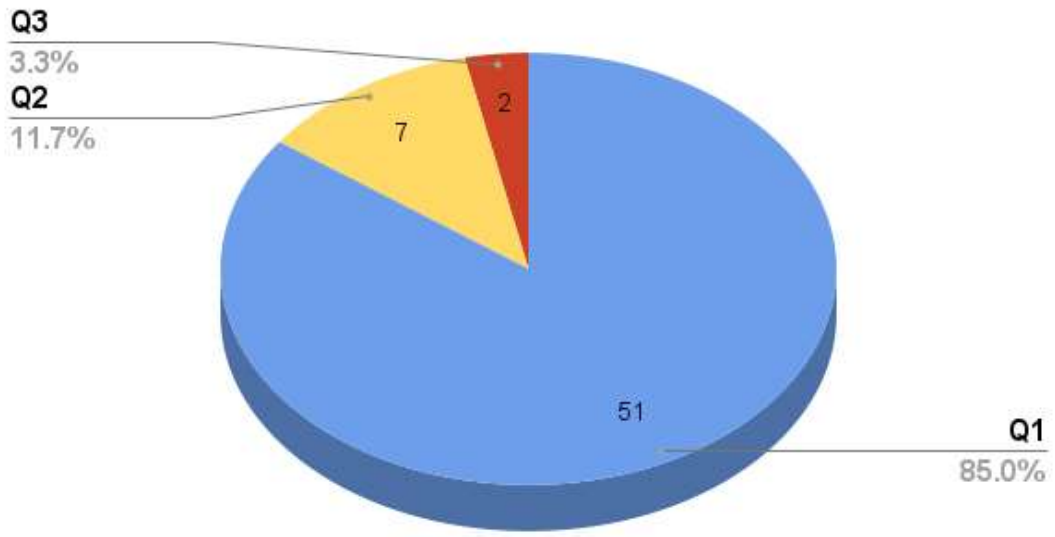
$$Z = \frac{Derginin\ impact\ faktöre\ göre\ kategorideki\ sıralaması}{Kategorideki\ toplam\ dergi\ sayısı}$$

MATERYAL VE METOD

Pubmed'de "artificial intelligence" ve "ophthalmology" kelimeleri ile arama yapıldı. Bunların arasından 2013-2024 yılları arasında yayınlanan, randomize kontrollü çalışmalar, klinik deneyler, gözlemsel çalışmalar ve meta analizler filtrelenip çalışmaya dahil edildi. Elde edilen 128 makalenin 68 tanesi oftalmoloji dergisi haricindeki dergilerde yayınlandığı veya içeriğinin ilgisiz olmasından dolayı çalışma dışı bırakıldı. Toplam 60 makale çalışmaya dahil edildi. Makaleler dergilerin Q değerlerine, yayınlandıkları yıla ve konu içeriklerine göre (retina, glokom, kornea, katarakt ve refraktif cerrahi, nörooftalmoloji ve diğer) kategorize edildi.

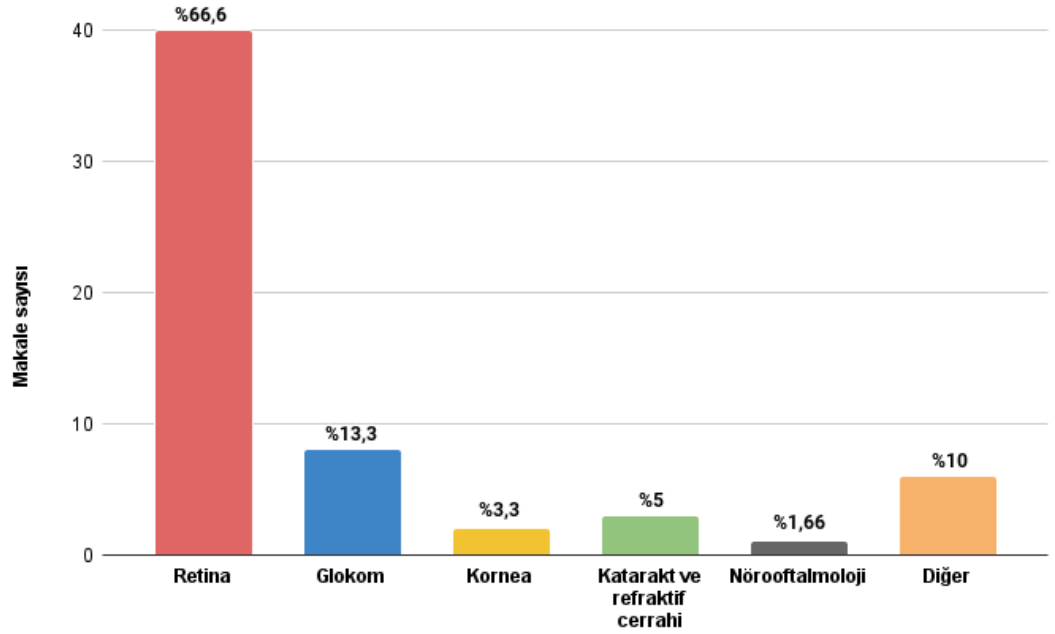
SONUÇ

60 makalenin 51 tanesinin Q1, 7 tanesinin Q2, 2 tanesinin ise Q3 kapsamındaki dergilerde yayınlandığı saptandı. Q4 dergi kapsamında yayınlanan makale bulunamadı (Şekil 1)

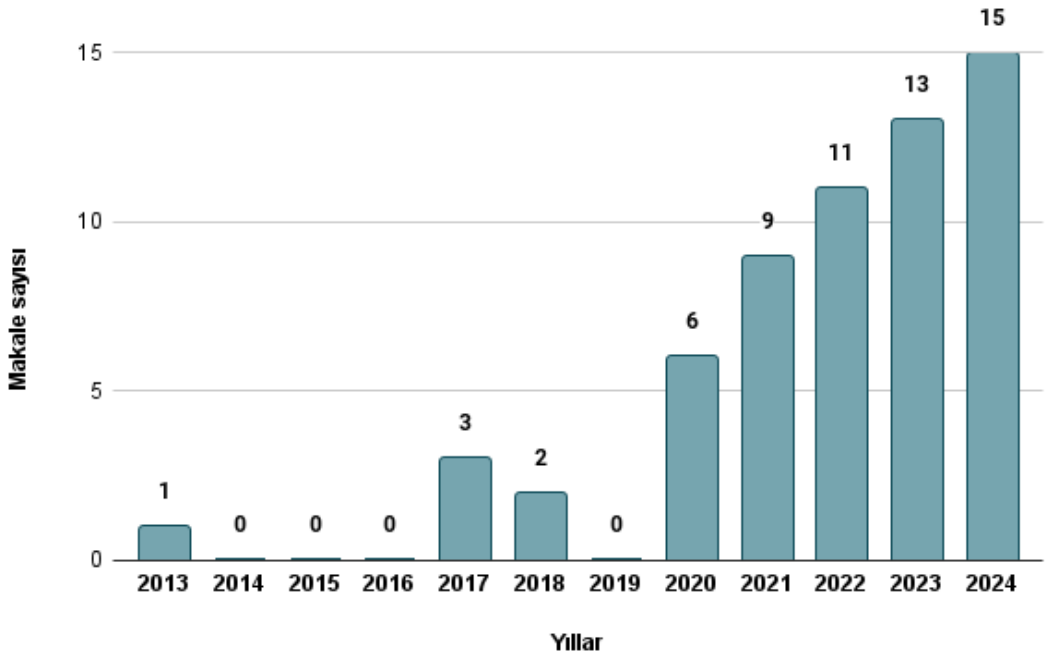


Şekil 1: Dergilere göre makale sayısı ve oranı

Yayınlanan çalışmaların 40'ı (%66,6) retinal hastalıklar ile ilgiliydi. Bunu, glokom 8 makale (%13,3), diğer konular 6 makale (%10), katarakt ve refraktif cerrahi 3 makale (%5) kornea 2 makale (%3,3) ve nörooftalmoloji 1 makale (%1,66) ile takip ediyordu. (Şekil 2)



Şekil 2: Konulara göre gruplandırılmış makale sayıları ve oranları
Çalışmaya dahil edilen makalelerin %90' ının son 5 yıl içerisinde yayınlandığı saptandı. (Şekil 3)



Şekil 3: Yıllara göre yayınlanan makale sayıları

Yayınlanan makalelerin konulara ve dergi Q dilimlerine göre analizi tablo'1 de belirtilmiştir.

	Q1	Q2	Q3	Q4
Retina	36	4	-	-
Glokom	5	1	2	-
Kornea	2	-	-	-
Katarakt ve refraktif cerrahi	2	1	-	-
Nörooftalmoloji	1	-	-	-
Diğer	5	1	-	-

Tablo 1: Dergi Q dilimleri ve konularına göre makale sayıları

TARTIŞMA

Yapılan çalışmaların içeriğine bakıldığında yapay zeka tabanlı tanı ve takip modellerinin en fazla retinal hastalıklarda yer bulacağı öngörülmektedir. Retinal hastalıkların toplumdaki görülme sıklığı göz önüne alındığında, hekime ulaşımın zor olduğu gelişmekte olan ülkelerde hastalıkların tanısı ve hekime yönlendirilmesinde yapay zekanın kullanımı ile önlenebilir görme kayıplarında yüz güldürücü sonuçların alınabileceği düşünülmektedir.

Popülerliği son yıllarda giderek artan yapay zekayı konu alan çalışmalar, sağlık camiası tarafından ilgi ile takip edilmekte ve alanında prestijli dergilerde daha fazla yer bulmaktadır.

KAYNAKÇA

Copeland B.J. (2019, 25 February). Encyclopedia Britannica, Artificial intelligence | Definition, Examples, and Applications | Britannica.com. https://www.britannica.com/technology/artificial-intelligence

Russell S.J., Norvig P. (2010). Artificial intelligence : a modern approach. 3rd ed. New Jersey: Pearson Education.

Burlina, P. M., Joshi, N., Pekala, M., Pacheco, K. D., Freund, D. E., & Bressler, N. M. (2017). Automated Grading of Age-Related Macular Degeneration From Color Fundus Images Using Deep Convolutional Neural Networks. JAMA ophthalmology, 135(11), 1170–1176. https://doi.org/10.1001/jamaophthalmol.2017.3782

Ting, D. S. W., Cheung, C. Y., Lim, G., Tan, G. S. W., Quang, N. D., Gan, A., Hamzah, H., Garcia-Franco, R., San Yeo, I. Y., Lee, S. Y., Wong, E. Y. M., Sabanayagam, C., Baskaran, M., Ibrahim, F., Tan, N. C., Finkelstein, E. A., Lamoureux, E. L., Wong, I. Y., Bressler, N. M., Sivaprasad, S., … Wong, T. Y. (2017). Development and Validation of a Deep Learning System for Diabetic Retinopathy and Related Eye Diseases Using Retinal Images From Multiethnic Populations With Diabetes. JAMA, 318(22), 2211–2223. https://doi.org/10.1001/jama.2017.18152

Grassmann, F., Mengelkamp, J., Brandl, C., Harsch, S., Zimmermann, M. E., Linkohr, B., Peters, A., Heid, I. M., Palm, C., & Weber, B. H. F. (2018). A Deep Learning Algorithm for Prediction of Age-Related Eye Disease Study Severity Scale for Age-Related Macular Degeneration from Color Fundus Photography. Ophthalmology, 125(9), 1410–1420. https://doi.org/10.1016/j.ophtha.2018.02.037

EVALUATION OF THE SYMMETRY RELATIONSHIP BETWEEN THE MUSCULATURE OF THE STOMATOGNATHIC SYSTEM AND KNEE MUSCULATURE IN PROFESSIONAL SOCCER PLAYERS.

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ABSTRACT

Sports Dentistry is a field within Dentistry focused on the knowledge, prevention, and treatment of injuries and diseases of the stomatognathic system in sports practice. This system holds functional and physiological importance due to its structural components (joints, muscles, teeth, ligaments, organs, and tissues). Any alterations in these structures can negatively impact athletes' physical performance. Surface electromyography is a well-established test for measuring muscle activity, being non-invasive, quick to perform, and suitable for evaluating both physiological normality and pathological conditions. Isokinetic evaluation is a test that allows for the analysis of muscle function and the assessment of potential imbalances and muscle deficits in the lower limb joints. Based on this premise, the aim of this study was to evaluate, in professional soccer players, whether a dysfunction in muscle activity within the stomatognathic system could have repercussions throughout the body, resulting in compensations in knee musculature. A total of 22 professional soccer players were evaluated, with an average age of 26.5 years; 11 of them presented symmetry in the stomatognathic musculature, while the other 11 had right or left asymmetry of the same muscles. The muscles assessed were the right and left masseter and temporalis muscles, as well as the right and left knee extensors and flexors. Surface

electromyography of the masseter and temporalis muscles was obtained using the Teethan electromyograph, while the isokinetic evaluation of knee extensors and flexors was conducted using the Biodex System 4 Pro Isokinetic Dynamometer. Preliminary results show a positive relationship of 90.9% between the stomatognathic muscle pattern and the pattern of knee extensor and flexor muscles in both groups. Based on these findings, it can be inferred that there is a strong relationship between the muscle strength pattern of the stomatognathic system and the strength pattern of the knee muscles.

Keywords: Sports, Electromyography, Stomatognathic System, Isokinetic Dynamometer, Sports Dentistry.

ÖĞRETMENLİK UYGULAMASI DERSİNİN SINIF ÖĞRETMENİ VE ADAYLARINA OLAN YANSIMALARI

REFLECTIONS OF TEACHING PRACTICE COURSE ON CLASSROOM TEACHERS AND CANDIDATES

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ÖZET

Öğretmen adayları lisans öğrenim süreçlerinde mesleki becerilerini geliştirmek için çeşitli strateji ve yöntemler üzerine eğitimler almaktadır. Bu stratejilerden biri de öğretmenlik uygulaması dersleridir. Öğretmenlik uygulaması dersleri, öğretmen adaylarına lisans öğrenim süreçlerinde aldıkları teorik eğitimleri pratikte uygulama fırsatı sunarak, onları gerçek sınıf ortamına hazırlamayı amaçlamaktadır. Bu dersler, öğretim becerilerinin yanı sıra sınıf yönetimi, öğrenci ihtiyaçlarını anlama, farklı öğrenci profillerini fark etme ve eğitim materyallerini etkin kullanma gibi birçok önemli yetkinliği geliştirmeyi hedeflemektedir. Sınıf öğretmeni adayları için öğretmenlik uygulaması dersleri, akademik bilgiyi uygulamaya dönüştürmenin ve öğretmenlik mesleğine adım atmanın bir aşaması olarak görülmektedir. Böylelikle öğretmen adayları, öğrenci etkileşimleri ve sınıf içi dinamikleri gerçek bir ortamda deneyimleme fırsatına sahip olmaktadır. Aynı zamanda bu dersler sayesinde öğretim stratejilerinin nasıl uygulanacağı, öğrenci davranışlarının nasıl yönetileceği ve etkili bir öğrenme ortamının nasıl oluşturulacağı konusunda önemli kazanımlar elde etmiş olunmaktadır. Bu sebeplerden dolayı öğretmenlik uygulaması derslerinin mesleğe ilk adım atma süreci olarak tanımlamak yerinde olacaktır. Öğretmenlik uygulaması derslerinde en önemli paydaşlardan biri de uygulama sınıf öğretmenleridir. Öğretmen adayları öğretmenlik uygulaması sürecinde Millî Eğitim Bakanlığı'na bağlı okullarda uygulama sınıf öğretmenleri eşliğinde dersler yürütmektedir. Uygulama sınıf öğretmenlerinin bu süreç boyunca öğretmen adaylarının mesleki becerilerini geliştirme noktasında geliştirici yaklaşımlarla dönütler vermesi sürecin en önemli noktalarından biri olarak görülmektedir. Bu doğrultuda bu araştırmada uygulama sınıf öğretmenlerinin ve sınıf öğretmen adaylarının, uygulama sürecinde karşılaştıkları durumları ve uygulamaya yönelik görüşlerinin irdelenmesi amaçlanmaktadır. Araştırma nitel araştırma yöntemlerinden durum çalışması desenine göre yürütülmüştür. Araştırmaya amaçlı örnekleme dayalı olarak 2023-2024 eğitim öğretim yılında İstanbul ilinde okuyan ve görev yapan 16 sınıf öğretmen adayı ile 5 uygulama sınıf öğretmeni katılım sağlamıştır. Veri toplama aracı olarak araştırmacı tarafından hazırlanan yarı yapılandırılmış görüşme formu uygulanmıştır. Veriler önce betimsel analiz ardından içerik analizine dayalı olarak çözümlenmiştir. Veri sonuçlarına yönelik öneriler sunulmuştur.

Anahtar kelimeler: Sınıf Öğretmeni, Sınıf Öğretmen Adayı, Öğretmenlik Uygulaması

ABSTARCT
Teacher candidates receive training on various strategies and methods to improve their professional skills during their undergraduate education. One of these strategies is teaching practice courses. Teaching practice courses aim to prepare teacher candidates for the real classroom environment by providing them with the opportunity to apply the theoretical training they received during their undergraduate education in practice. These courses aim to develop many important competencies, in addition to teaching skills, such as classroom management, understanding student needs, recognizing different student profiles, and using educational materials effectively. For classroom teacher candidates, teaching practice courses are seen as a stage of turning academic knowledge into practice and stepping into the teaching profession. Thus, teacher candidates have the opportunity to experience student interactions and classroom dynamics in a real environment. At the same time, thanks to these courses, important gains are made on how to apply teaching strategies, how to manage student behaviors and how to create an effective learning environment. For these reasons, it would be appropriate to define teaching practice courses as the first step into the profession. One of the most important stakeholders in teaching practice courses is the practice class teachers. During the teaching practice process, teacher candidates conduct courses with practice class teachers in schools affiliated with the Ministry of National Education. It is seen as one of the most important points of the process that the practice class teachers provide feedback with developmental approaches in terms of developing the professional skills of the teacher candidates throughout this process. Accordingly, this study aims to examine the situations encountered by practice class teachers and class teacher candidates during the practice period and their views on the practice. The research was conducted with case study desing, one of the qualitative research methods. Based on purposive sampling, 16 classroom teacher candidates and 5 practice classroom teachers studying and working in Istanbul province in the 2023-2024 academic year participated in the research. A semi-structured interview form prepared by the researcher was used as a data collection tool. The data were analyzed first based on descriptive analysis and then content analysis. Suggestions for the data results were presented.

Keywords: Classroom Teacher, Classroom Teacher Candidate, Teaching Practice

GİRİŞ

Öğretmenlik heyecan verici ve tatmin edici bir süreçtir ancak diğer meslekler gibi zordur. Öğretmenler, öğrencide öğrenmeyi sağlamak için ne yapılması gerektiğini açıkça anlamalı ve bunun için gerekli olan becerilerde oldukça yetkin olmalıdır. Öğretmenlik, mesaj iletmenin ötesinde karmaşık bir iletişim sorunudur. Bu iletişim sorunu farklı öğretim yöntem ve teknikleri kullanılarak çözülebilir. Öğretim yöntemleri, öğretmenlerin istenen öğrenmeyi sağlamaya çalıştıkları araçlardır. Mesleki olarak eğitilmiş bir öğretmen, farklı öğretim yöntemlerini başarılı bir şekilde kullanabilir (Azeem, 2011). Bu açıdan bakıldığında aday öğretmenler için öğretmenlik uygulaması zorlu bir süreçtir (Grossman, Hammerness, McDonald, 2009). Ball ve Forzani (2009), öğretmen yetiştirmede öğretimin klinik yönüne yani uygulama sürecine ağırlık verilmesi gerektiğini belirtmiştir. Eğitim programların uygulama dersini merkeze alarak şekillenmesi gerektiğini ve öğretmen adaylarının ne bildiği ya da inandığına odaklanmaktan ziyade ne yaptıkları üzerine daha fazla durulması gerektiğini ifade etmişlerdir.

Kendini sürekli geliştiren, uzmanlık alanında derin bilgi ve becerilere sahip, sınıf yönetimi konusunda etkili olan ve öğrencilerle güçlü bir iletişim kurabilen öğretmenlerin yetiştirilmesi, eğitim sistemimizin kalitesini önemli ölçüde artıracaktır. Bu bağlamda, uygulama dersleri ve öğretmen adaylarının eğitim süreçleri, öğretmen yetiştirmede kritik bir rol oynamaktadır (Gökulu, 2017). Eğitim fakültelerinde öğretmen adayları teoriye yönelik aldığı akademik dersleri uygulama sürecinde pratiğe dökme fırsatı yakalamaktadır. Özellikle sınıf öğretmenliği farklı disiplin

alanlarını kapsayan ortak bir program niteliğinde olduğundan her öğretim aşamasında farklı yaklaşım ve yönteme dayalı öğretim ihtiyacı gerektirmektedir. Sınıf öğretmen adayları kazandıkları bu öğretimleri lisans eğitimlerinin son senesinde pratiğe dökmektedir.
Sınıf öğretmeni adayları, gerçek bir sınıf ortamında öğretmenlik yaparak, okulu daha iyi tanıma ve öğrenme-öğretme süreçlerini etkin bir şekilde planlama becerilerini geliştirme şansı bulurlar. Ayrıca sadece bireysel olarak değil, aynı zamanda meslektaşlarıyla da doğrudan iletişim kurarak işbirliği yapma yeteneklerini geliştirirler (Yılmaz, 2011). Bunlara ek olarak sınıf öğretmen adayları uygulama sürecinde öğrenci ihtiyaçlarını fark etme, farklı öğrenci profillerini ortaya koyma, sınıfı etkin bir öğretim ortamına dönüştürme gibi bir çok beceriyi kazanmaktadırlar. Okullardaki uygulamaların sağlıklı bir şekilde yürütülmesi, tüm paydaşların koordineli bir şekilde çalışmasına ve kendilerine düşen sorumlulukları etkin bir biçimde yerine getirmesine bağlıdır. Özellikle uygulama sınıf öğretmenlerine bu anlamda büyük görev düşmektedir. Uygulama sınıf öğretmenleri bu süreçte öğretmen adaylarını okula entegrasyon, sınıfa uyum sağlama ve ders araç-gereçlerinin hazırlanması gibi konularda desteklemelidirler. Ayrıca değerlendirme ve dönüt vererek öğretim kalitesinin artırılmasına katkı sağlamaktadırlar (Ünver, 2003).
Sınıf öğretmen adaylarının ve uygulama sınıf öğretmenlerinin uygulama dersine yönelik görüşlerini ele alan çok sayıda çalışmaya rastlanılmaktadır (Gündoğdu vd., 2010; Yılmaz, 2011; Altıntaş, Görgen, 2014; Taşdere, 2014). Ancak zaman geçtikçe yaşam koşulları değiştiği gibi öğrenci ihtiyaçları, öğretim yöntemleri ve ders içerikleri de değişmektedir. Bu da öğretmenlik uygulaması dersinin sürekli gelişim ve değişim içerisinde olmasını sağlamaktadır. Bu nedenle bu araştırmada uygulama sınıf öğretmenlerinin ve sınıf öğretmen adaylarının, uygulama sürecinde karşılaştıkları durumları ve uygulamaya yönelik görüşlerinin irdelenmesi amaçlanmaktadır. Güncelliğini koruması gereken bu araştırmanın alanyazına katkısı olacağı düşünülmektedir.

YÖNTEM

Araştırma nitel araştırma yöntemlerinden durum çalışması desenine göre yürütülmüştür. Araştırmada, araştırmacı tarafından hazırlanan yarı yapılandırılmış görüşme formu kullanılmıştır. Araştırmaya amaçlı örnekleme dayalı olarak 2023-2024 eğitim öğretim yılında İstanbul ilinde okuyan ve görev yapan 16 sınıf öğretmen adayı ile 5 uygulama sınıf öğretmeni katılım sağlamıştır. Amaçlı örnekleme, nitel araştırmalarda sınırlı kaynakların en etkin şekilde kullanılmasını sağlamak amacıyla bilgi bakımından zengin vakaların belirlenip seçilmesine yönelik yaygın bir tekniktir. Bu yöntem, araştırmanın hedeflerine ulaşabilmesi için en anlamlı ve bilgilendirici örneklerin seçilmesine olanak tanır (Yağar, Dökme, 2018). Verilerin toplanma süreci 2023-2024 bahar dönemi sonunda öğretmenlik uygulaması dersine giden öğretmen adayları ve onlardan sorumlu olan uygulama sınıf öğretmenlerine yönlendirilmiş görüşme soruları ile gerçekleştirilmiştir. Görüşme soruları araştırmacı tarafından hazırlanmış olup uygulama sürecinde karşılaşılan olumlu ve olumsuz durumlar, lisans öğrenimine ve mesleki gelişime olan katkısı ile uygulama sürecinin alternatif ele alınma biçimleri üzerine şekillenmiştir. Verilerin analizi önce betimsel analiz ardından içerik analizine göre gerçekleştirilmiş olup katılımcıların görüşlerine doğrudan alıntılarla yer verilmiştir.

BULGULAR

Araştırma verileri aşama aşama ele alınarak irdelenmiştir. İlk olarak sınıf öğretmen adaylarının daha sonra sınıf öğretmenlerinin verileri incelenmiştir. Sınıf öğretmen adaylarının;
“Öğretmenlik uygulaması dersinin sana kazandırdığı olumlu yönler neler oldu? Detaylıca açıklar mısın?” sorusundan elde edilen verilerin analizine dayalı kodlar tablo 1’ de verilmiştir.

Tablo 1. *Sınıf öğretmen adaylarının birinci araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans
Mesleki gelişim	11
Saha deneyimi	10
Kişisel gelişim	4
Öğrenciyle doğru iletişimi sağlama	3
Okul kültürünü tanıma	3
Farklı bakış açısı geliştirme	1

Veriler incelendiğinde öğretmen adaylarının uygulama derslerinin en çok mesleki gelişimlerine katkısı olduğu (f=11) ve saha deneyimi (f=10) kazanmalarına fırsat tanıdığı görüşlerine sahip olduğu görülmektedir. Öğretmen adaylarından bazılarının görüşlerine doğrudan yer verildiğinde ÖA1 *"Öğretmenlik Uygulaması dersi, benim için birçok açıdan değerli kazanımlar sağladı. Öncelikle, teorik olarak öğrendiğim bilgileri pratikte uygulama fırsatı buldum. Bu deneyim, sınıf yönetimi ve ders planlaması konularında gerçek bir uygulama alanı sundu ve öğrenci davranışlarını gözlemleyerek bu davranışlara uygun stratejiler geliştirme yeteneğimi güçlendirdi. İletişim ve problem çözme becerilerim de güçlendi. Sabır, empati ve anlayış gibi kişisel özelliklerim güçlendi. Bu süreçte özgüvenim arttı ve zaman yönetimi ile organizasyon becerilerim gelişti."* şeklinde olduğu görülmektedir. Öğretmenlik uygulaması derslerinin öğretmen adaylarına birçok kazanım sağladığı bu görüş ile ortaya koyulmaktadır.

"Öğretmenlik uygulaması dersinin mesleki tecrübe kazandırma anlamında yeterli olduğunu düşünüyor musun? Evet ise neden? Hayır ise neden?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 2' de verilmiştir.

Tablo 2. *Sınıf öğretmen adaylarının ikinci araştırma sorusuna yönelik veri kodları*

Evet/Hayır	Kodlar	Frekans
Evet (f=12)	Mesleki gelişim	7
	Öğretmenlerle iletişim	4
	Öğrenci ile iletişim	2
	Uygulamanın lisansın erken yıllarına çekilmesi	2
Hayır (f=4)	Uygulamanın lisansın erken yıllarına çekilmesi	4
	Uygulama süresi yetersizliği	2
	Öğretim dersleriyle eş yürütülmesi	1
	Son senenin sadece uygulama olması	1

Veriler incelendiğinde mesleki tecrübe kazandırma noktasında uygulama dersinin yeterli olduğunu düşünen 12, düşünmeyen 4 öğretmen adayı bulunmaktadır. Mesleki gelişime olan katkısı (f=7) ve okuldaki öğretmenlerle iletişim halinde olarak (f=4) yeni öğrenmelerin gerçekleşmesine olanak sağlamasından dolayı uygulama dersinin yeterli olduğu görülmektedir. Ancak uygulama derslerinin lisansın son senesinden önce verilmesi gerektiği (F=4) ve uygulama süresinin yetersizliği (f=2) gibi nedenlerle dersin yeterli olmadığı görüşlerinin de olduğu ortaya koyulmuştur. Öğretmen adaylarından bazılarının görüşlerine yer verildiğinde ÖA2 *"Evet yeterli olduğunu düşünüyorum. Her hafta dersi planlamak, materyal hazırlamak, dersi anlatmak, dönüt almak çocuklarla iç içe olmak insana bir çok şey katıyor. Gerek kendi dersimiz dışında sınıf öğretmeninin dersi nasıl anlattığını dinlemenin katkısı büyük oluyor."* ve ÖA3 *"Hayır. Tam deneyim kazanmak için yeterli zamana ve yaşantıya olanak olmaması. Uygulama sürecinin öğretim dersleriyle eş zamanlı ilerlemesinin daha verimli olacağı kanaatindeyim. Öğretim derslerinden sonra son sınıfta ilk dönem gözlem ve uygulama ikinci dönem tam gün gözetmen*

eşliğinde ders anlatımlı uygulamaya izin verilen sistemin daha etkin olacağını düşünmekteyim." şeklinde olduğu görülmektedir.

"Öğretmenlik uygulaması dersinde karşılaştığın olumsuz yönler oldu mu? Olduysa açıklar mısın? Bu sorunların çözümü için ne önerebilirsin?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 3' te verilmiştir.

Tablo 3. *Sınıf öğretmen adaylarının üçüncü araştırma sorusuna yönelik veri kodları*

Olumsuz Durum	Kodlar	Frekans	Çözüm
Evet (f=2)	Uygulama okulun uzaklığı	1	Uygulama derslerinin lisans birinci sınıftan itibaren verilmesi
	Uygulama süresi yetersizliği	1	

Veriler incelendiğinde uygulama dersinde herhangi bir olumsuzlukla karşılaşmayan 14, karşılaşan 2 öğretmen adayı bulunmaktadır. Karşılaşan öğretmen adayları ise uygulama okulunun evlerine olan uzaklık durumunu ve uygulama süresinin yetersiz olmasından kaynaklı ders öğretimi ve materyal sunumunu yetiştiremediklerini ifade ettikleri görülmektedir.

"Öğretmenlik uygulaması dersi daha etkili bir şekilde nasıl yürütülebilir? Detaylıca açıklar mısın?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 4' te verilmiştir.

Tablo 4. *Sınıf öğretmen adaylarının dördüncü araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans
Uygulamanın lisansın erken yıllarına çekilmesi	9
Uygulama süresinin arttırılması	4
Uygulama öğretmen dönütleri	2
Veli-idare-öğretmen işleyişi	2
Gözlem dersinin eklenmesi	2
Lisans son sınıfta sadece uygulama dersinin olması	2
Okul idaresi ve müfettişlerin dönütü	1
Sınıfa başına düşen aday öğretmen sayısının azaltılması	1

Veriler incelendiğinde öğretmen adaylarının uygulama derslerinin daha etkili olabilmesi için uygulama dersinin lisansın erken yıllarından itibaren verilmesi (f=9) gerektiği konusunda görüşleri olduğu görülmektedir. Ayrıca uygulama süresinin arttırılması da (f=4) belirtilen bir diğer görüştür. Öğretmen adaylarının görüşlerine bakıldığında ÖA4 *"İlk olarak gözlem dersi geri gelmeli ve mümkün olduğu kadar fazla dönem gözlem yapılmalı. Öğretmenlik uygulaması dersi son sınıfta (4.sınıfta) tek ders olmalı. Başka bir ders son 2 dönemde olmamalı. Stajyer öğretmenler 2 dönem boyunca hafta içi her gün staj sınıfına gitmeli. Haftanın 1 tam günü tüm derslerde öğretmenlik yapmalı. Stajyer öğretmenin ders anlatımlarını, sınıf öğretmeni ve akademisyenlerin dışında okuldaki yöneticiler (müdür, müdür yardımcıları) ve M.E.B. tarafından görevlendirilen müfettişler tarafından incelenmeli. Yapılan inceleme ve gözlem raporları sonucunda stajyer öğretmenler hakkında geri bildirimler verilmeli. Bu şekilde stajyer öğretmenler kendilerini daha fazla geliştirme şansı bulmuş olurlar."* şeklinde olduğu görülmektedir. Öğretmen adaylarının uygulama derslerinin mesleki gelişimlerine olan katkısının farkındalığı ile daha kapsamlı bir şekilde bu derslerin ele alınması gerektiği durumunu istedikleri söylenebilir.

"Öğretmenlik uygulaması dersinin lisans öğrenimine katkısı nedir? Açıklar mısın?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 5' te verilmiştir.

Tablo 5. *Sınıf öğretmen adaylarının beşinci araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans
Öğretimin pratiğe dökülmesi	10
Öğretmenlik	5
Öğretimde somutlaştırma	2
Öğretmenlik sorunlarını deneyimleme	1
Bölümü tanıma	1
Öğretim derslerinden farklı olması	1

Veriler incelendiğinde öğretmen adaylarının uygulama dersinin lisansa olan katkısını belirttiğinde en çok öğretimde öğrendikleri teorilerin pratiğe dökülme (f=10) noktasında kazanım elde ettiklerini belirttikleri görülmektedir. Uygulama derslerinin öğretmen (f=5) olma noktasında birçok katkısı olduğu ve bunun lisans öğretimlerinden farklı olduğu görüşleri ortaya koyulmuştur. Öğretmen adaylarının görüşlerine bakıldığında ÖA5 *"4 yıllık eğitimimizi aldığımızda öğretmenlik uygulaması dersimizle beraber bunlar tamamlanmış oluyor. Birbirini tamamlamış ve iç içe geçmiş bir şekilde uygulamalarımızı yürütebiliyoruz. Aldığımız derslerimizi uygulama dersimizde de kullanabiliyoruz. Bu yüzden oldukça olumlu bir katkısı oluyor."* şeklinde olduğu görülmektedir. Öğretmen adayları için uygulama dersinin lisansın tamamlayıcı yönü olduğu, öğrenilen bilgileri pratiğe dökme ve aynı anda farklı durumlara maruz kalarak öğretmenlik becerisini geliştirmede en önemli ders olduğunun farkındalığına sahip oldukları söylenebilir.

Uygulama öğretmenlerine yöneltilen sorularda aşama aşama ele alınarak irdelenmiştir. Uygulama öğretmenlerine yönlendirilen "Öğretmenlik uygulaması dersinin mesleki tecrübe kazandırma anlamında yeterli olduğunu düşünüyor musunuz? Evet ise neden? Hayır ise neden?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 6' da verilmiştir.

Tablo 6. *Uygulama öğretmenin birinci araştırma sorusuna yönelik veri kodları*

Evet/Hayır	Kodlar	Frekans
Evet (f=4)	Mesleki gelişim	3
	Öğrenciyi tanıma	1
	Saha deneyimi	1
Hayır (f=1)	Uygulama süresi yetersizliği	1

Veriler incelendiğinde uygulama derslerinin mesleki tecrübe kazandırma noktasında yeterli olduğunu düşünen dört, düşünmeyen bir uygulama öğretmeni bulunmaktadır. Uygulama öğretmenleri mesleki gelişim (f=3) açısından bu dersin yeterli olduğunu düşünmekle birlikte uygulama süresinin yetersizliği (f=1) nedeniyle de olumsuz düşündüklerini ifade etmişlerdir. Uygulama öğretmenlerinin görüşlerine bakıldığında UÖ1 *"Yeterlidir. Mesleki bilgi ve beceriler kazandıklarını düşünüyorum. Öğrencilerin yaş düzeyi, ilgi ve ihtiyaçlarını yakından tanıma fırsatı bulmaktadırlar."* şeklinde olduğu görülmektedir.

"Öğretmenlik uygulaması dersinde karşılaştığınız olumsuz yönler oldu mu? Olduysa açıklar mısınız? Bu sorunların çözümü için ne önerebilirsiniz?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 7' de verilmiştir.

Tablo 7. *Uygulama öğretmenin ikinci araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans	Çözüm
Zaman yönetimi	1	Deneyim kazanma ve sınıfı tanıma
Uygulama öğrenci sayısı	1	Öğrenci sayısı azaltılmalı

Veriler incelendiğinde uygulama öğretmenleri uygulama süresince olumsuz bir durumla karşılaşmadıklarını ifade etmişlerdir. Ancak birkaç noktaya çözüm önerisi getirmişlerdir. Bunlar, öğretmen adaylarının zaman yönetimini iyi yapmaması ve uygulama öğrencilerinin sayı fazlalığı üzerine olmuştur. Öğretmen adaylarının deneyim kazanarak ve sınıfı daha iyi tanıyarak zaman yönetimini doğru bir şekilde planlayacaklarını ifade etmişlerdir. Aynı zamanda uygulama öğrenci sayısının azaltılarak uygulama öğretmenlerinin daha etkili bir süreç yürütecekleri şeklinde görüşleri olmuştur.

"Öğretmenlik uygulaması dersi daha etkili bir şekilde nasıl yürütülebilir? Detaylıca açıklar mısınız?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 8' de verilmiştir.

Tablo 8. *Uygulama öğretmenin üçüncü araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans
Uygulama süresinin arttırılması	3
Uygulamanın lisansın erken yıllarına çekilmesi	2
Uygulama dışı durumlar için ayrı ders	1
Öğrenci istekliliğini arttırma	1

Veriler incelendiğinde uygulama derslerinin daha etkili bir şekilde yürütülmesi için uygulama öğretmenleri sürenin arttırılması (f=3) gerektiğini ve uygulama derslerinin erken yıllardan itibaren verilmesi (f=2) gerektiğini ifade etmişlerdir. Uygulama öğretmenlerinin görüşleri UÖ2 *"Öğretmenlik uygulaması dersinin kesinlikle üniversitenin ilk yıllarından itibaren başlaması gerektiğini düşünüyorum. En azından gözlem günlerinin sayısı arttırılabilir. Öğretmen adayları konu anlatımının yanında öğrenci davranışları ve problemleri üzerine rehberlik anlamında ayrı olarak uygulama faaliyetlerine yer verilerek bilinçlendirilebilir. Sınıf ve zaman yönetimi alanındaki çalışmalara teorik ve pratik olarak daha fazla yer verilebilir."* şeklinde olduğu görülmektedir.

"Öğretmenlik uygulaması dersinin lisans öğrenimine katkısı nedir? Açıklar mısınız?" sorusundan elde edilen verilerin analizine dayalı kodlar tablo 9' da verilmiştir.

Tablo 9. *Uygulama öğretmenin dördüncü araştırma sorusuna yönelik veri kodları*

Kodlar	Frekans
Öğretimin pratiğe dökülmesi	3
Teori ve uygulama farklılığını görme	2
Mesleki gelişim	1
Bölümü tanıma	1
Farklı öğrenci profillerini tanıma	1

Veriler incelendiğinde uygulama öğretmenleri, uygulama dersinin öğretimde elde edilen teorik bilgilerin pratiğe dökülmesi (F=3) ve teori ile uygulama arasındaki farklılıkları görme (f=2) noktasında lisans öğrenimine katkı sağladığını belirtmişlerdir. Uygulama öğretmenlerinin görüşleri UÖ3 *"Lisansta öğrenilen bilgileri uygulama imkânı yaratır. Kalıcı öğrenme olmasını sağlar. Mesleki bilgi ve beceriler kazanarak öğretmenliği daha iyi tanıma ve okudukları bölümü değerlendirebilme imkânı sunar."* şeklinde olduğu görülmektedir.

Verilerden elde edilen kodlardan temalara ulaşılmış olup tablo 10'da temalar verilmiştir.

Tablo 10. *Kodlardan elde edilen temalar*

Temalar	Frekans
Meslek bilgisi	72
Uygulama ağırlıklı lisans	41
Kişisel gelişim	7
Okul	6

Veriler incelendiğinde uygulama derslerinden elde edilen temalar meslek bilgisi (f=72), uygulama ağırlıklı lisans öğrenimi (f=41), kişisel gelişim (f=7) ve okul (f=6) şeklinde belirlenmiştir. Bu temaların detaylı bir şekilde irdelenmesi ile elde edilen sonuçlar bir sonraki başlıkta ele alınmıştır.

SONUÇ VE ÖNERİLER

Araştırmadan elde edilen sonuçlara bakıldığında uygulama derslerinin öğretmen adaylarının mesleği tanımaları, teorik bilgilerini pratiğe dökmeleri, sınıf ve öğrenci ihtiyaçlarını fark etmeleri, materyal hazırlamaları, ders planı oluşturmaları, sınıf yönetimi, zaman yönetimi, öğretmen sorumlulukları, okul kültürünü tanımaları, veli iletişimi, idare yönetimi gibi birçok olumlu kazanım elde edilmesini sağladığı sonucuna varılmıştır. Bu sonucun benzer şekilde diğer araştırmalarla örtüştüğü görülmektedir (Özkılıç, Bilgin ve Kartal, 2008; Erarslan, 2009; Altıntaş, Görgen, 2014; Çakmak, 2019). Örneğin Çakmak (2019) araştırmasında öğretmen adaylarının uygulama sürecinde öğrenciyle iletişim, sınıf yönetimi, farklı öğrenci profillerini tanıma, saha deneyimi kazanma, stres yönetimi ve ders anlatımı gibi olumlu deneyim kazandıkları sonucuna varmıştır.

Uygulama öğretmenlerinin öğretmen adaylarına öğretim süreçlerine yönelik dönütler vermesinin geleceğin öğretmenlerini iyi bir şekilde yetişmesine olanak tanıdığı sonucuna varılmıştır. Öğretim derslerinin uygulamalar ile eş zamanlı yürütülerek öğrenme ve öğretme sürecinde etkililiğin arttırılabileceği sonucuna ulaşılmıştır.

Araştırmanın bir diğer sonucu uygulama öğretmeni başına düşen öğretmen adayı sayısında azalma olması gerektiği ve bu sayede uygulama öğretmenlerinin öğretmen adaylarına daha fazla zaman ayırarak dönütler vermesine imkân sağlayarak mesleki gelişimlerine olumlu katkı getireceği şeklinde olmuştur. Bu sonucun diğer araştırma sonuçlarıyla paralellik gösterdiği görülmektedir (Çepni, Aydın, 2015; Çakmak, 2019).

Araştırmanın dikkat çeken bir diğer sonucu uygulama süresinin yetersizliğinden dolayı uygulama derslerinin lisansın ilk yıllarından itibaren verilmesi şeklinde olmuştur. Böylelikle öğretmen adayları daha fazla uygulama gerçekleştirerek mesleğe ve bölüme karşı olumlu tutum geliştirmiş olacaklardır. Araştırmanın bu sonucuyla örtüşen çok sayıda çalışmanın olduğu görülmektedir (Tepeli, Caner, 2014; Çepni, Aydın, 2015; Şahin, 2016). Tepeli ve Caner (2014) araştırmalarında uygulama sürelerinin öğretmen adaylarının gelişimi için kısa olduğu sonucuna varmışlardır.

Araştırma sonuçlarına yönelik öneriler ise, lisans öğreniminin ilk yıllarından itibaren gözlem ve uygulamaya yönelik derslerin programlarda yer alması, uygulama derslerinin süresinin arttırılarak öğretmen adaylarının daha fazla uygulama gerçekleştirilmesine olanak tanınması, uygulama öğretmenine daha az sayıda öğretmen adayının sorumluluğunun verilmesi ve teorik kalan öğretim derslerinin uygulamalarla birlikte yürütülmesi şeklinde olmuştur.

KAYNAKÇA

Altıntaş, S., Görgen, İ. (2014). Sınıf öğretmeni adaylarının öğretmenlik uygulaması üzerine görüşleri (Muğla sıtkı koçman üniversitesi örneği). *Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic, 9* (8), 197-208

Azeem, M. (2011). Problems of prospective teachers during teaching practice. *Academic Research International*, *1*(2), 308.

Ball, D., Forzani, F. (2009). The work of teaching and the challenge for teacher education. *Journal of Teacher Education, 60*(5) 497–511.

Çakmak, M. S. (2019). Öğretmen adaylarının öğretmenlik uygulaması derslerine ilişkin görüşleri. *Siirt Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *7*(13), 207-226.

Çepni, O., Aydın, F. (2015). Coğrafya öğretmen adaylarının öğretmenlik uygulaması dersi kapsamında karşılaştığı sorunlar ve çözüm önerileri. *Türkiye Sosyal Araştırmalar Dergisi, 19* (2), 285-304.

Erarslan, A. (2009). İlköğretim matematik öğretmen adaylarının 'öğretmenlik uygulaması' üzerine görüşleri. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi, 3*(1), 207-221.

Gökulu, A. (2017). Aday öğretmenlerin Türkiye'deki aday öğretmenlik eğitim süreci ile ilgili görüşleri. *International Journal of Social Sciences and Education Research, 3*(1), 111-123.

Grossman, P., Hammerness, K., McDonald, M. (2009). Redefining teaching, reimagining teacher education. *Teachers and Teaching: Theory and Practice,15*(2) 273–289.

Gündoğdu, K., Bay, E., Coşkun, Z. S., Albez, C. (2010). Sınıf öğretmeni adaylarının öğretmenlik uygulamasına ilişkin görüşleri ve beklentileri. *Bayburt Eğitim Fakültesi Dergisi*, *5*(1), 55-67.

Özkılıç, R., Bilgin, A., Kartal, H. (2008). Öğretmenlik uygulaması dersinin öğretmen adaylarının görüşlerine göre değerlendirilmesi. *İlköğretim Online, 7*(3), 726-737.

Şahin, M. (2016). Pedagojik formasyon eğitimi uygulama dersinin (staj) öğretmen adaylarının görüşleri açısından değerlendirilmesi. *Akademik Sosyal Araştırmalar Dergisi, 4* (22), 32-49

Taşdere, A. (2014). Sınıf öğretmen adaylarının öğretmenlik uygulaması dersine yönelik yaşadıkları sorunlar ve çözüm önerileri. *Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic, 9* (2), 1477-1497

Tepeli, Y., Caner, M. (2014). Pedagojik formasyon programı öğrencilerinin öğretmenlik uygulaması ile ilgili görüşleri. *Eğitim Bilimleri Araştırmaları Dergisi, 4* (2), 313-328.

Ünver, G. (2003). Öğretmenlik uygulamasında işbirliği: bir durum çalışması. *G.Ü. Gazi Eğitim Fakültesi Dergisi, 23* (1), 87-100.

Yağar, F., Dökme, S. (2018). Niteliksel araştırmaların planlanması: Araştırma soruları, örneklem seçimi, geçerlik ve güvenirlik. *Gazi Sağlık Bilimleri Dergisi*, *3*(3), 1-9.

Yılmaz, M. (2011). Sınıf öğretmeni adaylarının öğretmenlik uygulaması dersini yürüten öğretim elemanlarına ilişkin görüşleri. *Gaziantep Üniversitesi Sosyal Bilimler Dergisi, 10* (4):1377 -1387

NEGATIVE EFFECTS OF SALT STRESS ON *PHYSALIS PERUVIANA* L. DURING GERMINATION STAGE IN PETRI TRIAL

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ABSTRACT
As an abiotic plant stress factor, salinity has become more important to learn about the effects of salinity on plants such as *Physalis peruviana*, which was grown in certain areas previously but has recently been cultivated in many countries on different continents because of its medicinal, aromatic, ornamental, and nutritional properties. In this study, irrigation applications with various NaCl concentrations (0, 25, 50, 100, 150, 200, and 250 mM) were carried out in Petri dishes to determine the salt tolerance level and negative effects of the salt on *Physalis peruviana* plant at the germination stage. As a result of 21 days of observations, the first germination day (day), the last germination day (day), mean germination day (day), germination rate (%), root length (cm), and seedling capacity rate (%) were evaluated. The results showed that the mean germination time increased statistically after 200 mM NaCl and above. The germination rate decreased rapidly at the same and higher concentrations. The root length was statistically affected by all salt concentrations applied, and the longest roots were obtained only from the control treatment containing no NaCl. However, the seedling capacity (root and stem formation) was seen the most in the concentrations 50 mM, 25 mM, and 0 mM of NaCl, respectively, while the concentrations 200 mM and 250 mM of NaCl were in the last group with no stem formation. This study showed that a small amount of salt of 50 mM and below can be encouraging in terms of the germination rate and seedling capacity, but salt has very detrimental effects on the root length.

Keywords: cape goose berry, golden berry, *Physalis peruviana*, plant protection, salt stress, seed germination

INTRODUCTION

Abiotic stress factors affect product quality and quantity during plant production stages and are mostly associated with light, temperature, water, soil structure, and soil content. On the other hand, abiotic stress factors can cause more damage by facilitating the infection and spread of biotic disease agents (Cramer et al., 2011; Suzuki et al., 2014; Ramegowda et al., 2020). High salinity stress caused by soil or irrigation water is also an increasingly important problem in the world. Whether the cause is natural or anthropogenic activities, it is a fact that salinity will have significant effects on plant production, such as reducing productivity and endangering production (Parihar et al., 2015; Balasubramaniam et al., 2023).

Physalis peruviana L. is a valuable plant in Solanaceae family because its fruits have medicinal-aromatic-ornamental and nutritional properties (Cavusoglu & Kasım, 2022). The plant is known native to Latin America (Barirega, 2014) with more than 90 species (Vargas-Ponce et al., 2011;

Ramirez et al., 2013). The crop has been widely introduced in tropical, subtropical, and temperate areas besides natively and agriculturally growing areas in Latin America (Barirega, 2014). Although all these areas seem to be climatically suitable for the cultivation of this plant, soil and/or irrigation water factors may be limiting in terms of yield and plant health.

For this purpose, the response of *Physalis peruviana* L. during the germination phase to a very common and threatening stress factor like salinity was evaluated as a preliminary study in Petri dishes.

MATERIALS AND METHOD

Location and Materials of the Study: The study was conducted in June 2024 in Plant Protection Laboratory of Agriculture Faculty at Kocaeli University. The one-year-old seeds used in the study were obtained from harvested fruits in June 2023. After separation from the fruit manually without any treatment, the seeds were kept in a paper towel under dark and at room temperature for one year. For salt stress treatment, NaCl was used which is 58.44 g/mol in molecular weight, 99.5% in purity, and pH 7 was purchased from a company. In the study filter papers were used in glass petri dishes with a diameter of 10 cm. During the study, the temperature was kept constant at 25 $^{\circ}$C and it was carried out in a 12-hour light/12-hour dark period in climate chamber.

Experimental Set Up: The experimental unit consisted of a 10 cm diameter glass Petri dish, with ten seeds on filter paper as a substrate, saturated with 10 mL of distilled water or with saline solution in distilled water (0, 25, 50, 100, 150, 200, and 250 mM) (Fig. 1a). A completely randomized design with three replicates was used. The germination test was carried out for 21 days. Germinated seeds were counted daily. A seed was considered germinated when radicle protrusion occurred as 1 mm. At the end of the experiment, the following data were evaluated: the first germination day (day), the last germination day (day), the mean germination day (day), the germination rate (%), the root length (cm), and the seedling capacity rate (%).

Data Evaluation: All measurements were taken from the average of at three independent biological replicates and all the replicates consisted of ten seeds. Thus, each treatment was calculated from a total of 30 seeds. In total 210 seeds were evaluated. ANOVA statistical analyses were performed using SPSS 26.0. Significant differences (at least $P < 0.05$) between the seven treatments, as determined by Tukey's tests, were indicated with different letters.

RESULTS AND DISCUSSION

The salinity extended the first, last, and mean germination time after 200 mM salt treatment. The first germination, last germination, and mean germination days varied between 4.3-7, 8.3-11.7, and 7-9 days respectively between 0-150 mM salt treatments. But the data statistically increased rapidly after 200 mM salt application in all treatments (Table 1, Fig. 1b, 1c, 2a, 2b, 2c).

The data presented in Table 2 showed that germination rate was affected after 150 mM salt concentration on the contrary the root length was strongly affected by all salt treatments statistically. While the root length was 3.42 cm in control group (0 mM salt), the data varied between 1.28-0.33 cm in the 25 mM application and above (Table 2, Fig. 1d, 3a, 3b).

The seedling capacity rate, which represents plants that form both roots and stems at the same time, gave the best results in the 50 mM (83,3%), 25 mM (66.7%), and 0 mM (50.3%) applications, respectively, while it statistically decreased in the 100 mM (46.7%) and 150 mM (23.3%) salt applications. Although there were germinations in application 200 and 250 mM, there was no seedling capacity (Table 2, Fig. 1e, Fig.3c).

In several studies, salt stress effects have been studied on *Physalis peruviana* (de Souza et al., 2014; Celikli et al., 2017; Monroy-Velandia & Coy-Barrera, 2021). However, the methods in these studies are highly different from this study. In these studies, seeds were subjected to pretreatment and salt stress was detected in different environments which are not the same as our conditions. Although pre-applications created differences between the results, it was noted that there was a regression in terms of development at high salt concentrations. For example, the shoot

length statistically decreased after 50 mM salt concentration in MS medium *in vitro* in one of the studies (Celikli et al., 2017).

In a study, 0, 30, 60, 90, 120, and 180 mM NaCl were used to evaluate the salt effect on germination and emergence of *Physalis peruviana* and *Physalis ixocarpa*. The data of the study showed that *P. peruviana* seeds are more successful than *P. ixocarpa* in terms of final germination percentage and mean germination time in Petri trial. In addition, *Physalis* species were affected by salinity in terms of seedling growth more than germination parameters (Yildirim et al., 2011) that results were supported this study.

Similarly, another Solanaceous plant, tomato, was tested for assessment of the effect of salinity on selected varieties. The treatments were 0, 50, 100, and 150 mM NaCl and applied to Petri plates. In the study, the highest seed germination rate, and lowest mean germination time was found in control (0 mm) treatment. In all varieties radicle length sharply decreased after 50 mM salt treatment. The study also showed that there are differences in being salt tolerant or sensitive in varieties (Chakma et al., 2019).

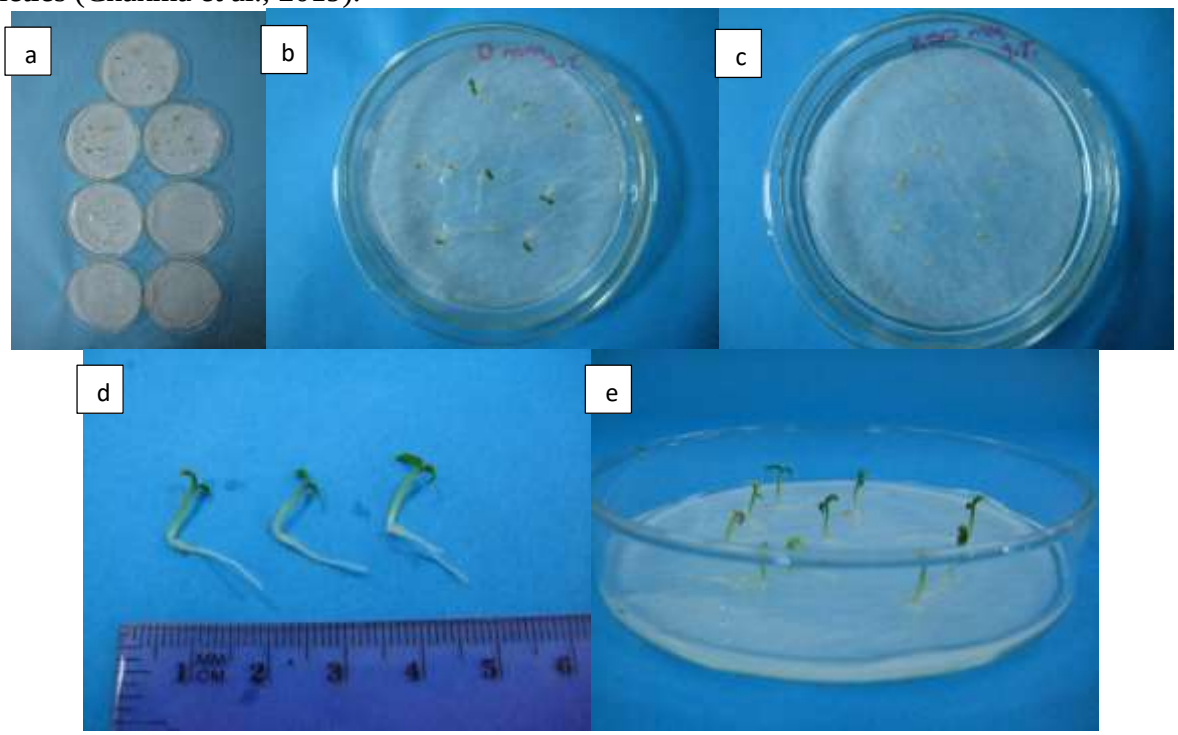


Figure 1. The seed germination and seedling features of *Physalis peruviana* under salt stress after 21 days; a) The first repeats of all salt stress applications, b) Germination in 0 mM salt (control) treatment, c) Germination in 250 mM salt treatment, d) Rooting in 25 mM salt group, e) Seedling form in 50 mM salt concentration

CONCLUSION

The main aim of this study was to assess the negative effects of salt stress on *Physalis peruviana*. According to the results, the study showed that a small amount of salt of 50 mM and below can be encouraging in terms of the germination rate and seedling capacity, but salt has very detrimental effects on the root length. The study should continue to obtain salt stress effects and harmful point of the stress at nursery and field conditions.

Table 1. The effect of increasing salt stress on the first germination time, the last germination time and the mean germination time of *Physalis peruviana*

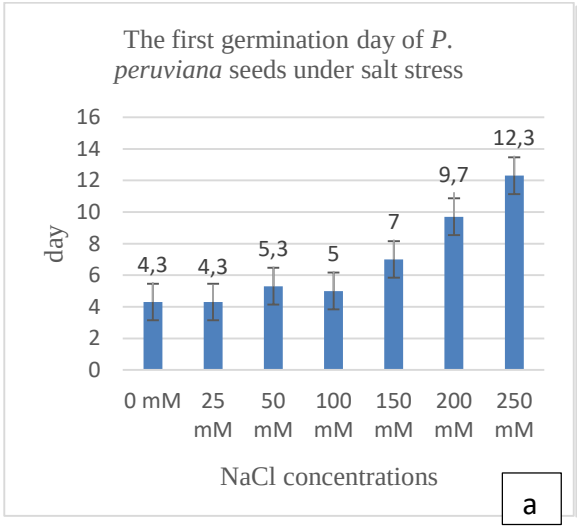
NaCl Concentrations	First Germination Time* (day)	Last Germination Time* (day)	Mean Germination Time* (day)
0 mM	4,3±1,5 [a]	8,3±0,6 [a]	7,0±0,8 [a]
25 mM	4,3±1,5 [a]	8,6±1,2 [a]	7,0±0,9 [a]
50 mM	5,3±1,5 [a]	9,0±0,0 [a]	7,1±0,6 [a]
100 mM	5,0±1,0 [a]	11,3±1,5 [ab]	7,4±0,3 [a]
150 mM	7,0±0,0 [ab]	11,7±2,1 [ab]	9,0±0,3 [a]
200 mM	9,7±0,6 [bc]	14,3±2,5 [b]	12,2±1,7 [b]
250 mM	12,3±2,3 [c]	13,7±1,5 [b]	12,8±1,9 [b]
Mean	**6,9±3,1**	**11,1±2,6**	**8,9±2,6**
	p<0,001	*p<0,001*	*p<0,001*

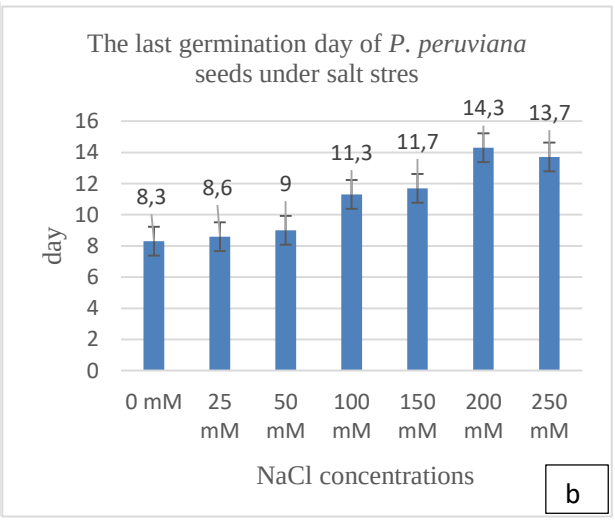
*All data are Means±SE of three replicates, Tukey's Test were indicated different letters at *p< 0.001* probability level.

Table 2. The effect of increasing salt stress on the germination rate, the root length and the seedling capacity of *Physalis peruviana*

NaCl Concentrations	Germination Rate* (%)	Root Length* (cm/seed)	Seedling Capacity* (%)
0 mM	93,3±5,8 [a]	3,42±0,94 [a]	50,33±11,6 [abc]
25 mM	100±0,0 [a]	1,25±0,13 [b]	66,70±15,3 [ab]
50 mM	100±0,0 [a]	1,27±0,07 [b]	83,30±20,8 [a]
100 mM	93,3±11,6 [a]	1,28±0,14 [b]	46,70±11,6 [bc]
150 mM	83,3±5,8 [ab]	0,82±0,08 [b]	23,30±15,3 [cd]
200 mM	56,7±15,3 [bc]	0,38±0,05 [b]	0,00±0,00 [d]
250 mM	26,7±20,8 [c]	0,33±0,08 [b]	0,00±0,00 [d]
Mean	**79,1±20,8**	**1,25±1,03**	**39,05±32,54**
	p<0,001	*p<0,001*	*p<0,001*

*All data are Means±SE of three replicates, Tukey's Test were indicated different letters at *p< 0.001* probability level.





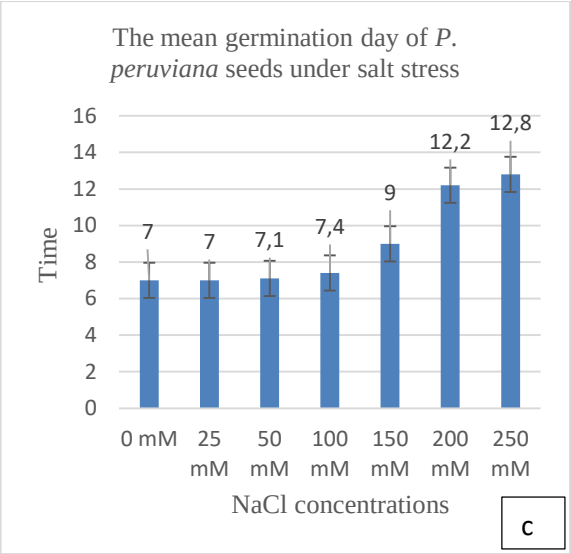
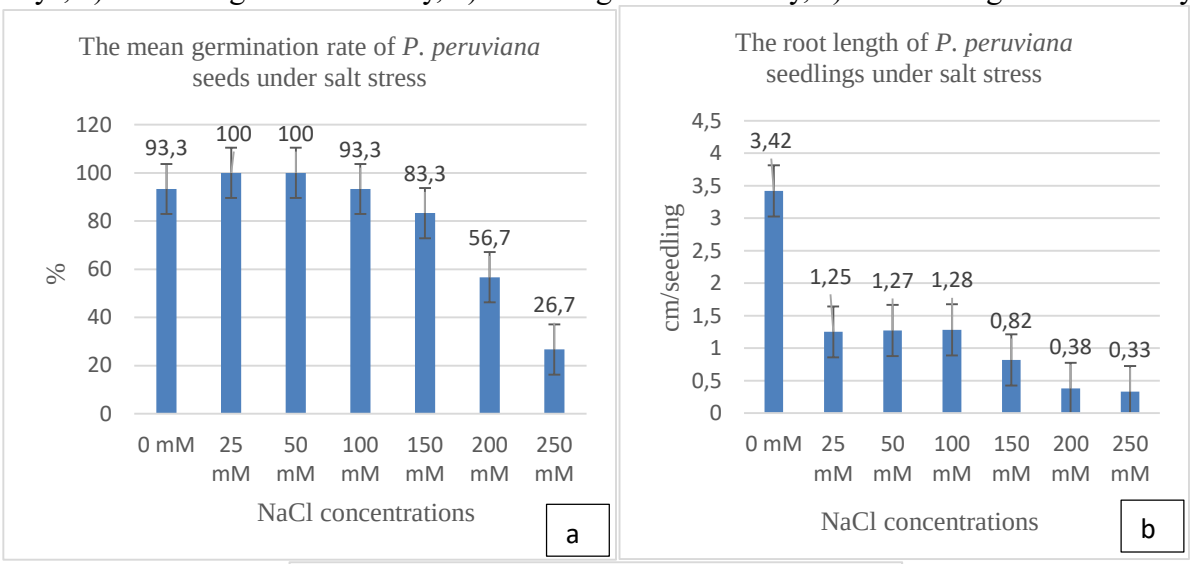


Figure 2. The seed germination and seedling features of *Physalis peruviana* under salt stress after 21 days; a) The first germination day, b) The last germination day, c) The mean germination day



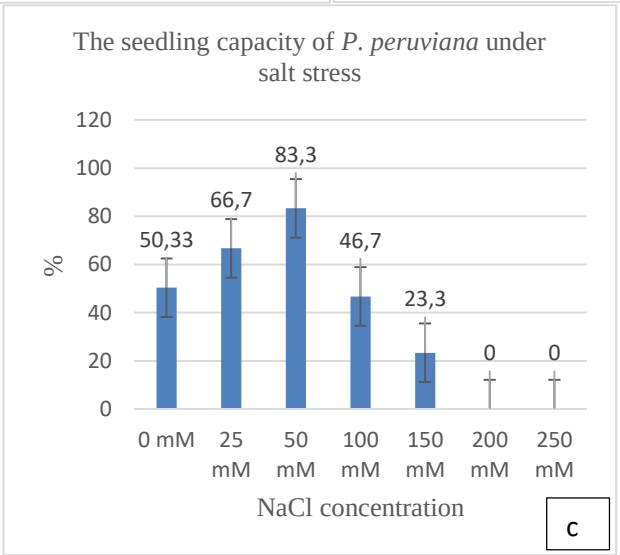


Figure 3. The seed germination and seedling features of *Physalis peruviana* under salt stress after 21 days; a) The mean germination rate, b) The root length per seedling, c) The seedling capacity

REFERENCES

Balasubramaniam, T., Shen, G., Esmaeili, N., & Zhang, H. (2023). Plants' response mechanisms to salinity stress. *Plants*, *12*(12), 2253.

Barirega, A. (2014). Potential for value chain improvement and commercialization of cape gooseberry (*Physalis peruviana* L.) for livelihood improvement in Uganda. *Ethnobotany Research and Applications*, *12*(1), 131-140.

Cavusoglu, A., & Kasım, R. (2022). Cutting length effects on survival and growth of rooted cuttings of *Physalis peruviana* L.. *International Journal of Botany Studies*, *7*(6), 28-33.

Celikli, F. B., Akkelle, P., & Onus, A. N. (2017). *In vitro* salinity evaluation studies in golden berry (*Physalis peruviana* L.). *Biotechnology Journal International*, *20*(1), 1-8.

Chakma, P., Hossain, M. M., & Rabbani, M. G. (2019). Effects of salinity stress on seed germination and seedling growth of tomato. *Journal of Bangladesh Agricultural University*, *17*(4), 490-499.

Cramer, G. R., Urano, K., Delrot, S., Pezzotti, M., & Shinozaki, K. (2011). Effects of abiotic stress on plants: a systems biology perspective. *BMC Plant Biology*, *11*, 163. doi:10.1186/1471-2229-11-163

de Souza, C. L. M., de Souza, M. O., de Oliveira, L. M., & Pelacani, C. R. (2014). Effect of priming on germinability and salt tolerance in seeds and seedlings of *Physalis peruviana* L. *African Journal of Biotechnology*, *13*(19), 1955-1960.

Monroy-Velandia, D., & Coy-Barrera, E. (2021). Effect of salt stress on growth and metabolite profiles of cape gooseberry (*Physalis peruviana* L.) along three growth stages. *Molecules*, *26*(9), 2756.

Parihar, P., Singh, S., Singh, R., Singh, V. P., & Prasad, S. M. (2015). Effect of salinity stress on plants and its tolerance strategies: a review. *Environmental Science and Pollution Research*, *22*, 4056-4075.

Ramegowda, V., Da Costa, M. V. J., Harihar, S., Karaba, N. N., & Sreeman, S. M. (2020). Abiotic and biotic stress interactions in plants: a cross-tolerance perspective. In *Priming-mediated stress and cross-stress tolerance in crop plants* (pp. 267-302). Academic Press. Cambridge, MA, USA; pp. 267-302.

Ramírez, F., Fischer, G., Davenport, T.L., Pinzón, J.C.A., & Ulrichs, C. (2013). Cape gooseberry (*Physalis peruviana* L.) phenology according to the BBCH phenological scale. *Scientia Horticulturae*, *162*, 39-42.

Suzuki, N., Rivero, R. M., Shulaev, V., Blumwald, E., & Mittler, R. (2014). Abiotic and biotic stress combinations. *New Phytologist*, *203*(1), 32-43.

Vargas-Ponce, O., Pérez-Álvarez, L.F., Zamora-Tavares, P., & Rodríguez, A. (2011). Assessing genetic diversity in Mexican husk tomato species. *Plant Molecular Biology Reporter*, *29*, 733-738.

Yildirim, E., Karlidag, H., & Dursun, A. (2011). Salt tolerance of *Physalis* during germination and seedling growth. *Pakistan Journal of Botany*, *43*(6), 2673-2676.

BESLENME VE PSİKOLOJİ ALANLARININ BİBLİYOMETRİK ANALİZİ VE LİTERATÜR İNCELEMESİ

BIBLIOMETRIC ANALYSIS AND LITERATURE REVIEW OF THE FIELDS OF NUTRITION AND PSYCHOLOGY

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Özet

Beslenme ve psikoloji alanları, bireylerin fiziksel ve zihinsel sağlığı üzerinde önemli etkileri araştıran disiplinlerdir. Beslenme, bireylerin genel sağlık durumu, bilişsel fonksiyonları ve psikolojik iyilik hali üzerinde kritik bir role sahiptir. Öte yandan, psikoloji disiplini, bireylerin zihinsel ve duygusal süreçlerini anlamak, davranışlarını ve ruh sağlığını incelemek için kullanılan bir bilim dalıdır. Bu iki disiplinin bir araya gelmesiyle, özellikle beslenmenin psikolojik süreçler üzerindeki etkileri, beslenme bozuklukları, davranışsal sağlık ve obezite gibi konular üzerine araştırmalar yapılmaktadır. Bu alanların kesişim noktaları, sağlıklı yaşam biçimlerinin geliştirilmesi ve bireylerin zihin-beden dengesini korumalarına yönelik çalışmaların temelini oluşturmaktadır.

Bibliyometrik analiz, bilimsel yayınları, yazarları veya kurumları inceleyen bir içerik analizidir. Bibliyometrik çalışmalarda yayın sayıları, atıf ilişkileri, yazarlar arasındaki işbirlikleri gibi çeşitli parametrelerin analizinde sosyal ağ analizlerinden yararlanılmaktadır. Sosyal ağ analizleri, bu parametrelerin oluşturduğu ağları inceleyen ve görselleştirerek anlama amacıyla kullanılan bir analizdir.

Çalışmada, Web of Science veri tabanında taranan beslenme ve psikoloji konulu yayınların bibliyometrik ve literatür analizleri gerçekleştirilmiştir. Araştırmanın amacı, bu iki disiplinin kesişim noktalarında yer alan akademik yayınların araştırma eğilimlerini, öncü araştırmacıları, sık kullanılan anahtar kelimeleri ve atıf ağlarını ortaya koymaktır. Çalışmada 1981 yılından günümüze kadar yayınlanan toplam 854 yayın incelenmiştir. Psikoloji ve beslenme alanlarındaki araştırmaların yıllara göre dağılımı, öne çıkan anahtar kelimeler ve yayınların türleri görselleştirilmiştir. Bununla birlikte sosyal ağ analizi ile yazarlar arasındaki işbirliği ağları, atıf dağılımları ve anahtar kelime analizleri yapılmıştır. 3728 yazarın yer aldığı bu yayınlarda, 4517 anahtar kelime kullanılmıştır. En yüksek atıf sayısına sahip yazarların 859'ar atıf ile D.R. Amundson, N.L. Kondracki ve N.S. Wellman olduğu görülmüştür. 'Beslenme' ve 'psikoloji' anahtar kelimeleri dışında en sık karşılaşılan anahtar kelimeler 96 yayında 'sağlık' ve 93 yayında 'obezite' olmuştur. Birbiriyle ilşkili bulunan 4412 anahtar kelimenin 50 kümeye ayrıldığı görülmüştür.

Anahtar Kelimeler: Bibliyometrik analiz, sosyal ağ analizi, psikoloji, beslenme

Abstract
Nutrition and psychology fields are disciplines that investigate the important effects on the physical and mental health of individuals. Nutrition has a critical role on the general health status, cognitive functions and psychological well-being of individuals. On the other hand, the discipline of psychology is used to understand the mental and emotional processes of individuals and to study their behaviour and mental health. Combined, these fields research topics such as the impact of nutrition on psychological processes, eating disorders, behavioral health, and obesity. Their intersection form the basis of studies aimed at developing healthy lifestyles and maintaining the mind-body balance of individuals.
Bibliometric analysis is a content analysis that examines scientific publications, authors or institutions. In bibliometric studies, social network analyses are used to analyse various parameters such as the number of publications, citation relationships and collaborations between authors. Social network analysis visualizes these networks to enhance understanding of the underlying relationships.
In this study, a bibliometric and literature analysis was conducted on publications related to nutrition and psychology, indexed in the Web of Science database. The aim of the study is to identify research trends, leading researchers, frequently used keywords and citation networks at the intersection of these two disciplines. A total of 854 publications since 1981 were analyzed. The distribution of research in the fields of psychology and nutrition by years, prominent keywords and types of publications were visualised.
Collaboration networks between authors, citation distribution and keyword analyses were performed with social network analysis. The dataset included 3,728 authors and 4,517 keywords. The authors with the highest number of citations were D.R. Amundson, N.L. Kondracki and N.S. Wellman with 859 citations each. Apart from ‘nutrition’ and ‘psychology’, the most frequently encountered keywords were ‘health’ in 96 publications and ‘obesity’ in 93 publications. It was observed that 4,412 interrelated keywords were grouped into 50 distinct clusters.

Keywords: Bibliometric analysis, social network analysis, psychology, nutrition

MICROWAVES ASSISTED DECONSTRUCTION OF HDPE WASTE INTO STRUCTURED CARBON AND HYDROGEN FUEL USING AL_2O_3-$NIFE_2O_4$ COMPOSITE CATALYSTS

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Plastic waste management is becoming an issue of global concern due to the excessive consumption of plastics with one-time use. The decomposition of plastic into valuable products by catalytic pyrolysis has gained significant attention as a promising technique of valorizing plastic waste. This study demonstrates the microwave-assisted decomposition of plastic waste materials for carbon nanotubes (CNTs) and high H_2 production using Al_2O_3-$NiFe_2O_4$ catalyst via in-situ exsolution. The Al_2O_3-$NiFe_2O_4$ catalyst showed better formation of CNTs and gas due to its low dielectric loss factor. The high surface area and magnetic-support interaction also promoted the catalytic activity of the catalyst. The oil byproduct mainly contained C_8-C_{16} compounds, showing better selectivity for small molecules in the tested process. Conclusively, Al_2O_3-$NiFe_2O_4$ produced CNTs with good structural properties and fewer impurities. The Al_2O_3-$NiFe_2O_4$ catalyst showed 90% hydrogen composition in evolved gases. In all cases, almost 90% of the hydrogen evolved from the feedstock within the first 2 min of the processing time.

Keywords: Aluminum oxide, Microwave pyrolysis, Wasted plastic, CNTs, Hydrogen fuel

HASTENEDE YATAN ÇOCUKLARIN KONFOR GEREKSİNİMLERİ VE HEMŞİRELİK BAKIMI

COMFORT NEEDS AND NURSING CARE OF HOSPITALIZED CHILDREN

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Özet
Hastaneye yatma her yaştan çocuk için travmatik ve stresli bir deneyimdir. Hastaneye yatış sonrasında farklı olduğunu hisseden çocuklar yetersizlik duygusu yaşamakta kendilerini bir engel gibi hissedebilmekte ve hastalık kaynaklı ağrı, korku gibi konforu bozan çok yönlü sorunlarla karşılaşmaktadır. Çocukların yaş gruplarına göre konfor gereksinimleri de değişmektedir. Yenidoğan döneminde; ağrı, uyku, beslenme, sıvı elektrolit dengesizliği gibi bebeğin fizyolojik durumunu etkileyen fiziksel konfor gereksinimleri ön planda iken çocukluk döneminde daha çok yorgunluk, bulantı- kusma, aşırı hareketliliğe bağlı düşme riski ve enfeksiyon riski gibi çevresel ve sosyo-kültürel konfor gereksinimleri ortaya çıkmaktadır. Ergenlik dönemine ise daha çok beden imajında bozulma, anksiyete, sosyal izolasyon gibi sosyo-kültürel ve psikospritüel konfor gereksinimleri görülmektedir. Bu süreçte hastanede yatan çocuk ve ebeveynlerinin sorunlarının tanınması, profesyonel destek sağlanması ve onlara etkili baş etme davranışlarının öğretilmesi önemlidir. Bu bakımdan çocuklara ve ebeveynlerine kaliteli ve kanıta dayalı sağlık hizmetlerinin sağlanması için hemşirelik kuramların kullanılması gerekmektedir. Böylece kuram temelli yapılandırılmış bir yaklaşım ile hastanede yatan çocuk ve ebeveynlerinin konfor gereksinimlerine çözüm bulunabilecektir. Bu nedenle, hemşireler bakımın hasta için önemli olan yönlerine yani konforlu olma hissine odaklanmaları gerekmektedir. Hemşireler bakım verdikleri çocuk ve ailesinin konfor düzeyini, konforu bozan durumları ve ihtiyaçlarını kapsamlı bir şekilde değerlendirmeli, çocuk ve ailesinin konforunu arttırmaya ve onlara yardımcı olmaya yönelik çözümler aramalıdır.

Anahtar Kelimeler: konfor, çocuk, hemşire, bakım

Abstract
Hospitalization is a traumatic and stressful experience for children of all ages. Children who feel different after hospitalization may experience a sense of inadequacy, feel like an obstacle, and encounter multifaceted problems that disrupt comfort such as pain and fear caused by illness. Children's comfort needs also vary according to their age group. During the newborn period, physical comfort needs affecting the physiological state of the baby such as pain, sleep, nutrition, fluid electrolyte imbalance are at the forefront, while during childhood, environmental and socio-cultural comfort needs such as fatigue, nausea and vomiting, risk of falling due to excessive movement and risk of infection emerge. In adolescence, socio-cultural and psychospiritual comfort needs such as body image deterioration, anxiety and social isolation are seen more.

During this process, it is important to recognize the problems of hospitalized children, and their parents provide professional support and teach them effective coping behaviors. In this respect, nursing theories should be used to provide quality and evidence-based health services to children and their parents. Thus, a structured approach based on theory can be used to find solutions to the comfort needs of hospitalized children and their parents. Therefore, nurses need to focus on the aspects of care that are important to the patient, namely the feeling of being comfortable. Nurses should comprehensively evaluate the comfort level of the child and family they care for, the situations that disrupt comfort, and their needs, and seek solutions to increase the comfort of the child and family and to help them.

Keywords: comfort, child, nurse, care

GİRİŞ

Hastaneye yatma her yaştan çocuk için travmatik ve stresli bir deneyimdir. Kriz olarak tanımlanan duruma maruz kalan çocuk, hastalığın neden olduğu fiziksel ve psikososyal sorunların yanı sıra çeşitli çevresel sorunlar da yaşamaktadır (Şahin ve ark., 2020; Sepahvand ve ark., 2021). Bir çocuk için hastaneye yatış olağandışı; onları aile hayatından, sosyal çevresinden, günlük rutinlerinden ve alışkanlıklarından uzaklaştırır. Hastaneye yatış sonrasında farklı olduğunu hisseden çocuklar yetersizlik duygusu yaşamakta ve kendilerini bir engel gibi hissetmektedirler (Pekyiğit ve ark, 2018).

Hastalıklardan bağımsız olarak hastanede yatan çocuklarda aileden, okul ve arkadaşlarından uzakta olmak çocuk için büyük stres kaynağı olarak karşımızı çıkmaktadır. Ebeveynlerden ve aileden ayrılma; yabancı ortam, araştırmalar, tedaviler ve otonomi kaybı, çocukların korkularını ve endişelerini daha da artırmaktadır (Coyne, 2006).

Çocuk hemşiresi, sağlık ekibinin diğer üyeleriyle iş birliği içinde çocuğun tedavisini sağlayan önemli bir sağlık çalışanıdır. Aynı zamanda çocuğu ve ailesini bakım ve tedavinin merkezine yerleştirir. Hastanede yatan çocuklara ve ailelerine bakım veren hemşireler, eğitimci, savunucu, lider, rehabilite edici, danışman ve karar verici olarak çağdaş hemşirelik rollerini yerine getirmelidir (Törüner ve Büyükgönenç, 2017). Bu süreçte hastanede yatan çocuk ve ebeveynlerinin sorunlarının tanınması, profesyonel destek sağlanması ve onlara etkili baş etme davranışlarının öğretilmesi önemlidir (Kaynak ve ark., 2022). Stresli bir dönem olan hastanede yatma sürecinde çocuğun ve ailenin rahatlığının sağlanması hastalığın fizyolojik komplikasyonlarının ortaya çıkmasını önleyebilir, hastaların fiziksel ve ruhsal durumlarını olumlu yönde etkileyerek tedavi maliyetlerini de büyük ölçüde azaltabilir. Hemşireler bakım verdikleri çocuk ve ailesinin konfor düzeyini, konforu bozan durumları ve ihtiyaçlarını kapsamlı bir şekilde değerlendirmeli, çocuk ve ailesinin konforunu arttırmaya ve onlara yardımcı olmaya yönelik çözümler aramalıdır (Sepahvand ve ark., 2021).

Kolcaba'nın konfor terorisine göre konfor; fiziksel, psikospiritüel, çevresel ve sosyo-kültürel olmak üzere dört alandaki ferahlama, rahatlama ve üstünlük ihtiyaçlarının her biri karşılandıktan sonra hastanın güçlenme şeklinde hissettiği bir deneyimdir (Kolcaba 2003; Yücel, 2011; Turki ve ark., 2019). Konfor, hemşirelik mesleği ile bütünleşmiş bir kavramdır. Hemşirelikte rahatlık, rahatlama, rahatsızlık ve konfor ölçütleri gibi pek çok konfor terimi yaygın olarak kullanılmaktadır (Dimarco ve Kolcaba, 2005).

HASTANEDE YATAN ÇOCUKLARDA KONFOR GEREKSİNİMLERİ VE HEMŞİRELİK BAKIMI

Hastanede yatan çocukların yaş gruplarına göre farklı konfor gereksinimlerinin öne çıktığı görülmektedir. Yenidoğan döneminde; ağrı, uyku, beslenme, sıvı elektrolit dengesizliği gibi bebeğin fizyolojik durumunu etkileyen fiziksel konfor gereksinimleri ön planda iken çocukluk döneminde daha çok yorgunluk, bulantı- kusma, aşırı hareketliliğe bağlı düşme riski ve enfeksiyon riski gibi çevresel ve sosyo-kültürel konfor gereksinimleri ortaya çıkmaktadır. Ergenlik dönemine ise daha çok beden imajında bozulma, anksiyete, sosyal izolasyon gibi sosyo-kültürel ve psikospritüel konfor gereksinimleri görülmektedir.

Yenidoğan Dönemi Konfor Gereksinimleri

Yenidoğan dönemi, doğumdan sonraki yaşamın ilk 4 haftasını ve bebeklik döneminin ilk 28 gününü kapsamaktadır (Zenciroğlu ve Özbaş, 2014). Yenidoğanda konfor gereksinimleri incelendiğinde; psikosipritüel ve sosyo-kültürel konfor gereksinimlerinden ziyade daha çok ağrı, uyku, beslenme, sıvı elektrolit dengesizliği ve stres gibi fiziksel konforu etkileyen fizyolojik faktörleri içermektedir.

Ağrı: Yenidoğan döneminde yoğun bakım ünitesine alınan bebeklerde ağrı fiziksel konforu etkileyen en önemli faktördür. Bebeğin yoğun bakım ünitesine alınmasıyla beraber birçok ağrılı müdahale yapılmaktadır. Pozisyon verme, mekanik ventilasyon, aspirasyon, orogastrik/nazogastrik tüp kullanımı, tanı ve tedavi amaçlı invaziv girişimler bebeklerin ağrı yaşamasına neden olmaktadır (Karakaya ve Topan, 2022). Ağrılı girişimler fizyolojik parametreleri, uyku ve uyanıklığı, bebeğin büyüme ve gelişmesini olumsuz yönde etkileyebilmekte ve yenidoğanın konfor düzeyini azaltabilmektedir (Alemdar ve Tüfekçi, 2015). Ağrı, bebeklerin, büyüme için gerekli olan enerjilerinin tükenmesine yol açmakta ve bebeğin iyileşme sürecinin yanında büyümeyi de olumsuz etkileyebilmektedir (Cheong ve ark., 2020). Yenidoğanda ağrının azaltılmasında birçok hemşirelik girişimi uygulanmaktadır. Bu girişimler arasında farmakolojik tedavilerin yanında; müzik dinletme, anne sütü, sarmalama, masaj gibi uygulamaların olumlu sonuçlarını ortaya koymaktadır (Karakaya ve Topan, 2022; Bayrak ve Alev, 2024; Üstündağ, 2023).

Uyku: Hastanede yatan yenidoğanlar gürültü, ışık, anneden uzak olma, tıbbi girişimler, ağrı gibi pek çok uyarana maruz kalmakta ve bu durum uyku örüntüsünde bozulmaya neden olmaktadır. Uyku örüntüsünde bozulma ve uyku eksikliği yenidoğan için önemli bir stres faktörüdür ve bebeğin genel gelişimine zarar verebilir (Bonan ve ark., 2015). Bebeklerde beslenme ve uyku problemlerinin görülmesi fiziksel bakım gereksinimlerinin de artmasına neden olmaktadır (Şermet ve Özyacıoğlu, 2022). Yenidoğanın uyku-uyanıklık döngüsünün gelişmesinde ritmik bakım uygulanmalıdır. Uykuyu etkileyen ışık ve ses seviyeleri gibi çevresel uyaranlar kontrol altına alınmalı, gece uykusunu desteklemek için devirli aydınlatma uygulanmalıdır. Yenidoğana uygun pozisyonun verilmesi, besleyici olmayan emme, kanguru bakımı gibi uykuyu destekleyen bakım uygulamaları yenidoğanın bakımına dahil edilmelidir. Yenidoğanın uyku-uyanıklık durumları düzenli olarak değerlendirilmeli ve kaydedilmelidir (Arpacı ve Altay, 2017).

Beslenme: Beslenme, yenidoğanın normal büyüme ve gelişmeye ulaşabilmesi, yaşamını sürdürebilmesi ve sağlığının korunması için temel bir gereksinimdir (Merter ve Altay, 2020). Hastanede yatan yenidoğanın beslenmesinde öncelikle anne sütü tercih edilmelidir. Anne sütünün olmadığı durumlarda ikinci seçenek olarak formüle mamalar kullanılmaktadır. Emme refleksi gelişmemiş yenidoğanda beslenme ise nazogastrik veya orogastrik sonda ile yapılmaktadır (Çay ve Güleç, 2015).

Sıvı Elektrolit Dengesizliği: Hem intrauterin hem de doğum sonrası dönemde sıvı ve elektrolit dengesinin sağlanması normal hücre ve organ fonksiyonlarının devamlılığının sürdürülmesi için oldukça önemlidir (Demirel, 2016). Sıvı ve elektrolit dengesindeki fizyolojik değişikliklerin bilinmesi ve uygun desteğin sağlanması yenidoğan yoğun bakım ünitelerinde hasta bakımı açısından önemli konularından birisidir (Yıldızdaş ve ark., 2018). Yenidoğanda vücudun büyük bir

kısmı sudan oluşmaktadır. Anne karnında sıvı ortamda olan fetus doğumun ardından gaz içerikli bir ortama uyum sağlamaya çalışmaktadır. Doğum sonrası bu dönemde bebeklerde hızlı bir fizyolojik adaptasyon görülür. Bu dönemde meydana gelen sıvı elektorolit değişikliklerin bilinmesi yenidoğan bebekte planlanan tedavinin en doğru şekilde yapılabilmesi için önemlidir (Özkısacık ve Erdem, 2019). Bu dönemde verilen bakımın amacı fetüsün başarılı bir şekilde yenidoğan dönemine geçişini sağlayarak büyüme döneminde ve hastalıkların oluşması sürecinde normal sıvı elektrolit dengesinin devamlılığının sağlanmasıdır (Yıldızdaş ve ark., 2018). Meydana gelebilecek sıvı elektrolit dengesizlikleri hastanede kalış süresinin uzamasına dolayısıyla çocuk ve ailesinin konfor düzeyinin azalmasına neden olmaktadır (Agarwal ve ark., 2018; Dimarco ve Kolcaba, 2005).

Stres: Hastanede ortamında yer alan yüksek düzeyde ışık ve gürültü gibi olumsuz çevresel faktörlere maruz kalma, düzensiz uyku, anneden ayrılma gibi durumlar strese neden olmaktadır. Yenidoğan döneminde oluşan bu stres durumu henüz gelişimini tamamlamamış olan beyin fonksiyonlarını ve nöro gelişimi olumsuz yönde etkilemektedir (Güven ve Dalgıç, 2017). Yenidoğanın yoğun bakım ünitesinde tedavi alırken maruz kaldığı ağrılı müdahaleler de strese girmelerine neden olmaktadır. Yenidoğanda stres belirtileri sık ağlama, yüzünü buruşturma, cilt tonunda değişiklik, elini yüzüne götürme, iç çekme ve fizyolojik parametrelerde değişiklik gibi belirtilerle fark edilmektedir (Shaw ve ark., 2009). Yenidoğanın stres düzeyinin azaltılmasına yönelik bakımın verilmesinde, stresin değerlendirilmesi, önlenmesi ve yönetilmesi, uykunun korunması ve emzik verme, pozisyon verme gibi gelişimi destekleyen girişimler, anne sütü, emme, masaj, bebeği sarmalama, kanguru bakımı gibi aile merkezli bakım ve çevrenin düzenlenmesi önerilmektedir (Aydın ve Yıldız, 2012; Ceylan ve Bolışık, 2017).

Okul Çağı Dönemi Konfor Gereksinimleri

Okul çağındaki çocukların hastanede yatması, tedavi sırasında yardıma ihtiyaç duymaları nedeniyle birçok aktiviteyi ve hayatı kaçırdıkları düşüncesi ile yoğun kaygılar yaşamalarına neden olmaktadır (Üstün ve ark., 2021). Bu dönemde hastanede yatan çocuklar yorgunluk, bulantı-kusma, uyku örüntüsünde bozulma, anksiyete, enfeksiyon riski, düşme riski ve etkisiz baş etme gibi konforu olumsuz etkileyen birçok sorunla karşı karşıya kalmaktadır.

Yorgunluk: Hastanede yatan çocuklarda görülen yorgunluğun, fiziksel, çevresel ve psikososyal çok farklı nedenleri vardır (Steur ve ark., 2020). Çocuğun hastaneye yatışıyla birlikte farklı ortam ve kişiler, tıbbi girişimler, gürültü, kalabalık, hastalık kaynaklı ağrı, korku, bıkkınlık gibi hislerin birer sonucu olarak karşımıza çıkan yorgunluk, çocuğun ve ailesinin konfor gereksinimini etkileyen faktörlerden birisidir (Ekici ve Mutlu, 2018). Hemşireler yorgunluğa ilişkin bakımın planlanmasında, çocukta yorgunluğa neden olan aktiviteleri belirlenmeli ve en aza indirilmelidir. Çocuğun yapması gereken aktiviteler çocuğun enerjisinin en yüksek olduğu zamana göre planlanmalıdır. Çocuğun ihtiyacı olan malzemeler yakınında bulundurularak, yorucu aktivitelerden önce dinlenmesi sağlanmalı ve gerekli kalori ihtiyacını karşılayacak besinlerce zengin diyetler hazırlanarak enerji koruma planları yapılmalıdır (Kudubeş, 2014).

Bulantı-Kusma: Bulantı ve kusma çocuğun konforunu bozan ve çok farklı tanılarla ve sistemlerle bağdaştırılabilen, yönetimi zor bir durumdur (Dimarco ve Kolcaba, 2005; Özdemir ve Tekin, 2022). Bulantı konforu bozmanın yanında çocuğun tedaviye uyumunu, beslenme örüntüsünde bozulmaya, sıvı elektrolit dengesizliğine, uyku örüntüsünde bozulmaya ve anksiyeteye neden olmaktadır. Hastanede yatan çocuklarda bulantıya neden olan etkenlerin başında cerrahi operasyonlarda kullanılan sedatif ve anestezik ajanların kullanımı, kemoterapi ilaçları, enfeksiyon ve farklı ilaç kullanımları görülmektedir (Gürcan ve Turan, 2019). Çocuklarda bulantı-kusmayı önlemek için; tüketilen besinler oda ısısında olmalı, su azar azar içilmeli, öğünlerin arası sık olmalı, öğünlerde az yemeye dikkat edilmelidir. Pirinç, kuru tahıl ve kraker gibi sindirimi kolay yiyecekler tercih edilmelidir. Çocuğun beslenmeye ilişkin tercihlerinin belirlenmesi ve mümkün olan imkanların sağlanması gerekmektedir (Özmen ve Çetinkaya, 2018).

Uyku Örüntüsünde Bozulma: Hastanede yatan çocuğun uyku örüntüsünü psikolojik, fizyolojik ve çevresel faktörler etkilemektedir. En önemli fizyolojik faktör ağrıdır. Psikolojik faktörler ise ayrılık kaygısı ve korkudur (Clayton ve ark., 2016). Monitör ve alarm sesleri, gürültü, aydınlatma ve tıbbi girişimler gibi çevresel faktörler de uyku kalitesini olumsuz yönde etkileyen etmenlerdir (Hybschman ve ark., 2021). Hastanede yatan çocuklarda görülen uyku sorunlarına dair hemşirelik girişimlerinde öncelikli olarak çocuğun uyku örüntüsünü bozan faktörler belirlenmelidir. Hasta odası çocuğun uykuya dalmasına elverişli hale getirilmelidir (Şermet ve Özyacıoğlu, 2022). Çocuğun uykuya dalmasını kolaylaştıracak basit, ulaşılabilir ve uygulanabilir kanıta dayalı uygulamalar kullanılmalıdır (İşsever ve ark., 2021). Çocuğun uykuya dalmasına yardımcı olan masal okuma, müzik dinletme ve ışıklı müzikli mobil gibi çocuğu sakinleştirerek uykuya dalmasına yardımcı materyallerin kullanımına dair çalışmalar literatürde mevcuttur (Galland, 2010; Berger ve ark., 2021; İşsever ve ark., 2021; Topsakal ve Ekici, 2022).

Anksiyete: Okul çağı dönemine bakıldığında çocuğun hastaneye yatması, çocuk ve ailenin yaşam tarzında önemli değişikliklere neden olur. Çocuk için hastalık ve buna bağlı olarak hastaneye yatma onu korkutan, rahatsız eden ve hoş olmayan birçok deneyimi içerir (Li ve ark., 2016). Hemşireler hastanede yatan çocukların kaygısını azaltmak için çocuğun kendisini rahat hissetmesini sağladıktan sonra kanıta dayalı kolay, ekonomik, erişilebilir girişimler uygulayabilmektedir (Friedrichsdorf ve Goubert, 2020). Erdoğan ve Özdemir'in (2021) damar yolu açma işleminde çocuklarda ağrı ve kaygıyı azaltmaya yönelik dikkat dağıtma kartları, sanal gerçeklik ve Buzzy® kullanılarak çocuklardaki kaygı düzeyinin incelendiği çalışmada materyallerin ayrı ayrı kullanımda dahi kaygıyı ve ağrıyı azalttığı görülmüştür. (Erdoğan ve Özdemir, 2021).

Enfeksiyon ve enfeksiyon riski: Çocukların immün sistemlerinin gelişimindeki yetersizlik, hastanede tedavi görüyor olmaları, kullanılan ilaçlar ve uygunsuz çevre koşulları nedeniyle enfeksiyon açısından yüksek riskli grupta yer almaktadır (Aydın ve ark., 2013). Hastanede yatan çocuklarda nosokomiyal enfeksiyon gelişmesi çocuğun immün sistemini daha da zayıflatmaktadır. Bu nedenle enfeksiyon gelişmeden oluşumu önlenmeli, hasta enfeksiyona neden olabilecek tüm koşul ve durumlardan izole edilmelidir (Hacımustafaoğlu ve ark., 2009). Çocuğun tedavi ve iyileşme sürecinde gerekli olmayan tüm materyaller çocuğun çevresinden uzak tutulmalı ve enfeksiyon oluşumunu önleyen standartlar kullanılmalıdır (Aydın ve ark., 2013).

Düşme riski: Çocukların fiziksel, nöromotor, duyusal, bilişsel ve psikososyal açıdan gelişim düzeylerinin gelişmeye devam etmesinden dolayı düşme riski yüksek gruplar arasında yer almaktadır. Kaba ve ince motor sistemlerinin tam gelişmemesi, denge kurmada yaşanan zorluk, algılama yeteneklerinin tam gelişmemiş olması, birden fazla uyaranı aynı anda algılamada zorluk yaşanması, fiziksel hareketin sürekli olması ve merak duygusu çocukların hasta güvenliğini tehdit eden çeşitli kazalarla karşılaşmalarına neden olmaktadır (Pazarcıkcı ve Efe, 2018). Düşme riskini değerlendiren ölçme araçlarının kullanılması, düzenli aralıklarla risk analizinin yapılması, düşme riski yüksek olan hastalarda standart sembollerin kullanılması, kol bandı uygulaması, hastanede yatan çocuklara özel yatakların kullanımı, transfer sırasında önlemlerin alınması, sağlık bakım ekibi üyelerine düşme riskinin önlenmesine yönelik hizmet içi eğitimlerin verilmesi gibi hemşirelik girişimleri uygulaması düşme oranlarını azaltmaktadır (Chroma, 2016).

Etkisiz başetme: Hastaneye yatış, ebeveynlerden ayrılma, tedavi süreçleri ya da hastalık sürecinin yanlış anlaşılması nedeniyle okul çağı çocuklarında baş etmede zorluklar yaşanabilir. Bu durumda öfke, saldırganlık gibi davranışlar gözlemlenebilir ve sosyokültürel ihtiyaçlar bozulabilir. Hastanede yatan bir çocuğun içinde bulunduğu durumu sürdürebilmesi için uygun baş etme stratejilerinin bulunması gerekir. Çocukla iletişime açık, sakin ve güvenilir bir ortam hazırlanmalıdır. Çocuğa kendi güçlü yönlerini ve yeteneklerini tanıma ve ortak ilgi alanlarını ve hedefleri paylaşan insanlarla ilişkiler kurma fırsatı verilmelidir (Yayan ve Zengin, 2018).

Ergenlik Dönemi Konfor Gereksinimleri

Ergenlik, çocukluk döneminin sona ermesi fiziksel, zihinsel, cinsel, duygusal, ahlaki ve sosyal yönden olgunlaşmaya başlanılan ve çocukluk ile yetişkinlik arasında yer alan bir dönemdir (Aybak ve İpek, 2021). Bu dönemde çok hızlı değişimler yaşanmaktadır. Ergenlik döneminde hastanede yatan çocukların konfor gereksinimleri incelendiğinde ağrı, uyku örüntüsünde bozulma gibi fiziksel konfor gereksinimlerinden ziyade anksiyete, beden imajında bozulma, sosyal etkileşimde bozulma ve sosyal izolasyon gibi psikospritüel ve sosyo-kültürel konfor gereksinimleri dikkat çekmektedir.

Anksiyete: Ergenlik döneminde benlik saygısı, beden imgesi, bağımsızlık, akran grubuna ait olma, gizlilik ve cinsellik önemli olan kavramlardır. Kontrol kaybı ve yabancı bir ortamda bulunma ergenin kaygı düzeyinin artmasına neden olabilmektedir. Ayrıca hastanede yatma ergenin ebeveynlere olan bağımlılığı arttırabileceği için çaresizlik ve öfke yaşamalarına da yol açabilmektedir (Söyünmez ve Koç, 2020). Ergenlik döneminde, bağımsızlık gereksinimi, kimlik arayışı içinde olma, vücutta meydana gelen fiziksel ve psikolojik değişiklikler, hastanede yatma durumu ve neden olduğu kısıtlılıklar kontrol kaybına neden olduğu için hastalıkla baş etmeyi de güçleştirmektedir. Hemşireler terapötik iletişim tekniklerini kullanarak, ergenin mahremiyetine özen gösteren ve bağımsızlık isteğine saygı duyan bir hemşirelik yaklaşımı ile ergen ile arasında güven verici bir ilişki kurabilir. Bu güven verici ilişki ergenin hastanede yatma süreci ile baş etmesini kolaylaştıracak ve anksiyetesini azaltacaktır. Ayrıca hemşireler hastanede yatan ergenlerin anksiyete düzeyinin belirleyip, anksiyete ile baş etme eğitimi ve danışmanlık vererek de anksiyete düzeyini azaltabilirler (Dolgun ve ark., 2011; Şahin ve Küçük, 2024).

Beden imajında bozulma: Fonksiyon kaybı ve fiziksel görünümündeki değişiklikler adölesan için son derece travmatize edicidir. Bu değişiklikler beden imajında bozulmaya ve arkadaş grubu tarafından reddedilme korkusuna, anksiyeteye ve kendine olan güvenini kaybetmesine neden olabilmektedir (Törüner ve Büyükgönenç, 2018). Hemşireler bakımı planlarken ergenin beden algısına yönelik beklentilerini karşılanmalı ve dış görünümünün kişisel değeri ile ilişkili olmadığı ergene açıkça belirtilmelidir (Güçlü ve ark., 2022). Beden imajının bozulduğu durumlarda, olumsuz etkilenmenin azaltılabilmesi için hastanın işlevsel olan fonksiyonlarının desteklenmesi gerekmektedir (Şenyürek, 2018). Beden imgesini güçlendirmek için benzer sorunları yaşayan akran gruplarından destek alınmalıdır. Beden görünüşü ile ilgili beğenisini arttırmak için yapılacaklar konusunda ergen desteklenmeli, gerekirse gelecekteki uyumuna ilişkin psikiyatri, psikolog ve/veya ortopedi, fizik tedavi vb. ihtiyaç duyulabilecek uzmanlarından destek alınmalıdır (Gültekin ve Baran, 2005).

Sosyal etkileşimde bozulma: Hastanede yatan ergenlerde var olan sekonder sorunlar, fiziksel hareketteki kısıtlılıklar, çevresel, ailesel, kişisel faktörler, iletişim ve davranış problemleri sosyal ilişkilerinde ve sosyokültürel gereksinimlerde bozulmalara sebep olabilir (Üstün ve ark., 2021). Ergenler hastanede yattığı süre boyunca otonomi kaybı, hasta damgası, mahremiyet gibi konulardan dolayı arkadaşları ve akrabaları ile iletişim kurmaktan kaçınabilmekte, kendilerini zayıf hissetmekte, bu durumun bilinmesi ve görünmesini istememekten dolayı kendisini toplumdan soyutlayabilmektedir. Bu durum sosyal izolasyon ve yalnızlık ile sonuçlanabilmektedir. Hastanede yatan ergenin ve ailesinin duygusal ve sosyal açıdan desteklenmesi, sosyal ve toplumsal aktivitelere katılımının sağlanması önemlidir. Hastanede yatan ergenler arasında küçük gruplar oluşturularak özel aktiviteler planlanmalıdır. Aile bireyleri ile ergenin bağı ve ilişkisinin zayıf ve güçlü yönleri belirlenerek, iletişim beceri ve tekniklerinin kullanımı konusunda aile desteklenmelidir (Üstün ve ark., 2021; Selbes ve ark., 2021).

SONUÇ

Sonuç olarak, hastanede yatan çocukların yaş gruplarına göre farklı konfor gereksinimlerinin öne çıktığı görülmektedir. Hastanede yatan çocuğun konfor gereksinimlerinin belirlenmesi etkin bir hemşirelik bakımının planlanması açısından önemlidir. Bu yüzden hemşireler bakımı planlarken

hastanede yatan çocuk ve ebeveynlerinin sorunlarını tanılamalı, profesyonel destek sağlanmalı ve onlara etkili baş etme davranışlarını öğretmelidir. Bu bakımdan kaliteli ve kanıta dayalı sağlık hizmetlerinin sağlanması için çocuğu ve ailesini fiziksel, çevresel, psikospiritüel ve sosyo-kültürel bir bütün olarak ele alan hemşirelik kuramların kullanılması gerekmektedir. Böylece kuram temelli yapılandırılmış bir yaklaşım ile hastanede yatan çocuk ve ebeveynlerinin konfor gereksinimlerine çözüm bulunabilecektir. Hemşireler bakım verdikleri çocuk ve ailesinin konfor düzeyini, konforu bozan durumları ve ihtiyaçlarını kapsamlı bir şekilde değerlendirmeli, çocuk ve ailesinin konforunu arttırmaya ve onlara yardımcı olmaya yönelik çözümler aramalıdır.

KAYNAKLAR

Agarwal, N., Rao, Y., Saxena, R., Acharya, R. (2018). Profile Of Serum Electrolytes In Critically Ill Children:A Prospective Study. Indian J Child Health. 5(2), 128–132.

Alemdar, D.K., & Tüfekçi, F.G. (2015). Prematüre Bebek Konfor Ölçeği'nin Türkçe Geçerlilik ve Güvenilirliği. Journal of Education & Research in Nursing/Hemşirelikte Eğitim ve Araştırma Dergisi, 12(2).

Arpacı, T., & Altay, N. (2017). Yenidoğan Yoğun Bakım Ünitelerinde Bireyselleştirilmiş Gelişimsel Bakım: Güncel Yaklaşımlar. Turkiye Klinikleri Journal of Nursing Sciences, 9(3).

Aybak, T., & İpek, M. (2021). Ergenlik dönemindeki çocuğa sahip ebeveynlerin yaşadıkları sorunlar. Aydın Sağlık Dergisi, 7(2), 141-165.

Aydın, D., & Yıldız, S. (2012). Effect of classical music on stress among preterm infants in a neonatal intensive care unit. HealthMED, 6(9), 3176-82.

Aydın, N., Kürklü, A.,Doğan, P. (2013). Çocuk ve Yenidoğan Yoğun Bakım Ünitelerinde Oyuncak Bulundurulması Enfeksiyon Açısından Risk Midir?. Yoğun Bakım Hemşireliği Dergisi, 17(2), 77-81.

Bayrak, B., & Alev, B. (2024). Yenidoğanlarda Müzik Müdahalelerinin Fizyolojik Parametreler Üzerine Etkisi: Sistematik Derleme. Journal of Traditional Medical Complementary Therapies, 7(1).

Berger, J., Zaidi, M., Halferty, I., Kudchadkar, S. R. (2021). Sleep in the hospitalized child: a contemporary review. Chest, 160(3), 1064-1074.

Bonan, K. C. S. D. C., Pimentel Filho, J. D. C., Tristão, R. M., Jesus, J. A. L. D., & Campos, D. (2015). Sleep Deprivation, Pain and Prematurity: A Review Study. Arquivos De Neuro-psiquiatria, 73(2), 147-154.

Çay, S., & Güleç, S.G. (2015). Yenidoğan beslenmesinde kullanılan enteral yöntemler ve hemşirelik bakımı. JAREN/Hemşirelik Akademik Araştırma Dergisi, 1(1), 39-4.

Ceylan, S. S., & Bolışık, B. (2017). Yenidoğan Stres Ölçeği'nin Psikometrik Özelliklerinin Incelenmesi. Acıbadem Üniversitesi Sağlık Bilimleri Dergisi, (2), 97-103.

Cheong, J. L., Burnett, A. C., Treyvaud, K., & Spittle, A. J. (2020). Early environment and long-term outcomes of preterm infants. Journal of Neural Transmission, 127(1), 1-8.

Chroma, J. (2016). Risk of falling in Pediatrics nursing. Central Europen Journal of Nursing and Midwifery, 7(4): 542-548.

Clayton, E., Stickland, A., Sankey, R., Hill, C. M. (2016). A Qualitative Study Of Sleep Quality In Children And Their Resident Parents When In Hospital. Archives Of Disease In Childhood, 101(6), 546-551.

Coyne, I. (2006). Children's experiences of hospitalization. Journal of child health care, 10(4), 326-336.

Demirel, N. (2016). Yenidoğanda Sıvı ve Elektrolit Dengesi. Klinik Tıp Pediatri Dergisi, 8(2), 34-37.

Dimarco, K.K., Kolcaba, K. (2005). Comfort theory and its application to pediatric nursing. *Pediatric nursing,* 31(3), 187-194.
Dolgun, G., İnal S. & Uğurlu, F. (2011). Ergen sağlığının sürdürülme ve geliştirilmesinde hemşirenin rolü. Türk Pediatri Arşivi, 46(11), 4-8.
Ekici, B., Mutlu, B. (2018). Terminal Dönemdeki Çocuklarda Yorgunluk Yönetimi. Çocuklarda Palyatif Bakım, Türkiye Klinikleri Dergisi, 23-7.
Erdoğan, B., Özdemir, A. A. (2018). Çocuklarda kan alma sırasında uygulanan üç farklı yöntemin ağrı ve anksiyete üzerine etkisi. Yüksek Lisans Tezi Atatürk Üniversitesi, Sağlık Bilimleri Enstitüsü, Erzurum.
Friedrichsdorf, S. J., Goubert, L. (2020). Pediatric pain treatment and prevention for hospitalized children. Pain reports, 5(1), e804.
Güçlü, M., Kusan, O., Ersoy, A. (2022). 13-15 Yaş Obez Erkek Çocuklarda 12 Haftalık Fiziksel Aktivite sonrası Beden İmajı Algısı ve Psikolojik İyi Oluş Düzeylerinin incelenmesi Efe Akademi Yayınları.
Gültekin, G., Baran, G. (2005). Hastalık ve çocuk. Sosyal Politika Çalışmaları Dergisi, 8(8).
Gürcan, M., Turan, S. A. (2019). Kanser Tedavisi Alan Çocuklarda Bulantı-Kusmaya Yönelik Semptom Yönetimi: Kanıt Temelli Uygulamalar. Güncel Pediatri Dergisi, 17(1), 170-182.
Güven, Ş. T., & Dalgıç, A. İ. (2017). Prematüre Yenidoğanlar için Geliştirilmiş Bireyselleştirilmiş Destekleyici Gelişimsel Bakım Programı. Uluslararası Hakemli Kadın Hastalıkları ve Anne Çocuk Sağlığı Dergisi, 9, 41-61.
Hacımustafaoğlu, M., Çelebi, S., Tuncer, E., Özkaya, G., Çakır, D., Bozdemir, Ş. E. (2009). Çocuk Kliniği ve çocuk yoğun bakım ünitesi hastane enfeksiyonları sıklığı. J Pediatr Inf, 3, 112-7.
Hemşirelerin Aile Merkezli Bakım Yaklaşımını Kullanma Durumlarının Incelenmesi.
Hybschmann, J., Topperzer, M. K., Gjærde, L. K., Born, P., Mathiasen, R., Sehested, A. M., Sorensen, J. L. (2021). Sleep in hospitalized children and adolescents: a scoping review. Sleep Medicine Reviews, 59, 101496.
İşsever, O., Akcay, N., Yılmaz, H. B. (2021). Çocuk bakımında önemli bir konu: güvenli uyku ve uyku eğitimi. İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi, 6(2), 157-161.
Karakaya, A.G., & Topan, A. (2022). Yenidoğanlarda Ağrının Azaltılması ve Konforun Sağlanmasında Kullanılan Nonfarmakolojik Yöntemler. Unika Sağlık Bilimleri Dergisi, 2(2), 296-308.
Kaynak, S., Yıldırım, Y., Fadıloğlu, Z. Ç., Aykar, F. Ş. (2022). Yoğunbakım Ünitesinde İzlenen Serebral Palsili Çocuğun Konfor Kuramına Göre Hemşirelik Bakımı: Olgu Sunumu. *Balıkesir Sağlık Bilimleri Dergisi*, 11(2), 341-346.
Kolcaba, K. (2003). Comfort theory and practice: a vision for holistic health care and research. Springer Publishing Company.
Kudubeş, A. A. (2014). Çocuğun Kansere Bağlı Yaşadığı Yorgunluk Ve Hemşirelik Bakımı. Türk Onkoloji Dergisi, 29(3), 120-124.
Li, W. H., Chung, J. O. K., Ho, K. Y., Kwok, B. M. C. (2016). Play Interventions To Reduce Anxiety And Negative Emotions In Hospitalized Children. BMC Pediatrics, 16, 1-9.
Merter, Ö. S., & Altay, N. (2020). Yenidoğan Yoğun Bakımda İzlenen Prematüre Bebeklerin Anne Sütü ile Beslenme Durumlarının Değerlendirilmesi. Gazi Sağlık Bilimleri Dergisi, 5(1), 21-29.
Özdemir, İ., Tekin, D. (2022). Bulantı Kusma Ile Başvuran Çocuğa Yaklaşım. Türkiye Klinikleri Pediatric Emergency-Special Topics, 3(3), 56-63.
Özkısacık, S.K., & Erdem, A. O. (2019). Yenidoğan Hastada Sıvı-Elektrolit Tedavisi. Turkiye Klinikleri Pediatric Surgery-Special Topics, 9(2), 5-9.
Özmen, D., Çetinkaya, A. (2018). Terminal Dönemdeki Çocuklarda Bulantı-Kusma Yönetimi. Turkiye Klinikleri Pediatric Nursing-Special Topics, 4(3), 28-32.
Pazarcıkcı, F. ve Efe, E. (2018). Pediatri hemşireliğinde hasta güvenliği, SDÜ Sağlık Bilimleri Enstitüsü Dergisi, 9(2): 169- 174.

Pekyiğit, A., Yıldız, D., Eren Fidancı, B., Çalık Bağrıyanık, B. (2021). Hastanede Yatan Çocuklarda Yaratıcı Oyun Yöntemi ile Hastalık ve Hastane Kavramı: Niteliksel Bir Çalışma. Journal of Child, 21(2), 175-182.
Şahin, B. S., & Küçük, L. (2024). Süreğen Hastalığı Olan Çocuk ve Adölesanların Ruh Sağlığını İyileştirmeye Yönelik Müdahaleler. Turkiye Klinikleri Pediatric Nursing-Special Topics, 10(1), 61-66.
Şahin, Ö. Ö., Topan, A., Suzan, Ö. K., Canbaz, T. (2020) Hastanede Çocuklara Bakım Veren Hemşirelerin Aile Merkezli Bakım Yaklaşımını Kullanma Durumlarının İncelenmesi. Jaren, 6(1), 89-96.
Şahin, Ö. Ö., Topan, A., Suzan, Ö. K., Canbaz, T. (2020). Hastanede Çocuklara Bakım Veren
Selbes, M., Manav, G., Muslu, G. K. (2021). Hastanede Yatan Çocuğun Psikososyal Belirtilerinin Çocuğa Ait Bazı Değişkenler Açısından İncelenmesi. Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi, 24(4), 420-428.
Şenyürek, E. (2018). Erinlik ve Beden İmaji. International Journal of Social Inquiry, 11(1), 277-29.
Sepahvand, F., Valizadeh, F., Khanjarian, F. (2021). Application of Kolcaba's Theory of Comfort For A 12-year-old Epileptic Adolescent Admitted to the Emergency Room: A Case Study. Interdisciplinary Journal of Acute Care, 2(1), 31-41.
Şermet, M. B., Özyazicioğlu, N. (2023). Hastanede Yatan Süt Çocuklarının Uyku Alışkanlıkları ve Uyku Sorunlarını Etkileyen Faktörlerin Belirlenmesi: Tanımlayıcı ve İlişki Arayıcı Araştırma. Turkiye Klinikleri Journal of Nursing Sciences, 15(3).
Shaw, R. J., Bernard, R. S., DeBlois, T., Ikuta, L. M., Ginzburg, K., & Koopman, C. (2009). The relationship between acute stress disorder and posttraumatic stress disorder in the neonatal intensive care unit. Psychosomatics, 50(2), 131-137.
Söyünmez, S., & Koç, E. T. (2020). Pediatri hemşireliğinde aile merkezli bakım. Kırşehir Ahi Evran Üniversitesi Sağlık Bilimleri Dergisi, 1(3), 141-148.
Steur, L. M. H., Kaspers, G. J. L., Van Someren, E. J. W., Van Eijkelenburg, N. K. A., Van Der Sluis, I. M., Dors, N., Van Litsenburg, R. R. L. (2020). The Impact Of Maintenance Therapy On Sleep-Wake Rhythms And Cancer-Related Fatigue In Pediatric Acute Lymphoblastic Leukemia. Supportive Care In Cancer, 28, 5983-5993.
Topsakal, S.,Ekici, B. (2022). Effect Of Illuminated Musical Mobile On Sleep Quality Of Children Hospitalized In Pediatric Emergency Departments. Journal Of Pediatric Nursing, 67, E156-E164
Törüner, E., Büyükgönenç, L.(2017). Çocuk Sağlığı Temel Hemşirelik Yaklaşımları. Ankara: Nobel Tıp Kitabevi.
Turki, B., Firouzjaei, I.T., Azizi-qadikolaee, A., Turki, F., Taghadosi, M. (2019). The Effect Of Lavender Oil On Pain And Comfort In Cardiac Patients After Injection Of Enoxaparin. *Iranian Journal Of Nursing Research.*0;14(4):21-6.
Üstün, G., Akan, B., Küçük, L. (2021). Hastanede Yatan Çocuklarda Psikososyal Semptomlar ile Annelerinin Endişe Düzeyleri Arasındaki İlişkinin İncelenmesi. Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi, 14(3), 207-216.
Üstündağ, H. (2023). Beyaz Gürültünün Bebek ve Yenidoğanlar Üzerindeki Etkileri: Uyku Kalitesi ve Ağrı Üzerine Bir Derleme. Ağrı Tıp Fakültesi Dergisi, 1(2), 64-67.
Yayan, E. H., Zengin, M. (2018). Çocuk kliniklerinde terapötik oyun. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 7(1), 226-233.
Yıldızdaş, H. Y., Demirel, N., & İnce, Z. (2018). Türk Neonatoloji Derneği Yenidoğanda Sıvı Ve Elektrolit Dengesi Rehberi. Türk Pediatri Arşivi, 53(1), 55-64.
Yücel, Ş. Ç. (2011). Kolcaba'nın Konfor Kuramı. Ege Üniversitesi Hemşirelik Fakültesi Dergisi, 27(2), 79-88.
Zenciroğlu, A., & Özbaş, S. (2014). T.C. Sağlık Bakanlığı Temel Yenidoğan Bakımı. Özyurt Matbaacılık, Ankara. D.K.

MAHREMİYETİN DÖNÜŞÜMÜ VE TOPLUMSAL NORMLAR: YORGOS LANTHİMOS'UN "POOR THİNGS" FİLMİ ÜZERİNE ANTHONY GİDDENS EKSENİNDE BİR İNCELEME

TRANSFORMATION OF PRIVACY AND SOCIAL NORMS: AN ANALYSIS OF YORGOS LANTHIMOS' "POOR THINGS" IN THE FRAMEWORK OF ANTHONY GIDDENS

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Özet

Bu çalışma, Anthony Giddens'ın toplum teorisi perspektifinden Yorgos Lanthimos'un 2023 yapımı "Poor Things" adlı filmi üzerinde durmaktadır. Giddens'ın bireyler arası ilişkilerde mahremiyet ve toplumsal normlar konusundaki görüşleri, filmdeki karakterlerin deneyimlerini anlamak için önemli bir çerçeve sunmaktadır. Giddens'a göre, modern toplumlarda bireyler arasındaki mahremiyet sınırları, sürekli olarak toplumsal normlar ve teknolojik ilerlemelerle yeniden şekillenmektedir. "Poor Things" filmi de bu temaları derinlemesine ele alır. Film, Victoria dönemi Londra'sında geçmekte olup, ana karakter Bella Baxter'in hayatını ve etrafındaki karakterlerle olan ilişkilerini merkeze almaktadır. Bella Baxter'in hikayesi, bir bilim adamı tarafından yeniden yaratılan bir kadın olarak başlar ve zamanla kendini toplumsal normlarla ve mahremiyetin sınırlarıyla savaş halinde bulur. Giddens'ın vurguladığı gibi, bireylerin kimlikleri ve mahremiyetleri, toplumsal yapılar tarafından belirlenmekte ve sınırları sürekli olarak test edilmektedir. Film, Bella'nın kendi kimliğini keşfetme çabası ve toplumsal beklentilerle olan mücadelesi üzerinden, Giddens'ın bireyselleşme ve toplumsal düzen dinamiklerine dair teorik bakış açısını desteklemektedir. Bella'nın deneyimleri, mahremiyetin kişisel ve toplumsal boyutlarını anlamak için zengin bir zemin sunmaktadır. Bella'nın yeniden yaratılması ve bu süreçte maruz kaldığı gözetim, Giddens'ın toplumsal normların mahremiyet algısını nasıl dönüştürdüğü konusundaki mücadelesini yansıtmaktadır. Bu çalışma, "Poor Things" filminin ana temalarını ve karakterlerin toplumsal normlarla olan etkileşimlerini analiz ederek, Giddens'ın teorik çerçevesi içinde mahremiyet ve toplumsal ilişkilerin karmaşıklığını derinlemesine incelemeyi amaçlamaktadır.

Anahtar Kelimeler: Yorgos Lanthimos, "Poor Things", "Zavallılar", Anthony Giddens, mahremiyet, toplumsal normlar,

Abstract

This study focuses on Yorgos Lanthimos' 2023 film "Poor Things" from the perspective of Anthony Giddens' social theory. Giddens' views on privacy and social norms in interpersonal relationships provide a significant framework for understanding the experiences of the characters in the film. According to Giddens, boundaries of intimacy between individuals in modern societies are continually reshaped by social norms and technological advancements. "Poor Things" deeply explores these themes. Set in Victorian-era London, the film centers on the life of the main

character Bella Baxter and her relationships with those around her. Bella Baxter's story begins as a woman recreated by a scientist and evolves as she finds herself in conflict with societal norms and boundaries of privacy. As emphasized by Giddens, individuals' identities and intimacies are shaped by social structures and their boundaries are constantly tested. The film supports Giddens' theoretical perspective on individuation and dynamics of social order through Bella's struggle to discover her own identity and her battle with societal expectations. Bella's experiences provide a rich ground for understanding the personal and societal dimensions of privacy. Her recreation and the surveillance she undergoes reflect Giddens' contention on how societal norms transform perceptions of privacy. This study aims to analyze the main themes of "Poor Things" and the interactions of characters with societal norms within Giddens' theoretical framework of privacy and social relationships.

Keywords: Yorgos Lanthimos, "Poor Things", Anthony Giddens, privacy, social norms

AFETLERDE KRONİK HASTALIKLARDA KÜLTÜREL YAKLAŞIM

CULTURAL APPROACH TO CHRONIC DISEASES IN DISASTERS

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ÖZET
Kronik hastalıklar en fazla ölüme yol açan hastalık gruplarıdır. Dünya Sağlık Örgütü 2023 verilerine göre kronik hastalıklar her yıl 41 milyon kişide ölüme yol açmaktadır ve tüm ölümlerin %74'üne denk gelmektedir. Afet, can ve mala büyük hasar, kayıp, yıkım ve tahribat getiren ani, felaket niteliğinde bir olaydır. Kronik hastalığı olan bireyler afet sonrasında en savunmasız gruplar arasında yer almaktadır. Kronik hastalığı olan bireyler, afetler nedeniyle pek çok zorlukla karşılaşmaktadır ve afetlerden sonra bakım süreci zordur. Afetler sırasında çeşitli nedenler ile kronik hastalıklar alevlenebilir ve bu hastalıklara bağlı başka sağlık sorunları da meydana gelmektedir.
Afet/afetlerin etkilerini doğru yönetimi için, başta hemşireler olmak üzere tüm sağlık çalışanları kritik rollere sahiptirler. Hemşireler afet sürecinde sağlık eğitimini planlamaktadırlar ve toplumun bu eğitimlere katılmalarına destek olmaktadırlar. Afet durumlarında hemşirelerin almış oldukları eğitim, mesleki tecrübe ve becerilerini etkilemektedir. Hemşirelik bakım kalitesinin yükseltilmesinde hemşirelerin toplumun kültürel özelliklerini bilmesi ve değerlendirmesi önemlidir. Bireylerin kendi kültürleri çerçevesinde uygun bakım almaları, hemşirelerin yasal ve ahlaki sorumluluğunu oluşturmaktadır. Afet eğitiminin lisans müfredatına göre entegre edilmesi, lisansüstü programlarda yaygınlaştırılması önerilmektedir. Bu derlemenin amacı afetlerde kronik hastalıklarda kültürel yaklaşımı değerlendirmek amacıyla yapılmıştır.

Anahtar Kelimeler: afet, kronik, hastalık, kültür

ABSTRACT
Chronic diseases are the disease groups that cause the most deaths. According to the World Health Organization 2023 data, chronic diseases cause 41 million deaths every year, which corresponds to 74%. A disaster is a sudden, catastrophic event that causes great damage, loss, destruction and devastation to life and property. Individuals with chronic diseases are among the most vulnerable groups after a disaster. Individuals with chronic diseases face many difficulties due to disasters, and the care process after disasters is difficult. Chronic diseases can flare up for various reasons during disasters, and other health problems related to these diseases also occur.

All healthcare professionals, especially nurses, have critical roles in correctly managing the effects of disasters. Nurses plan health education during the disaster process and support the community to participate in this education. The education that nurses receive in disaster situations affects their professional experience and skills. It is important for nurses to know and evaluate the cultural characteristics of the community in order to increase the quality of nursing care. It is the legal and moral responsibility of nurses that individuals receive appropriate care within the framework of their own culture. It is recommended that disaster education be integrated into undergraduate curricula and disseminated in graduate programs. The purpose of this review was to evaluate the cultural approach to chronic diseases in disasters.

Key Words: disaster, chronic, illness, culture

GİRİŞ

Kronik Hastalıklar Tanımı ve Yayılımı

Kronik hastalıklar, bir yıl veya daha uzun süreli ortaya çıkan, tıbbi süreç içeren, günlük yaşam aktivitelerini kısıtlayan bir durumdur (Centers for Disease Control and Prevention, 2024). Kronik hastalıklar önemli bir sorun olarak bildirilmektedir (Saka, 2020). Dünya Sağlık Örgütü (WHO) 2023 verilerine göre kronik hastalıklar her yıl 41 milyon kişinin ölümüne neden olmaktadır ve ölümlerin %74'üne denk gelmektedir.

Tablo 1: Kronik Hastalıkların Çeşitleri

Anemi	Kronik Böbrek Yetmezliği
Astım	Sinüzit
Epilepsi	Ülseratif Kolit
Multiple Skleroz	Kronik Obstruktif Akciğer Hastalığı
Kalp yetmezliği	Atopik Dermatit
Tip 1 Diyabet	Polikistik Over Sendromu
Hipotiroidi	Hipertansiyon
İrritabl Bağırsak Sendromu	Tip 2 Diyabet

Afet tanımı ve etkileri

Afet/afetler, yaygın hasara neden olan bir kriz durumu olarak tanımlanmaktadır. Afet, can ve mala büyük hasar, kayıp, yıkım ve tahribat getiren ani, felaket niteliğinde bir olaydır. Afetlerin neden olduğu hasar ölçülemez ve coğrafi konum, iklim ve dünya yüzeyinin türüne göre değişmektedir. Doğal afetler nispeten ani olmaktadır ve insanların çok az veya hiç kontrol edemediği sosyal sistemlerde ve yaşamda büyük ölçekli, yaygın ölümlere, mal kayıplarına ve bozulmalara yol açmaktadır (Lobra ve Subramani, 2016). Zaman ilerlemesi ve artan kentleşmeye bağlı olarak afetlerin hem şiddeti hem de sıklığı artmaktadır (Çakmak ve diğerleri, 2018).

Tablo 2: Afet Çeşitleri

DOĞAL AFETLER	**İNSAN KAYNAKLI AFETLER**
Yavaş gelişen doğal afetler • Şiddetli soğuklar • Kuraklık • Kıtlık vb. **Ani Gelişen Doğal Afetler** • Deprem • Seller, su taşkınları • Toprak kaymaları, kaya düşmeleri • Çığ • Fırtınalar, hortumlar • Volkanlar • Yangınlar gibi	• Nükleer, biyolojik, kimyasal kazalar • Taşımacılık kazaları • Endüstriyel kazalar • Aşırı kalabalıktan meydana gelen kazalar • Göçmenler ve yerlerinden edilenler vb.

Kaynak: AFAD. (2024). Afet türleri. https://www.afad.gov.tr/afet-turleri. Erişim Tarihi:05.10.2024.

Afetler yüksek oranda morbidite ve mortaliteye yol açmaktadır. Ayrıca bireyleri, psikolojik, ekonomik ve sosyal yönden olumsuz etkilemektedir. Afetler ani bir şekilde meydana gelmesi nedeniyle daha hızlı ve işbirlikli bir şekilde uygulama yapılmasını gerektirmektedir. Afet yönetimi; sistematik bir süreç gerektirmektedir (Yeşildal, 2020).

Afet durumunda gereksinimlerini karşılamada özellikle belirli gruplar (kronik hastalığa sahip bireyler, yaşlılar, engelliler gibi) kültürel ve dil farklılığı olan bireylerin daha fazla riski taşımaktadır (Aydoğmuş Atalay ve Çakır, 2021).

Afetlerde Kronik Hastalık Yönetiminde Hemşirenin Rolleri

Kronik hastalığı olan bireyler afet sonrasında en savunmasız gruplar arasında yer almaktadır (Sağlık Bakanlığı, 2023). Afetler ile yaşanan olumsuzluklar sağlıklı bireylerle birlikte özellikle kronik hastalığı olanları daha fazla etkilemektedir. Çünkü afetler sırasında çeşitli nedenler ile (tedaviye ve sağlık profesyoneline erişememe, beslenme bozuklukları, anksiyete, uyku sorunları gibi) kronik hastalıklar alevlenebilir ve bu hastalıklara bağlı başka sağlık sorunları da meydana gelmektedir. Ayrıca afetlerde yıkılan ve zarar gören evlerin yanı sıra sağlık kurumları da zarar gördüğünden kronik hastalığı olan bireylerin sağlık kurumuna başvuru yapmaları ve hastalık yönetimini sürdürmeleri kesintiye uğramaktadır (Ovayolu ve Ovayolu, 2024). Kronik hastalığı olan kişiler doğası gereği uzun süreli ilaç tedavisine ve hastalıklarının takibine ihtiyaç duyarlar. Bu durumda kronik hastalık, stres ve kötü yaşam koşulları nedeniyle daha da kötüleşebilir (Bilgehan, 2023). Sağlık hizmetlerine erişimde problem yaşama, afetlerden sonra başlıca ölüm nedenlerindedir (Sofulu ve diğerleri, 2023). Kronik hastalığı olan bireyler, afetler nedeniyle pek çok zorlukla karşılaşmaktadır ve afetlerden sonra bakım süreci zordur. Aydoğmuş Atalay ve Çakır (2021) çalışmasında kronik hastalığı olan bireylerin afet/acil durumlarda en fazla zarar görebilir gruplar arasında olduğu belirtilmiştir. Kaur (2024) çalışmasında kasırgadan etkilenen bireylerin en az birinde kronik hastalık olduğunu, doğal afetlerde kronik hastalıkların yönetimi ile ilgili bilgi verilmiştir. Yeterince kontrol altında tutulamayan kronik hastalıklar, afetlerin acil müdahale aşamasında yaşam için bir tehdit oluşturabilir. Örneğin; kan basıncındaki artışın ve depremin

yarattığı stresin koroner kalp hastalığı ve inme hastalarının sayısında bir artışa dönüşüp dönüşmeyeceği önemli bir konudur (Sofulu ve diğerleri, 2023).
Afet/afetlerin etkilerinin yönetimi için, başta hemşireler olmak üzere diğer sağlık çalışanları, kritik rollere sahiptir. Hemşireler afet öncesi, sırası ve sonrasında sağlık eğitimini planlamaktadırlar ve toplumun bu eğitimlere katılmalarına destek olmaktadırlar. Aynı zamanda sağlık bilincinin oluşturulmasına destek olmaktadırlar. Bu hizmetler, sağlık personeline, afetten etkilenen kronik hastalıkların bakımını yönetmek için uygun planlamaların oluşturulmasında yardımcı olmaktadır (Sofulu ve diğerleri, 2023).
Afet yönetiminde hemşireler risk altındaki gruplara yönelik önlemlerin belirlemesi, gerekli planlamaların ve girişimlerin planlamasında önemli rol ve sorumluluklara sahiptirler (Karaman ve Akyüz, 2018). Afet durumlarında hemşirelerin almış oldukları eğitim, deneyim ve becerilerini etkilemektedir. Halbuki bazı eksiklikler (afet eğitiminin müfredatta farklılık göstermesi, bu konuda lisansüstü programların gelişmemesi, görev ve yetki tanımlamalarında eksiklik olması) olumsuz etkilemektedir (Gümüş ve diğerleri, 2024).

Kültür ve Hastalık Yönetimi Arasındaki İlişki

Kültür, nesilden nesile aktarılan dil, gelenek ve değerleri kapsayan karmaşık bir bilgi ve gelenek sistemi olarak tanımlanmaktadır. Kültürel inançlar, bireylerin sağlıklarını nasıl algıladıklarını ve tıbbi müdahalelere nasıl yanıt verdiklerini etkiler (Escalante ve diğerleri, 2023).

Kültür ve hastalık arasında karşılıklı iki yönden ilişki bulunmaktadır:
1. Kültür hem hastalıkların önlenmesini hem de tedavisini etkilemektedir. Kültürel etkinlik ve uygulamalar, iki yönden sağlık üzerinde olumlu etkiler oluşturmaktadır: belirli hastalıklara veya sağlık sorunlarına yakalanma riskinin önlenmesinde ve belirli durumların iyileştirilmesinde tamamlayıcı bir tedavi olarak kullanılmaktadır.
2. Kültürel etkinliğin aktif olarak uygulanması veya daha az uygulanmasına göre sağlık üzerindeki etkiler farklılaşmaktadır (Eusko Jaurlaritza, 2022).
İnsanlar hastalıkların süreçleri ilgili algı ve inanışlarını, çocukluk dönemleri ve yetiştikleri kültür ortamının onaylanması ile edinmektedir. Ayrıca hastanın kendi inanışlarına uygun bir tedavi planı, tedavide başarılı olma oranını arttırmaktadır (Bakan ve diğerleri, 2017).
Hemşirelik bakım kalitesinin yükseltilmesinde hemşirelerin toplumun kültürel özelliklerini bilmesi ve değerlendirmesi önemlidir (Erdem ve Sivrikaya Karaca, 2015). Bireylerin kültürlerine uygun bakım almaları, hemşirelerin yasal ve ahlaki sorumluluğunu oluşturmaktadır. Kültürel olarak uygun sağlık bakımının alınması, etnik gruplar arasındaki farklılıkları önlemek için bir araç olarak önerilmektedir. Bu yüzden kültür kavramına yeterli önem verilmelidir. Bu kapsamda farklı dillerin anlaşılması için tercüman hizmetlerinin kurulması, uygun eğitim materyallerinin geliştirilmesi ve danışmanlıkları içermektedir (İlhan ve Akhan, 2019; Kaymak Özsezer, 2018).

SONUÇ VE ÖNERİLER

Afet hemşireliği kavramı oluşturulmalı ve yaygınlaştırılmalıdır. Hemşirelik lisans müfredatına afet hemşireliği dersinin eklenmesi, yüksek lisans ve doktora programlarda afete yönelik içeriklerin oluşturulması önerilmektedir. Ayrıca toplumun kültürel özelliklerinin bilinmesi iyi bir bakım sunulmasında önem taşımaktadır.

KAYNAKLAR

AFAD. (2024). Afet türleri. https://www.afad.gov.tr/afet-turleri. Erişim Tarihi:05.10.2024.
Aydoğmuş Atalay, G., & Çakır, Ö. (2021). Kronik hastalığa sahip bireylerin afetlerde zarar görebilirliği. Hastane Öncesi Dergisi, 6(2), 243-261.
Bakan, G., Azak, A., Özdemir, Ü. (2017). Diyabet ve sosyo- kültürel yaklaşım. Kesit Akademi Dergisi, 3(12),180-215.

Bilgehan, T. (2023). Depremzede bireylerde kronik hastalıkların epidemiyolojisi, semptomların tespiti ve sağlık gereksinimleri ve deprem stresi ile baş etme stratejilerinin belirlenmesi. (https://deprem.tubitak.gov.tr). Erişim Tarihi: 15.09.2024.

Centers for Disease Control and Prevention. (2024). About chronic diseases. https://www.cdc.gov/chronic-disease/about/index.html. Erişim Tarihi:01.10.2024.

Çakmak, H., Ocaktan, M. E., & Akdur, R. (2018). Doğal afetler, eşitsizlikler ve sağlık sonuçları. Eşitsizlikler ve Sağlık Sonuçları (Akın A, Editör), Türkiye Klinikleri, Ankara, 88, 94.

Erdem, N., & Sivrikaya Karaca, S. (2015). Dahiliye hastalarının bakımında kültürlerarası yaklaşım. Türkiye Klinikleri, 1(3), 14-21.

Escalante ,G.N., Ganz, R.N., Mendez Minetti, D.L.(2024). Influence of culture on disease perception. Community and Interculturality in Dialogue, 3(94), 1-6.

Eusko Jaurlaritza. (2022). Culture and health. https://www.euskadi.eus/contenidos/noticia/keb_argit_22_osasuna/eu_def/adjuntos/Basque-Culture-Observatory-2022_Culture-and-health-executive-summary-.pdf. Erişim Tarihi:07.10.2024.

Lone, I.R., & Subramani, S. (2016). Natural disasters: Causes, consequences and ıts preventive role in sustainable development. The International Journal of Indian Psychology, 3(3), 58-63.

İlhan, N., & Akhan, L. (2019). Kültürel özelliklerin sağlık üzerine etkileri. II. İnsan ve Toplum Bilimleri Araştırmaları Kongresi (S. 944-954).

Gümüş, D., Yılmaz, Z., Tuncer, M., & Aydın, E. (2024). Afet yönetiminde hemşirelerin rolü. Afet ve Risk Dergisi, 7(2), 354-367. https://doi.org/10.35341/afet.1329817

Karaman, A., & Akyüz, N. (2018). Afetlerde özel grupların hemşirelik bakımı. Öztekin, S.D. (Edt.). Afet hemşireliği. Ankara: Türkiye Klinikleri, (Pp:55-59).

Kaur, N. (2024). Natural disasters and chronic illnesses: How they affect individuals with kidney disorders, diabetes, and cardiovascular disease. African Journal of Biological Sciences, 6(4), 4842-4854.

Kaymak Özsezer, G. (2018). Yaygın görülen kronik hastalıklarda kültürel farkındalık. Journal of Awaneress, 3(3), 715-722.

Ovayolu, Ö., & Ovayolu, N. (2024). Afetlerde kronik hastalığı olan bireylerin yönetimi. Karadağ, G. Afetler ve toplum sağlığı. 1. Baskı. Ankara: Türkiye Klinikleri, (Pp:79-85).

Sağlık Bakanlığı (2023). Afetlerde kronik hastalıklar. (https://deprem.saglik.gov.tr/depo/deprem/afisler/afetlerde-kronik-hastaliklar.pdf). Erişim Tarihi:30.09.2024.

Saka, G. (2020). Kronik hastalıklar ve halk sağlığı. Saka, G. (Edt). Halk sağlığı bakışıyla Türkiye'de kronik hastalıklar 1. Baskı. Ankara, Türkiye Klinikleri.

Sofulu, F., Özgürsoy Uran, B. N., Ünsal Avdal, E., & Tokem, Y. (2023). Afetlerde kronik hastalık yönetimi. İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi, 8(2), 641-645.

Yeşildal, A. (2020). Doğal afetlerle mücadelede yerel yönetimlerin rolü ve kapasite sorunları: Esnek şehir uygulaması. Fırat Üniversitesi İİBF Uluslararası İktisadi ve İdari Bilimler Dergisi, 4(1), 87-115.

World Health Organization. (2023).Noncommunicable diseases. https://www.who.int/news-room/fact-sheets.... Erişim Tarihi: 05.10.2024.

BİLİM VE SANAT MERKEZLERİNDE KULLANILAN TÜRKÇE ETKİNLİK KİTABININ İNCELENMESİ

EXAMINATION OF TURKISH ACTIVITY BOOKS USED IN SCIENCE AND ART CENTERS

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Özet
Her birey farklı yeteneğe, öğrenme hızına ve stiline sahiptir. Ayrıca her bireyin potansiyeli ve ilgi alanı da farklıdır. Eğitim sisteminde bireysel ihtiyaçların dikkate alınması, eğitim ortamlarının bireylerin öğrenme biçimlerine göre tasarlanması, bireye uygun eğitim yöntemlerinin uygulanması, bireysel farklılıkların göz önünde bulundurulması; bireylerin öğrenme motivasyonlarını arttıracak, potansiyellerinin ortaya çıkmasına yardımcı olacak, duygusal ve sosyal gelişimlerine katkı sağlayacak ve akademik başarılarını arttıracaktır. Bunların yanında eğitimde fırsat eşitliğini de sağlayacaktır. Bu açıdan inceleme konumuzu oluşturan "Bilim ve Sanat Merkezlerinde Kullanılan Türkçe Etkinlik Kitabının" öğrenci ilgi ve ihtiyaçlarına göre hazırlanmasına, bireysel yeteneklerinin ortaya çıkarılmasına yardımcı olmasına, farklılaştırılmış ve zenginleştirilmiş içeriğe sahip olmasına özen gösterilmesi büyük önem arz etmektedir. Bu çalışmada amaç, bilim ve sanat merkezlerinde öğrenim gören özel yetenekli öğrenciler için hazırlanan, Türkçe etkinlik kitabının eğitim programı, kazanımlar, modül etkinlikleri, disiplinler arası işbirliği ve beceriler bakımından incelemektir. Araştırma nitel bir doküman incelemesidir. İnceleme nesnesini "Bilim ve Sanat Merkezi Türkçe Komisyonu" tarafından hazırlanan "Bilim ve Sanat Merkezleri Türkçe Etkinlik Kitabı" oluşturmaktadır. Bu materyale yönelik içerik analizi yapılmıştır.
Anahtar Kelimeler: Bilim ve Sanat Merkezleri, Türkçe Etkinlik Kitabı.

Abstract
Each individual has different abilities, learning speed and style. Each individual also has different potential and interests. Considering individual needs in the education system, designing educational environments according to individuals' learning styles, applying appropriate educational methods, and taking individual differences into consideration will increase individuals' motivation to learn, help them to reveal their potential, contribute to their emotional and social development, and increase their academic success. In addition to these, it will also ensure equality of opportunity in education. In this respect, it is of great importance that the "Turkish Activity Book Used in Science and Art Centers", which constitutes the subject of our review, is prepared according to the interests and needs of the students, helps to reveal their individual talents, and has differentiated and enriched content. The aim of this study is to examine the Turkish activity book prepared for gifted students studying in science and art centers in terms of curriculum, achievements, module activities, interdisciplinary cooperation and skills. The research is a qualitative document analysis. The object of analysis is the "Science and Art Centers Turkish Activity Book" prepared by the Science and Art Center Turkish Commission. Content analysis was conducted for this material.
Keywords: Science and Art Centers, Turkish Activity Book.

BİLGİ OKURYAZARLIĞI ALANINDA YAZILAN YÜKSEK LİSANS VE DOKTORA TEZLERİNİN İNCELENMESİ

REVIEW OF MASTER'S AND PHD THESIS WRITTEN IN THE FIELD OF INFORMATION LITERACY

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ÖZET
Bu araştırma "Bilgi Okuryazarlığı" ile ilgili yapılmış olan çalışmaların incelenmesi amacıyla yapılmıştır. Bu kapsamda nitel bir araştırma olarak tasarlanarak durum çalışması deseni kullanılmıştır. Verilerin analizinde betimsel analiz yöntemi kullanılmış olup sistematik derleme yapılmıştır. Veri kaynağını Yüksek Öğretim Kurulu Ulusal Tez Merkezinde yer alan ve erişime açık olan Yüksek Lisans ve Doktora tezleri oluşturmaktadır. 2004-2024 yılları arasında bilgi okuryazarlığı konusunda yapılmış olan 41 teze ulaşılmıştır. Araştırma sürecinde amaca uygun olarak alt kategoriler oluşturulmuş ve belirlenen değişkenlere göre sorulara yanıtlar aranmıştır. Belirlenen değişkenlerden elde edilen veriler tablolaştırılmıştır. Araştırmada araştırmacılar tarafından hazırlanan sınıflandırma formu kategorilendirilerek analiz edilmiştir. Form, Excel programına aktarılarak kodlamalar yapılmıştır. Kodlanan verilerin analizi yapılarak sonuçlar betimlenmiştir. Araştırma sonucunda ilgili çalışmaların en fazla 2022 yılında hazırlanmış olduğu saptanmıştır. Çalışmaların en çok Hacettepe Üniversitesinde yapıldığı belirlenmiştir. Ana bilim dalına göre dağılıma bakıldığında en çok Bilgi ve Belge Yönetimi Ana Bilim Dalında çalışma yapıldığı belirlenmiştir. Yeni içerik geliştirilen çalışma sayısı az olmasına karşın öneriler kısmında en çok Bilgi Okuryazarlığı konusunda etkin ve yenilikçi bir programın hazırlanması gerekliliğinin vurgulandığı saptanmıştır. Tablolarda; Çalışmaların Yıllarına İlişkin Dağılımları, Yüksek Lisans ve Doktora Tezlerinin Üniversitelere Göre Dağılımı, Çalışmaların Türlerine Göre Dağılımları, Çalışmaların Model/Yöntem/Desene Göre Dağılımı, Çalışmaların Kullanılan Veri Toplama Araçlarına Göre Dağılımı, Çalışmaların Yapıldığı Ana Bilim Dalına Göre Dağılımı, Öğrencilerle Yapılan Çalışmaların Sınıf Seviyesine Göre Dağılımı, Çalışmaların Veri Analiz Araçlarına/Yöntemlerine Göre Dağılımı, Çalışmaların Kullanılan Örnekleme Yöntemine Göre Dağılımı, Çalışmaların Önerilere Göre Dağılımı başlıkları altında 10 ayrı tablo oluşturulmuştur. Çalışmanın sonucunda elde edilen sonuçlar doğrultusunda öneriler belirtilmiştir.

Anahtar Kelimeler: Bilgi Okuryazarlığı, Sistematik Derleme, Betimsel Analiz

ABSTRACT
This research was conducted to examine the studies on "Information Literacy". In this context, a qualitative research was designed and the systematic review method was used. Descriptive analysis was used to analyze the data. The data source consists of Master's and Doctoral theses that are available and available at the National Thesis Center of the Council of Higher Education. 41 theses written on information literacy between 2004 and 2024 were reached. During the research process, subcategories were created in accordance with the purpose and answers were sought to the questions according to the determined variables. The data obtained from the

determined variables were tabulated. In the study, the classification form prepared by the researchers was categorized and analyzed. The form was transferred to the Excel program and coding was done. The situation was described by analyzing the coded data. As a result of the research, it was determined that there will be more relevant studies in 2022. It was determined that most of the studies were carried out at Hacettepe University. When looking at the distribution according to the department, it was determined that most studies were carried out in the Department of Information and Document Management. Although the number of studies in which new content was developed was low, it was determined that the necessity of preparing an effective and innovative program on Information Literacy was most emphasized in the recommendations section. In the tables; Distribution of Studies by Years, Distribution of Master's and Doctoral Theses by Universities, Distribution of Studies by Types, Distribution of Studies by Model/Method/Design, Distribution of Studies by Data Collection Tools Used, Distribution of Studies by Department of Science, Distribution of Studies Conducted with Students by Grade Level 10 separate tables were created under the headings: Distribution of Studies According to Data Analysis Tools/Methods, Distribution of Studies According to the Sampling Method Used, Distribution of Studies According to Recommendations. Recommendations were developed in line with the findings obtained as a result of the study.

Key Words: Information Literacy, Systematic Review, Descriptive Analysis.

GİRİŞ

Bilgi okuryazarlığının tanımı, önemi, standartları ve modellerine ilişkin açıklamalar 1970'li yıllardan itibaren başlayan çalışmalarda görülmekle birlikte ülkemizde 2000'li yıllarda vurgulanmaya başlanmıştır (Kıymacı, 2019). Hızla artan gelişmeler ile birlikte "bilgi"ye ulaşma süreci daha karmaşık bir hale gelmiştir. Özellikle II. Dünya Savaşı'ndan sonra bilgi, hakimiyet alanını genişletmiştir. Ancak 21.yüzyıl çağında bilgi miktarında yaşanan artış kişilerin bilgi yığını içinde kalıp yolunu bulmasını zorlaştırmıştır. Tüm dünyada bilginin hakimiyet alanının artmasıyla birlikte kişilerin doğru bilgiye ulaşması süreci önem kazanmaktadır. Bilgi miktarındaki artış birey ve toplum için hem avantajlı hem dezavantajlı bir süreci de beraberinde getirmektedir. Öyle ki günümüzde, ülkelerin gelişmişlik düzeyi bilgi teknolojilerini kullanma sıklıklarına göre ölçülmektedir (Kevük, 2006). Yalnızca bilgiye ulaşma değil bilgiyi kullanma ve paylaşma becerisi de önem arz etmektedir. Tam bu noktada ortaya çıkan "okuryazarlık" kavramı günümüzde her alanda doğru tanımlanması ve uygulanması gereken bir kavramdır.

Bilgi okuryazarlığı farklı değişkenler ele alınarak çeşitli şekillerde tanımlanmıştır. Bilgi okuryazarlığı, kişinin bilgi alt yapısını ve birikimlerini oluşturma becerisidir. Özellikle bilgi teknolojilerinin kullanımı okuryazarlık becerilerini kazanmada etkilidir (Polat ve Odabaş, 2008). 1970'ler bilgi okuryazarlığı kavramının ortaya çıktığı bir dönemdir. Özellikle kavramı ilk kullanan ve bilgi okuryazarlığı bilgi yönetimi yaklaşımının temsilcisi kabul edilen Zurkowski, bilgi okuryazarı bir kişinin bilgi kaynaklarından daha iyi yararlanabileceğini savunmuştur. Amerikan Kütüphane Derneği Bilgi Okuryazarlığı Komitesi Sonuç Raporu (Presidential Committee on Information Literacy: Final Report) adıyla yayımlanan raporda bilgi okuryazarlığı kavramı; bilgi gereksinimini tanımlama, gereksinim duyulan bilgiyi bulma, değerlendirme ve etkili biçimde kullanma becerisi olarak tanımlanmıştır. Bilgi okuryazarlığının uygulanabilirliği açısından ulusal bir politika belirlenmemesine karşın bu becerilerin bireylere kazandırılması için model ve standartlar geliştirilmiştir. Bilgi okuryazarlığı becerileri; bilgi ihtiyacının farkına varılması ile başlayıp bilgi ihtiyacını belirleme, bilgi ihtiyacına yönelik farklı dokümanları tarama, bilgiyi tespit etme, bilgiyi kullanma, kullanılan bilgi kaynaklarını ve bilgiyi değerlendirme şeklindeki adı geçen bütün aşamaları bilimsel etik/yasal konular dikkate alarak yapabilmeyi kapsamaktadır (Demiralay ve Karadeniz, 2008, s. 98). Önceki yıllarda bilgi kaynaklarını barındıran kütüphaneler bilgiye ulaşmak açısından önemli mekanlardı. Günümüzde ise bireyler bilgiye ulaşma sürecinde

teknolojiden faydalanmaktadır. Daha hızlı bir şekilde bilgiye ulaşmamızı sağlayan teknolojik gelişmeler "doğru bilgiye nasıl ulaşılır?" sorusunu da beraberinde getirmektedir.
21. yüzyıl becerileri içerisinde yer alan Bilgi Okuryazarlığı becerisi diğer okuryazarlıklara da temel oluşturmaktadır. Kavram, eğitim açısından ele alındığında "öğrenmeyi öğrenme" ve "yaşam boyu öğrenme" kavramlarıyla da yakından ilişkilidir. Diğer bir vurguyla öğrenme biçimleri bilgi okuryazarlığına temel olmaktadır. Aynı zamanda sadece profesyonellerin değil tüm bireylerin anlamlandırıp kullanması gereken bir beceridir. Sadece kütüphanecilerin değil eğitimcilerin de ilgilendiği bir kavramdır. Ezberlenen bilgiler yerine hayata aktarılabilinen bilgilere sahip olmak da önemli görülmektedir (Özdemir, 2011). Bu anlamda bilgi okuryazarlığı; yaşam boyu öğrenme becerilerine, üst düzey düşünme becerilerine, iletişim becerilerine bağlı kapsayıcı bir kavramdır (Kurbanoğlu, 2010). Bilgiye erişme, bilgiyi tanımlama, bilgiyi kullanma ve değerlendirme bilgi okuryazarlığı kavramının kapsamında yer almaktadır. Bu sebeple özellikle günümüzde dijitalleşmenin artması ile birlikte bireylerin doğru bilgiye ulaşma ihtiyacı da artış göstermektedir. Konunun yalnızca kütüphanecilik alanında değil eğitim alanında da çalışılması önemli görülmektedir. Bu nedenle özellikle okullarda erken dönemden itibaren bilgi okuryazarlığı becerilerini geliştirecek programların hazırlanıp uygulanması, bireylerin okuryazarlık becerilerini destekleyecek etkinliklerin planlanması, öğreticilere dönük eğitimlerin uygulanması bilgi okuryazarlığı kavramının etkin kullanımını sağlayacağı düşünülmektedir. Gelişen, değişen ve dijitalleşen çağımızda ortaya çıkan her yeni fikrin, düşüncenin, kavramın doğru anlaşılması ve uygulanması gerekli görülmektedir. Bu sebeple konunun uzmanları tarafından yapılmış olan çalışmaların farklı değişkenler ve ilişkiler açısından incelenmesi bu çalışma için önemli görülmektedir.
Bu nedenle bu araştırmada temel amaç; bilgi okuryazarlığı konusunda yazılan ve YÖK tez arşivinde yer alan yüksek lisans ve doktora tezlerinin incelenmesi ve betimlenmesidir. Tüm bunlar dikkate alındığında çalışmada "Bilgi okuryazarlığı konusunda yazılmış olan tezlerin yıllara göre dağılımı, sayısı, benzer ve farklı yönleri, önerileri, kullanılan yöntemleri, veri toplama araçları nasıldır?" sorusuna cevap aranmıştır. Belirlenen değişkenler tablolaştırılarak inceleme yapılmıştır. Bu araştırma bilgi okuryazarlığı alanında yapılacak çalışmalara mevcut durum betimlemeleri ile katkı sağlayacağından önemli görülmektedir.

YÖNTEM

Bu çalışmada nitel araştırma modeli kapsamında durum çalışması deseni kullanılmıştır. Bu kapsamda "sistematik derleme" yöntemi kullanılmıştır. Sistematik derleme, araştırma sorusunu kapsayan çalışmaların çeşitli kriterler belirlenerek bir araya getirilip sentezlenmesidir (Karaçam, 2013). Sistematik derleme, belirlenen konu ile ilgili yapılmış olan araştırmaların önemli ve değerli görülenlerinin çalışmaya dahil edilmesiyle yapılır. Bu çalışmada bilgi okuryazarlığı alanında yapılmış çalışmalar detaylı ve geniş biçimde taranmış, benzer ve farklı noktalar belirlenmiştir. Tespit edilen tüm çalışmalar yansız ve nesnel bir anlayışla doğru sonuçlara ulaşabilmek için analiz edilmektedir (Yılmaz, 2021). Bu çalışmada "Bilgi Okuryazarlığı " konusunda yapılmış olan çalışmalar; 10 başlık altında yöntemsel ölçütler esas alınarak tablolaştırılmış ve incelenmiştir.

Veri Toplama Araçları

Bu araştırmanın veri kaynağını; YÖK Ulusal Tez Merkezinde yer alan yüksek lisans, doktora tezleri oluşturmaktadır. "Bilgi Okuryazarlığı " anahtar kelime olarak belirlenerek veri tabanı taranmıştır. Konu ile ilgili tüm çalışmalar tek tek incelendikten sonra veri çözümlemesi yapılmıştır. 2004-2024 yılları arasında YÖK Ulusal Tez Merkezinde yer alan 41 tez çalışmasına ulaşılmıştır. Temel ölçüt olarak çalışmaların erişime açık olması ve bilgi okuryazarlığı konusunda yazılmış olması noktalarına dikkat edilmiştir. Yazılmış olan çalışmalardan tümü ölçütlere uygun olduğundan araştırmaya dahil edilmiştir. Araştırmacılar tarafından hazırlanan sınıflandırma formu hazırlanırken tezlerde kullanılan ya da kullanılması mümkün olan değişkenler dikkate alınmıştır. Kullanılacak bu formun çalışmanın amacına ve içeriğine uygun olmasına özen gösterilmiştir.

Yapılan incelemeler sonucunda eksiklikler tamamlanarak formun son hali oluşturulmuştur. Sınıflandırma formu 10 temel başlıktan oluşmaktadır.

Geçerlik ve Güvenirlik

Çalışmanın geçerlik ve güvenirliğini sağlamak için literatür taraması yapılmış ve bilgi okuryazarlığı alanında yazılan ve ulaşılabilir olan tezler bir havuzda toplanmıştır. Ulaşılan çalışmalar kodlanmış ve sınıflandırılmıştır. Verilerin toplanması ve analiz edilmesi için kullanılan süreç detaylı şekilde anlatılarak iç geçerlik sağlanmaya çalışılmıştır. Dış geçerliği sağlamak için ise ilgili bölümlerde araştırmanın aşamaları detaylı olarak açıklanarak sağlanmaya çalışılmıştır. İç güvenirliğin sağlanması için ise veriler araştırma sorusunun gerektirdiği şekilde amaca uygun ve ayrıntılı biçimde elde edilmiştir. Araştırmadan elde edilen bulgular ve sonuçlar için uzman görüşü alınması ile dış güvenilirliğin sağlanması amaçlanmıştır.

Verilerin Analizi

Tablolaştırılan verilerin çözümlenmesinde betimsel analiz kullanılmıştır. Hazırlanan sınıflandırma metodu ile veriler incelenmiş kod ve tablolar oluşturulmuştur. Tabloların oluşturulması ve kodlamaların yapılması işleminde Excel formatı kullanılmıştır. Kodlama ve sınıflama incelemesinin ardından verilerin frekans analizi yapılmıştır. Elde edilen bulgular tablolar halinde oluşturulup bulgular kısmında yer almıştır.

BULGULAR

Bu bölümde çalışmaların detaylı incelenip değerlendirilmesiyle elde edilen bulgular, araştırmacılar tarafından araştırmanın kapsamında belirtilen başlıklar yönünde tablolaştırılarak verilmiştir

Tablo 1: Çalışmaların Yıllarına İlişkin Dağılımları

Yıl	**f**
2004	1
2005	1
2007	2
2008	2
2011	2
2013	2
2016	3
2017	2
2018	5
2019	6
2021	3
2022	10
2023	1
2024	1
TOPLAM	**41**

Tablo 1 incelendiğinde; Bilgi Okuryazarlığı konusunda en çok 2022 yılında tez hazırlandığı görülmektedir. Tabloda belirtildiği gibi 2004 öncesine ait bir çalışmanın yer almaması ve 2022 yılından sonra çalışma sayılarında düşüş olması önemli bir veridir. Tepe noktası 2022 yılı olarak dikkat çekmektedir.

Tablo 2: Yüksek Lisans ve Doktora Tezlerinin Üniversitelere Göre Dağılımı

Üniversite Adı	**f**
Hacettepe Üniversitesi	7
Marmara Üniversitesi	4
Gazi Üniversitesi	4
Çankırı Karatekin Üniversitesi	4
Ankara Üniversitesi	3
İstanbul Üniversitesi	2
Necmettin Erbakan Üniversitesi	2
Bolu Abant İzzet Baysal Üniversitesi	2
Iğdır Üniversitesi	2
Selçuk Üniversitesi	1
Dokuz Eylül Üniversitesi	1
İstanbul Bilim Üniversitesi	1
Atatürk Üniversitesi	1
Bartın Üniversitesi	1
Gebze Teknik Üniversitesi	1
Kastamonu Üniversitesi	1
Yıldız Teknik Üniversitesi	1
Tokat Gaziosmanpaşa Üniversitesi	1
Aksaray Üniversitesi	1
Karadeniz Teknik Üniversitesi	1
TOPLAM	**41**

Tablo 2'de tezlerin yazılmış olduğu üniversitelere göre dağılımı verilmiştir. Bu noktada çalışmaların en çok Hacettepe Üniversitesinde yapılmış olduğu görülmektedir. Marmara Üniversitesi, Gazi Üniversitesi, Çankırı Karatekin Üniversitesi ise çalışmaların sayılarına göre dağılımına bakıldığında 2.sırada yer almaktadır.

Tablo 3: Çalışmaların Türlerine Göre Dağılımları

Çalışma Türü	**f**
Yüksek Lisans Tezi	30
Doktora Tezi	11
Toplam	**41**

Tablo 3'te çalışmaların türlerine göre dağılımı görülmektedir. Konu ile ilgili yazılan tezlerin yüksek lisans alanında daha fazla olduğu görülmektedir. Doktora tezi düzeyinde yetersiz sayıda tez hazırlanmış olması dikkat çekici bir sonuçtur.

Tablo 4: Çalışmaların Model/Yöntem/Desene Göre Dağılımı

Kullanılan Model/Yöntem/Desen	**f**
Betimleme Yöntemi	8
İlişkisel Tarama Modeli	8
Tarama Yöntemi	7
Karma Yöntem	3
Birden fazla yöntem	3
İçerik Analiz Yöntemi	2
Yarı Deneysel Desen	1
Belgesel Analiz Yöntemi	1
Tanılayıcı-İlişki Arayıcı Yöntem	1
Betimsel Tarama Modeli	1

Tanımlayıcı Durum Çalışması Modeli	1
Keşfedici Bibliyometrik Analiz Yöntemi	1
Nitel Betimleyici Araştırma Yöntemi	1
Karma Nitel Araştırma	1
Betimleyici Alan Araştırması	1
Durum Çalışması	1
TOPLAM	**41**

Tablo 4'te çalışmaların model/yöntem/desene göre dağılımı verilmektedir. Tablo incelendiğinde; çalışmalarda en fazla Betimleme Yöntemi ve İlişkisel Tarama Modelinin kullanıldığı görülmektedir.

Tablo 5: Çalışmaların Kullanılan Veri Toplama Araçlarına Göre Dağılımı

Veri Toplama Aracı	**f**
Birden Çok Ölçme Aracı	26
Ölçek	6
Anket	4
Test	1
Görüşme	1
Bilgi Formu	1
WoS Veri Tabanı	1
Yarı Yapılandırılmış Görüşme	1
TOPLAM	**41**

Tablo 5'te çalışmalarda kullanılan veri toplama araçlarına ait değerler verilmiştir. Çalışmalarda birden çok ölçme aracının daha fazla kullanıldığı görülmektedir. Sonuçlar kısmında birden çok ölçme aracının kullanılması durumu geçerlik ve güvenirlik ile ilişkilendirilerek ele alınmıştır.

Tablo 6: Çalışmaların Yapıldığı Ana Bilim Dalına Göre Dağılımı

Ana Bilim Dalı	**f**
Bilgi ve Belge Yönetimi Ana Bilim Dalı	17
Bilgisayar ve Öğretim Teknolojileri Eğitimi Ana Bilim Dalı	6
Türkçe ve Sosyal Bilimler Eğitimi Ana Bilim Dalı	3
Halkla İlişkiler ve Tanıtım Ana Bilim Dalı	2
Eğitim Bilimleri Ana Bilim Dalı	2
Matematik ve Fen Bilimleri Eğitimi Ana Bilim Dalı	2
Beden Eğitimi ve Spor Ana Bilim Dalı	2
Hemşirelik Ana Bilim Dalı	1
İç Mimarlık Ana Bilim Dalı	1
Yaşam Boyu Öğrenme Ana Bilim Dalı	1
İlköğretim Ana Bilim Dalı	1
Felsefe ve Din Bilimleri Ana Bilim Dalı	1
Strateji Bilimi Ana Bilim Dalı	1
Eğitim Yönetimi Ana Bilim Dalı	1
TOPLAM	**41**

Tablo 6'da çalışmaların yapıldığı ana bilim dalına göre dağılımı verilmiştir. Tablo incelendiğinde; Bilgi ve Belge Yönetimi Ana Bilim Dalının en çok çalışma yapılan ana bilim dalı olduğu

görülmektedir. Dağılımda 2.sırada ise Bilgisayar ve Öğretim Teknolojileri Eğitimi Ana Bilim Dalı yer almaktadır. Eğitim bilimleri alanında çalışma sayısının az olması dikkat çekici bir bulgu olarak görülmektedir.

Tablo 7: Öğrencilerle Yapılan Çalışmaların Sınıf Seviyesine Göre Dağılımı

Sınıf Seviyesi	**f**
Lisans	17
Birden Fazla Kademe	7
7.sınıf	2
Lisansüstü Eğitim	2
İlköğretim	1
Ortaokul	1
8.sınıf	1
9.sınıf	1
Ortaöğretim(Tüm Kademe)	1
Ön Lisans	1
TOPLAM	**34**

Tablo 7 incelendiğinde; 41 çalışma içerisinden 34 çalışmanın öğrencilerle yapıldığı görülmektedir. Diğer çalışmalarda katılımcı grubunu dokümanlar oluşturmaktadır. Öğrencilerle yapılan çalışmalarda sınıf seviyelerine bakıldığında en çok lisans öğrencileri ile çalışmalar hazırlandığı saptanmaktadır.

Tablo 8: Çalışmaların Veri Analiz Araçlarına/Yöntemlerine Göre Dağılımı

Veri Analiz	**f**
Birden fazla veri analiz yöntemi	27
Betimsel Analiz	3
İçerik Analizi	2
SPSS 22	2
t testi	2
Anova	1
Belgesel Kaynak Analizi	1
Çözüm Odaklı İrdeleme	1
NCSS	1
Karma Veri Analizi	1
TOPLAM	**41**

Tablo 8'de tezlerin veri analiz araçlarına göre dağılımı verilmektedir. Bu noktada birden çok veri analiz aracının en çok kullanılarak 1.sırada yer aldığı görülmektedir. Sonrasında ise betimsel analizin en fazla tercih edildiği görülmektedir.

Tablo 9: Çalışmaların Kullanılan Örnekleme Yöntemine Göre Dağılımı

Örnekleme Yöntemi	**f**
Belirtilmemiş	16
Tesadüfi/ Rastgele Örnekleme	10
Amaçlı Örnekleme Yöntemi	4
Kolay Ulaşılabilir Örneklem	3
Basit Seçkisiz Örnekleme	2
Çok Aşamalı Örnekleme	1
Tipik Durum Örneklemesi	1
Dokümantasyon	4
TOPLAM	**41**

Tablo 9'da kullanılan örnekleme yöntemine göre tezlerin dağılımı verilmektedir. Çalışmalarda kullanılan örnekleme yönteminin çoğunlukla belirtilmemiş olması sonuç kısmında yer alacaktır.

Belirtilen yöntemler içerisinde ise en çok Tesadüfi/Rastgele Örnekleme Yönteminin kullanıldığı saptanmaktadır.

Tablo 10: Çalışmaların Önerilerine Göre Dağılımı

Öneriler	**f**
Etkin ve yenilikçi bir programın hazırlanması	12
Araştırma farklı eğitim kademelerinde yapılabilir.	4
Cinsiyet değişkenine göre çalışmalar yapılabilir	2
Bilgi Okuryazarlığı projesi başlatılması	1
Konunun ortaöğretim ve lisans düzeyindeki etkisine bakılması	1
Bilgi okuryazarlığı alanında proje temelli ders verilmesi	1
Okul programı ile bütünleşmiş okul kütüphanesi	1
Kütüphane kalkınma politikalarının devlet eliyle desteklenmesi gerekliliği	1
Çalışmanın farklı fakülte ve bölüm öğrencilerine uygulanması	1
Ulusal bilgi okuryazarlığı standartları geliştirilmeli	1
Konuyla ilgili daha kapsamlı çalışmaların yapılması	1
Konu ile ilgili ders programının hazırlanması	1
Okullarda bilgi okuryazarlığı eğitimi verilmesi	1
Farkındalık oluşturacak çalışmaların yapılması	1
İş dünyası temsilcilerinin yükseköğretim kurumlarının yönetimine dahil edilmesi	1
Türkiye için "Ulusal Bilgi Okuryazarlığı Standartları" oluşturulması	1
Bilgi Okuryazarlığına İlişkin Seminerlerin Düzenlenmesi	1
Üniversitelerle işbirliği içeren çalışmalar yapmak	1
Bilgi okuryazarlığının düşünme becerilerine etkisi araştırılabilir.	1
Araştırma sürecine kütüphanecilerin de dâhil edilmesi	1
Bilgi okuryazarlığı tanımları çağın okuryazarlık pratiklerinin dikkate alarak yapılması	1
Ters-yüz öğrenme eğitiminin öğretmenlere seminer olarak verilmesi	1
Okullarda kütüphane kullanımına ilişkin eğitimin verilmesi	1
Alan eğitimi derslerine bilgi okuryazarlığının entegre edilmesi	1
Geleneksel yöntemlerin oyunlaştırılmış yöntemlerle harmanlanarak eğitimlerin verilmesi	1
WoS indekste Türkiye adresli çalışmaların arttırılması önerilmektedir.	1
TOPLAM	**41**

Tablo 10'da çalışmaların önerilerine göre dağılımı verilmektedir. Çalışmalarda birden fazla öneri belirtilmiş olsa da tabloda araştırma boyunca en çok üzerinde durulan öneriler yer almaktadır. Çalışmalarda en çok üzerinde durulan önerinin bilgi okuryazarlığı konusunda etkin ve yenilikçi programın hazırlanması olduğu görülmektedir. Bu durum pek çok araştırmada bir ihtiyaç olarak belirtilmiştir. Buradan yola çıkılarak tartışma ve sonuç kısmında bulgulardan çıkan sonuçlar değerlendirilmiştir.

SONUÇ, TARTIŞMA VE ÖNERİLER

Bu araştırmanın amacı YÖK Ulusal Tez Merkezinde yer alan "Bilgi Okuryazarlığı" alanında yazılan tezlerin sistematik olarak incelenmesidir. Bu doğrultuda araştırmada yer alan çalışmalar 10 ayrı tablo halinde bulgular bölümünde verilerek incelenmiştir. Araştırmada yer alan çalışmaların yayın yılına göre dağılımı incelendiğinde en fazla "2022" yılında diğer yıllara göre daha çok çalışmanın yapıldığı belirlenmiştir. Ayrıca çalışmaların ilk olarak 2004 yılında yapılmış olması da dikkat çekici bir veridir. Özellikle 2018 yılında eğitim alanında yapılan değişikliklerle

okuryazarlık becerilerinin programlara dahil edilmesinin çalışma sayısına etki ettiği düşünülmektedir.

Yazılan tezlerin üniversitelere göre dağılımı dikkate alındığında Hacettepe Üniversitesinde daha çok çalışmanın yapıldığı belirlenmiştir. İlgili literatürde, araştırmada elde edilen bu sonuç ile benzer sonuçları elde eden araştırmalar mevcuttur. Çünkü Akcan ve Ablak (2022) ve Yeşiltaş ve Evci (2021) Türkiye'de yapılan araştırmalarda konu ile ilgili Hacettepe Üniversitesinin ilk sırada yer aldığını belirtmektedirler.

Yazılan tezlerin türlerine göre dağılımı konusunda elde edilen sonuç incelendiğinde; yüksek lisans tezlerinin doktora tezlerinden daha fazla olduğu saptanmaktadır. Benzer bir sonuca Sur (2022)'un araştırmasında da rastlanmaktadır. Okuryazarlık kavramının genel olarak doktora tezlerinde daha az çalışılması yeni bir araştırma konusu olarak dikkat çektiği belirtilebilir.

Çalışmalarda kullanılan model/yöntem/desene göre dağılım incelendiğinde; Betimleme ve İlişkisel Tarama Yönteminin daha çok kullanıldığı belirlenmiştir. Tarama yönteminin amacı nesnelerin, toplumların, kurumların, olayların doğasını ve özelliklerini tanımlamaktır. Betimleme yönteminde de araştırmacı araştırdığı olguyu etraflıca inceler. Yapılan çalışmalarda bu iki yöntemin daha fazla kullanılmasının nedeninin Bilgi Okuryazarlığı konusunun daha çok kütüphanecilik alanında çalışılmış olması ve doküman incelemelerinin ağırlıkta olmasının etki etmiş olabileceği düşünülebilir.

Çalışmaların veri toplama araçlarına göre dağılımına ait sonuçlar incelendiğinde; araştırmacıların daha çok birden fazla veri toplama aracı kullandığı belirlenmiştir. Bu noktada geçerlik ve güvenirliği sağlamak, araştırmayı tutarlı ve doğru ilerletmek, araştırmalarda kullanılan yönteme uygun olarak veri toplama aracı belirlemek önemli görülmektedir. Veri analizlerinde ise yine birden fazla veri analiz yönteminin kullanıldığı belirlenmiş olup bu noktada araştırmacıların geçerlik ve güvenirlik açısından bu tercihleri yaptığı düşünülebilir.

Çalışmaların kullanılan örnekleme yöntemlerine göre dağılımına ait sonuçlar incelendiğinde; 16 çalışmada örnekleme yönteminin belirtilmediği tespit edilmiştir. Hazırlanan bilimsel çalışmalarda evren ve örneklemin ve katılımcı grubunun hangi yönteme göre belirlendiğinin belirtilmesi oldukça önemli bir boyuttur. Bu durumun çalışmanın inandırıcılığı ve doğruluğu açısından da üzerinde durulması gereken konulardan biri olduğu vurgulanabilir.

Çalışmaların hazırlandığı ana bilim dalına göre dağılımlarına ilişkin sonuçlar incelendiğinde; Bilgi ve Belge Yönetimi Ana Bilim Dalının ilk sırada yer aldığı belirlenmiştir. Bilgi Okuryazarlığı konusunun yalnızca bu alanda değil eğitim alanında da çalışılması gerektiği düşünülmektedir. Gelişen teknoloji, artan ve çeşitlenen bilginin öğrenci tarafından doğru anlaşılması ve kullanılması önemli görülmektedir. Bu sebeple çalışmaların eğitim fakültelerinin ana bilim dallarında da çalışılması gerekliliği önem arz etmektedir.

Çalışmalarda belirtilen önerilere göre sonuçların dağılımı incelendiğinde; bilgi okuryazarlığı alanında etkin ve yenilikçi programların hazırlanmasının öneri olarak ilk sırada yer aldığı belirlenmiştir. Konunun daha bütünlükçü olarak ele alınması gerekliliği hazırlanan programlar üzerinden verildiğinde sistemli ve planlı ilerlemenin sağlanacağı düşünülmektedir. Bilgi, bireyin çevresinde meydana gelen olay ve olguları anlamlandırmasında son derece önemli bir kavramdır. Geçmişten günümüze artarak çeşitlenen bilgi insan hayatında her dönemde başrole sahip olmuştur. Doğru bilgiye ulaşmanın önemi de bu noktada karşımıza çıkmaktadır. Bilginin insan hayatında bu kadar önemli olması beraberinde bilginin etkili kullanımını gerekli hale getirmiştir. Bilgi Okuryazarlığı kavramı çerçevesinde yapılan çalışmaların incelendiği bu araştırma sonuçları doğrultusunda aşağıda bazı öneriler sunulmuştur:

Araştırmalardan elde edilen sonuçlar MEB ve diğer kurumlar tarafından dikkate alınarak uygulamaya konulabilir.

Araştırma sonuçlarının uygulanabilmesi için elde edilen veriler eğitim paydaşları ve ilgili kurumlar ile de paylaşılmalıdır.

Sınırlı sayıda çalışılmış içerikler üzerinde daha fazla çalışılabilir. Bu sebeple içerik geliştirme çalışmaları arttırılabilir.
Sonuçlardan politika üreticilerinin, yöneticilerin, öğretmenlerin ne derece faydalandığı incelenebilir.
Çalışmalarda kullanılan örnekleme yönteminin belirtilmesinin önemli olacağı üzerinde durulabilir.
Çalışmaların yalnızca bilgi ve belge yönetimi ana bilim dalında değil eğitim fakültelerinin ana bilim dallarında da çalışma yapılmasının önemi göz önünde bulundurulabilir.
Çalışmaların hazırlandığı yıllara (2004-2024 arası) göre dağılımı dikkate alındığında; 2022 yılında diğer yıllara göre daha fazla çalışma yapılmasının nedenleri yeni bir araştırma konusu olarak belirlenebilir.

KAYNAKÇA

Kıymacı, A. (2019). *Öğretmenlerin bilgi okuryazarlığının bazı değişkenlere göre incelenmesi*. [Yüksek lisans tezi, Gazi Üniversitesi]. YÖK Tez Merkezi.
Kevük, S. (2006). Bilgi ekonomisi. *Yaşar Üniversitesi E-Dergisi, 1 (4)*, 319–350.
Polat, C., & Odabaş, H. (2008, Mart 27-30). *Bilgi toplumunda yaşam boyu öğrenmenin anahtarı:Bilgi okuryazarlığı.*Küreselleşme, Demokratikleşme ve Türkiye Uluslararası Sempozyumu Bildiri Kitabı, Antalya, Türkiye.
Demiralay, R., & Karadeniz, Ş. (2008). *İlköğretim öğrencilerinde bilgi okuryazarlığı becerisinin geliştirilmesi: B6 Modeli* [Poster]. 2. Uluslararası Gelecek için Öğrenme Alanında Yenilikler Konferansı, İstanbul, Türkiye.
Özdemir, S. M. (2011). Toplumsal değişme ve küreselleşme bağlamında eğitim ve eğitim programları: Kavramsal bir çözümleme. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 12(1)*,85-110.
Kurbanoğlu, S. (2010). Bilgi okuryazarlığı: Kavramsal bir analiz. *Türk Kütüphaneciliği, 24(4)*,723-747.
Yılmaz, K. (2021). Sosyal bilimlerde ve eğitim bilimlerinde sistematik derleme, meta değerlendirme ve bibliyometrik analizler. *MANAS Sosyal Araştırmalar Dergisi,2(10)*,1458-1490.
Karaçam, Z. (2013). Sistematik derleme metodolojisi: Sistematik derleme hazırlamak için bir rehber. *Dokuz Eylül Üniversitesi Hemşirelik Yüksekokulu Elektronik Dergisi, 6(1)*, 26-33.
Yeşiltaş, E., & Evci, N. (2021). Eğitimde bilgisayar okuryazarlığı çalışmalarının bibliyometrik bir analizi. *Gazi Eğitim Bilimleri Dergisi, 7(3)*, 223-242.
Akcan, C., & Ablak, S. (2022). Eğitim alanında bilgi okuryazarlığı ile ilgili çalışmaların bibliyometrik analizi. *Uluslararası Sosyal Bilgilerde Yeni Yaklaşımlar Dergisi, 6(2),* 164-182.
Sur, E. (2022). Okuryazarlık kavramı ve Türkiye'deki okuryazarlık araştırmaları üzerine bir inceleme. *Necmettin Erbakan Üniversitesi AKEF dergisi*, *4(2),* 445-467.

EK 1: İNCELENEN YÜKSEK LİSANS VE DOKTORA TEZLERİNİN LİSTESİ

	TEZ ADI	**YAZAR**	**TÜRÜ**	**YILI**
T1	Öğretmen adaylarının bilgi okuryazarlığı düzeyleri üzerine bir araştırma: Sakarya Üniversitesi örneği	Ahmet ALDEMİR	Yüksek Lisans	2004
T2	Üniversitelerde kütüphane merkezli bilgi okuryazarlığı programlarının geliştirilmesi: Hacettepe Üniversitesi örneği	Coşkun POLAT	Doktora	2005
T3	Bilgi okuryazarlığı ve Üniversite kütüphaneleri: Bilgi okuryazarlığı planı hazırlama unsurları	Duygu KIZILASLAN	Yüksek Lisans	2007
T4	Yükseköğrenimde bilgi okuryazarlığı: Selçuk Üniversitesi örneği	Muhammet KIZIL	Yüksek Lisans	2007
T5	Öğretmen adaylarının bilgi ve iletişim teknolojilerini kullanımları açısından bilgi	Raziye DEMİRALAY	Yüksek Lisans	2008

	okuryazarlığı öz-yeterlik algılarının değerlendirilmesi			
T6	Web tabanlı çoklu öğrenme ortamlarının öğrencilerin bilgi okuryazarlığı performansı üzerine etkisi	Gözde OCAK	Yüksek Lisans	2008
T7	Üniversite öğrencilerinin web 2.0 teknolojilerini kullanım durumları ile bilgi okuryazarlığı öz-yeterlik algıları arasındaki ilişkinin incelenmesi	Fiğen ATA	Yüksek Lisans	2011
T8	Okul kütüphanelerinde bilgi okuryazarlığı eğitimi ve bir örnek: Marmara Eğitim Kurumları İlköğretim Okulu	Filiz YÜKSEL İLERİ	Yüksek Lisans	2011
T9	Araştırma görevlilerine bilgi ve iletişim teknolojileri bağlamında bilgi okuryazarlığı becerilerinin kazandırılması	Nevzat ÖZEL	Doktora	2013
T10	Okul kütüphanelerinin bilgi okuryazarlığına etkileri	Samiye EROL ALKAN	Yüksek Lisans	2013
T11	Hemşirelik öğrencilerinin kendi kendine öğrenme, bilgi okuryazarlığı ve akademik başarıları arasındaki ilişkinin değerlendirilmesi	Melike YALÇIN	Yüksek Lisans	2016
T12	Üniversite kütüphanelerinde bilgi okuryazarlığı eğitiminin verilmesinde kütüphanecilerin yetkinlik ve sorumlulukları	Fadime TAŞÇI	Yüksek Lisans	2016
T13	Öğrencilerin bilgi okuryazarlığı özyeterlik algılarının çeşitli değişkenler açısından incelenmesi	Meltem GÜLNAR	Yüksek Lisans	2016
T14	İç mimarlık lisans eğitiminde bilgi okuryazarlığının çok yönlü analizi ve bir ders önerisi	Alper TORUN	Yüksek Lisans	2017
T15	Risk iletişimi stratejileri açısından bilgi ve bilgi okuryazarlığı: Sağlık haberlerine ve sağlık çalışanlarına yönelik bir araştırma	Eda TURNACI	Doktora	2017
T16	Türk milli eğitim sisteminde bilgi okuryazarlığı gereksinimlerinin karşılanması	Özlem ŞENYURT	Doktora	2018
T17	Öğretmen adaylarının bilgi okuryazarlığı becerilerindeki zorlanma düzeylerinin farklı değişkenler açısından incelenmesi: Atatürk Üniversitesi örneği	Ali KAVAK	Yüksek Lisans	2018
T18	Öğretmen adaylarının yaşam boyu öğrenme eğilimleri ile bilgi okuryazarlığı becerileri arasındaki ilişkinin değerlendirilmesi	Havva Duygu YASA	Yüksek Lisans	2018
T19	Üniversite öğrencilerinin bilgi okuryazarlığı becerilerinin değerlendirilmesi: İran örneği	Jahangir GHOLİPOUR	Doktora	2018
T20	Öğretmenlerin dijital vatandaşlık düzeylerinin bilgi okuryazarlığı ile internet ve bilgisayar kullanım özyeterlikleri bağlamında değerlendirilmesi	Ali TATLI	Yüksek Lisans	2018
T21	Lise öğrencilerine bilgi okuryazarlığı	Duygu DUYGULU	Yüksek	2019

	becerilerinin kazandırılmasında okul kütüphanelerinin rolü: Gaziantep Kolej Vakfı özel okulları lisesinde uygulanan bilgi okuryazarlığı programının değerlendirilmesi	DARDAĞAN	Lisans	
T22	Sosyal bilgilerde bilgi okuryazarlığı: Öğrenci görüşlerine yönelik bir durum çalışması	Meral ÖZGÜN	Yüksek Lisans	2019
T23	Öğretmenlerin bilgi okuryazarlığının bazı değişkenlere göre incelenmesi	Ahmet KIYMACI	Yüksek Lisans	2019
T24	Öğrencilerin bilgi okuryazarlığı becerilerini geliştirmede kullanıcı eğitiminin rolü: Çanakkale Onsekiz Mart Üniversitesi örneği	Ülkü ÖZGÜVEN	Yüksek Lisans	2019
T25	Ortaokul döneminde bilgi okuryazarlığı becerilerinin önemi: Özel Final Okulları 6. sınıf öğrencilerine yönelik bir uygulama	Serpil FIRAT	Yüksek Lisans	2019
T26	Öğrencilerin istihdam edilebilirlik ve bilgi okuryazarlığı becerileri: Hacettepe Üniversitesi örneği	Tuba YILDIRIM	Doktora	2019
T27	Yaşam boyu öğrenme, bilgi okuryazarlığı, dijital okuryazarlık ve yenilikçilik ilişkisi: Üniversite idari personeli üzerinde bir araştırma	Erol TUNCAY	Yüksek Lisans	2021
T28	Bilgi okuryazarlığı ve kolektif öğretmen yeterliği arasındaki ilişkinin incelenmesi (Zonguldak ili örneği)	Ömer ERDEM	Yüksek Lisans	2021
T29	Yüksek din öğrenimi gören öğrencilerin bilgi okuryazarlığı ve epistemolojik inanç düzeyleri üzerine bir araştırma	Fatih İPEK	Doktora	2021
T30	Dijital çağda bilgi okuryazarlığı: Çok katmanlı bilgi okuryazarlığı modeli	Kübra AYIK	Doktora	2022
T31	Fen bilgisi öğretmen adaylarının bilgi okuryazarlığı düzeyleri ve çevrimiçi araştırma sorgulama algıları üzerine bir çalışma	Selime DELİKTAŞ	Yüksek Lisans	2022
T32	Oyunlaştırmayla zenginleştirilmiş bilgi okuryazarlığı hibrit eğitiminin öğrenci başarısına etkisi	Demet SOYLU	Doktora	2022
T33	Sosyal bilgiler eğitimi için bilgi okuryazarlığı modeli önerisi	Çağrı DEMİRTAŞ	Doktora	2022
T34	Öğretmenlerin bilgi okuryazarlığı düzeylerinin EBA platformunu kullanma özyeterlikleri ile öğretmen ve okul özellikleri bağlamında incelenmesi	Sümeyye Fatma BARDAKÇI BAYRAM	Yüksek Lisans	2022
T35	Mobil destekli Çevrimiçi Ters-Yüz Öğrenme Yönteminin öğretmen adaylarının bilgi okuryazarlığı becerilerine ve eğitim inançlarına etkisi	Bilal İNAN	Yüksek Lisans	2022
T36	Fen bilimleri dersi bağlamında 7. Sınıf öğrencilerinin bazı bilgi okuryazarlığı yetkinlikleri üzerine bir çalışma	Habip TOK	Yüksek Lisans	2022
T37	Yükseköğrenimde bilgi okuryazarlığı eğitimi	Rabia Elif	Yüksek	2022

	verilmesinin kütüphane kullanımına etkisi	ATLIGİL	Lisans	
T38	Sosyal bilgiler öğretmen adaylarının bilgi okuryazarlığı düzeylerinin geliştirilmesi	Tuğba TURGUT	Doktora	2022
T39	Spor bilimleri fakültesinde öğrenim gören öğrencilerin bilgi okuryazarlığı ve girişimcilik düzeyleri arasındaki ilişkinin incelenmesi (TRB1 bölgesi)	Taner BAHŞİ	Yüksek Lisans	2022
T40	Spor bilimleri öğrencilerinin bilgi okuryazarlığı ile problem çözme düzeylerinin incelenmesi	Gazi KOÇER	Yüksek Lisans	2023
T41	Web of Science veri tabanında bilgi okuryazarlığı konulu yayınların bibliyometrik analizi	Ayça Nur SEZEN	Yüksek Lisans	2024

HEYKELLERİNİ KONUŞTURAN KADIN, CAMILLE CLAUDEL

THE WOMAN WHO MAKES HER SCULPTURES TALK, CAMILLE CLAUDEL

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Özet

Fransız heykeltıraş Camille Claudel, (8 Aralık 1864-19 Ekim 1943) hüzünlü/dramatik yaşam öyküsü/biyografisi duyan/dinleyen herkesi derinden üzer. Çocukluk yıllarında başlayan taşa ve çamura ilgisi Claudel'i Académie Colarossi'nin heykeltıraşı Alfred Boucher çalışmaya kadar getirir. Dönemin etkisiyle 1880'lerde Paris Sanat Akademisi'nde (Ecolé des Beaux-Arts) kadınların eğitim almasına olanak verilmezken Claudel, bir grup genç kadın sanatçıyla birlikte Rodin'in atölyesindeki heykel derslerine katılmaya başlar ve Claudel'in etkileyici kişiliği ve üstün yeteneği Rodin'e ilham verirken duygusal bir yakınlaşma/bağ söz konusu olur. Bu çetrefilli, karmaşık usta-çırak ilişkinin ilk etkisi Rodin'in "Cehennemin Kapıları" eserinde ortaya çıkar, sanat eleştirmenlerine göre bu eser Claudel'den izler taşır. Söz konusu olan etkileşim bir süre sonra Rodin'nin Claudel'i rakip/düşman olarak görmesine sebep olur. Kadının erkekten üstün olması kabul edilemez bir durumdur bu zamanda ve Claudel bu gayrimeşru ilişkiden hamile kalmış, çocuğunu düşürmüş ve toplum tarafından evli bir adamla beraber olduğu için dışlanmış ve ailesi tarafından ise terk edilmiştir. Rodin'le ilişkisi de bitince kendini sanatına veren Claudel dönemin en etkili sanat eserlerini ("Olgunluk Çağı," "Kayıp Tanrı" ve "Geveze Kadınlar") vermiş ve 1903 yılında bu eserler Salon d'Automne'da sergilenmiştir. Klasik heykelden uzaklaşarak Art Nouveau'ya yaklaşan bu eserler için yazar ve sanat eleştirmeni Octave Mirbeau, "dahilik" örneği olarak nitelendirmiştir. Oniks materyalini ilk kullanan heykeltıraş Claudel'in "Olgunluk Çağı" eseri ise Rodin'le olan ilişkisinin zorluğunun vücut bulmuş halidir. Hayatı gittikçe zorlaşan Claudel'in ruh sağlığı giderek bozulmaya başlar ve 1903 yılında geçirdiği bir kriz anında tüm heykellerini parçalar, akıl sağlığını kaybettiği gerekçesiyle ailesi ve Rodin onu Neuilly-sur-Marne'daki Ville- Évrard akıl hastanesine yatırdı. 1920'lerde doktoraları ailesine birçok mektup yazarak artık onun iyileştiğini, evine dönebileceğini ifade etseler de ailesi görmezlikten gelerek onu 30 yıl tek başına sanattan uzak izole edilmiş şekilde kendi yalnızlığına tek ettiler ve kendi ifadesinde sürekli sorguladığı; "Bu kadar yalnız kalmak için ne yaptım?" sorusuyla,19 Ekim 1943 yılında vefat eden Claudel, Monfavet mezarlığına gömülmüştür. Bu derece hüzünlü bir hayat hikayesi üzerine birçok biyografi yazıldı ve 1988 yılında başrollerini Gerard Depardieu ve Isabelle Adjani'nin paylaştığı bir filmle ve 2013 yılında *Camille Claudel, 1913* adıyla beyaz perdeye taşındı, hem Camille Claudel'in trajik yaşamı/yalnızlığı ve hem muhteşem sanatıyla ifade ettiği acısı/çelişkisi, insanın vücut bulmuş/konuşan heykelleriyle bir kez daha gözler önüne çıkarılmıştır.

Anahtar Kelimeler: Sanat Tarihi, Heykel, Rodin, Akıl Hastanesi, Akıl Hastanesi

Abstract
The French sculptor Camille Claudel (December 8, 1864 - October 19, 1943) had a poignant and tragic biography that evokes tremendous sorrow in those who encounter it. Claudel's fascination with stone and clay, originating in her youth, prompted her to apprentice under Alfred Boucher, the sculptor at the Académie Colarossi. While women were not allowed to study at the Paris Academy of Art (Ecolé des Beaux-Arts) in the 1880s due to the prevailing cultural climate, Claudel, alongside a group of young women artists, began attending sculpture classes at Rodin's studio, and Claudel's magnetic personality and superior talent inspired Rodin, leading to an emotional rapprochement. The initial influence of this intricate master-apprentice dynamic is seen in Rodin's "Gates of Hell," which, as noted by art critics, exhibits elements of Claudel's style. Subsequently, this contact leads Rodin to perceive Claudel as a competitor/adversary. The superiority of a woman over a man was unacceptable at this time, and Claudel became pregnant from this illicit relationship, miscarried her child, and was ostracized by society for being with a married man and abandoned by her family. Following the conclusion of her connection with Rodin, Claudel dedicated herself to her artistry, creating several of the era's most significant pieces, including "The Age of Maturity," "The Lost God," and "Chattering Women," which were showcased at the Salon d'Automne in 1903. The author and art critic Octave Mirbeau characterized these works, which diverged from classical sculpture and embraced Art Nouveau, as instances of "genius." Claudel's "Age of Maturity," the first sculpture to utilize onyx, epitomizes the complexities of her connection with Rodin. As Claudel's life grew more challenging, her mental health became worse, and in 1903, in a moment of fury, she obliterated all her sculptures. Subsequently, her family and Rodin hospitalized her in the Ville-Évrard asylum in Neuilly-sur-Marne, citing her loss of sanity. In the 1920s, despite her physicians sending numerous letters to her family indicating her recovery and readiness to return home, they disregarded these letters and abandoned her for 30 years, sequestered from art. Claudel, who passed away on October 19, 1943, was interred in the Monfavet cemetery, perpetually pondering the question, "What did I do to be so alone?" which she frequently articulated in her own reflections. Numerous biographies have chronicled this poignant life narrative, which was adapted for film in 1988 featuring Gerard Depardieu and Isabelle Adjani, and again in 2013 with "*Camille Claudel, 1913*." Both adaptations illuminated Camille Claudel's tragic life and the anguish and turmoil she conveyed through her exquisite artistry, manifested in the animated sculptures of human figures.
Key Words: Art History, Statue, Rodin, Mental Hospital

YENİLİKÇİLİK ÖRGÜTSEL ÖĞRENME İLİŞKİSİNDE YARATICILIĞIN, ETKİLEŞİMCİ /DÖNÜŞÜMCÜ LİDERLİĞİN ROLÜ

THE ROLE OF CREATIVITY AND INTERACTIONAL/TRANSFORMATIONAL LEADERSHIP IN THE RELATIONSHIP BETWEEN INNOVATION AND ORGANIZATIONAL LEARNING

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Özet
Çalışmada, örgütlerde yenilikçiliğin örgütsel öğrenme üzerindeki etkisinde dönüşümcü/etkileşimci liderlik ve yaratıcılığın aracı rolü incelenmiştir. Araştırmanın evrenini Türkiye'nin İstanbul şehrinde faaliyet gösteren tüm vakıf üniversitesi çalışanları örneklemini ise üç özel vakıf üniversitesinde çalışan toplam 407 akademik çalışan oluşturmaktadır. Veriler çevrimiçi anket yöntemiyle toplanmıştır. Yapılan analizler sonucunda, yenilikçiliğin örgütsel öğrenme üzerinde doğrudan pozitif ve anlamlı bir etkiye sahip olduğu tespit edilmiştir. Ayrıca, dönüşümcü/etkileşimci liderlik ve yaratıcılığın da örgütsel öğrenme üzerinde pozitif yönde etkili olduğu belirlenmiştir. Bunun yanı sıra, dönüşümcü/etkileşimci liderlik ve yaratıcılığın, yenilikçilik ile örgütsel öğrenme arasındaki ilişkide kısmi aracılık rolü oynadığı ortaya konulmuştur.

Anahtar Kelimeler: Yenilikçilik, Yaratıcılık, Liderlik, Öğrenme.

Abstract
The study examines the mediating role of transformational/interactional leadership and creativity in the impact of innovation on organizational learning within organizations. The research population consists of all foundation university employees in Istanbul, Turkey, while the sample includes a total of 407 academic staff working at three private foundation universities. Data were collected through an online survey. The analyses revealed that innovation has a direct, positive, and significant effect on organizational learning. Additionally, it was determined that

transformational/interactional leadership and creativity also have a positive impact on organizational learning. Furthermore, it was found that transformational/interactional leadership and creativity play a partial mediating role in the relationship between innovation and organizational learning.

Keywords: Innovation, Creativity, Leadership, Learning.

A STUDY ON WASTE PLASTIC IN BITUMEN

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Abstract:

Plastics are everywhere in today's lifestyle and are growing rapidly throughout particularly in a developing country like India. As these are non-biodegradable there is a major problem posed to the society with regard to the management of these solid wastes. Low density polyethylene (LDPE) has been found to be a good modifier of bitumen. Even, the reclaimed polyethylene originally made of LDPE has been observed to modify bitumen. In the present study, an attempt has been made to use reclaimed polyethylene which has been obtained from different kinds of plastic waste and for the plastic is also obtained from recycling plant in grain form, in dry form with the aggregates like a fiber in a bituminous mix. Detailed study on the effects of this locally waste polyethylene on several properties of Bitumen will be made in this study.

KEY WORDS: Ductility test, Softening point test, Penetration test, Viscosity test, Milk packets, Bitumen, Marshall Test.

1. Introduction

Any nation's progress is directly dependent on infrastructure. India is on the threshold of a major forward thrust in the field of transportation infrastructure. Over the past two decades, traffic volumes have increased, demanding from pavement engineers, stronger and long-lasting pavements. New methods of pavement design are being developed to improve the performance of roads. New materials are being used to replace the old ones to improve the durability, strength, aesthetics, and economy. One of the promising ways is to use plastics in bituminous road construction industry. Today, the availability of the waste plastics is enormous, as the plastic materials have become part and parcel of daily life. If not recycled, their present disposal is either by land filling or by incineration. Both these processes have certain impact on the environment. Under this circumstance, an alternate use for the waste plastics is the need of the hour.

In this study to the Marshall properties of bituminous mixes have been found when plastic wastes are incorporated into them. Plastic in different forms is found to be almost 5% in municipal solid waste, which is toxic in nature. It is a common sight in both urban and rural areas to find empty plastic bags and other type of plastic packing material littering the roads as well as drains. Due to its biodegradability, it creates stagnation of water and associated hygiene problems. In order to overcome this problem research has been carried out whether this waste plastic can be reused productively.

The experimentation at several institutes indicated that the waste plastic, by adding it to bitumen directly (known as wet process) and by adding it to hot aggregate will form a fine coat of plastic over the aggregate and such aggregate, when mixed with the binder is found to give higher strength, higher resistance to water and better performance over a period of time (known as dry process). Use of higher percentage of plastic waste reduces the need of bitumen by 10%. It also increases the strength and performance of the road. Plastic roads would be a boon for India's hot

and extremely humid climate, where temperatures frequently cross 50°C and torrential rains create havoc, leaving most of the roads with big potholes.

This paper envisages the use of waste plastic in different proportion (4% to 16% by weight of bitumen) to prepare bituminous concrete mix. The variation in different tests like Ductility, Softening, Penetration, Stripping Value and Marshall Properties of for the mixes containing different amount of plastic waste are studied.

2. Need for the Study

i. Disposal of waste plastic is a major problem.
ii. It is non-biodegradable.
iii. It mainly consists of low-density polyethylene
iv. To find its utility in bituminous mixes for road construction.
v. Burning of these waste plastic bags causes
vi. environmental pollution.
vii. Laboratory performance studies were conducted on bituminous mixes.
viii. Studies proved that waste plastic enhances the property of the mix.
ix. Improvement in properties of bituminous mix provides the solution for disposal in a useful way.

3. Literature Review

Most of the researches have worked in publishing their work on use of Plastic Waste as material in road construction for improving the strength of pavement. The observation, methodology, conclusions, and further scope of work are used to finalize the objectives of present work. The available literature of review is as follows:Monika (2013) studied the result of the addition of waste plastic modifies the properties of bitumen. The modified bitumen shows good result when compared to standard results. The optimum content of waste plastic to be used is between the range of 1% - 2% to weight of aggregate. The problems like bleeding are reduce in hot temperature region. Plastic has property of absorbing sound, which also help in reducing the sound pollution of heavy traffic. The waste plastic used in this study is LDPE (Low Density Polyethylene) from waste milk packaging for BC, SDBC, and with different admixtures. The waste plastics thus can be put to use and it ultimately improves the quality and performance of road. Total material cost of the project is reduced by about 13%.Azmat et al., (2017) studied the behaviour of plastic waste modified BC, we can conclude that the modified mix possesses improved Marshall Characteristics. It is observed that Marshall Stability value increases with plastic content and we observed that the Marshall Flow value decreases upon addition of polythene i.e. the resistance to deformations under heavy wheel loads increases. From all the experiments performed we can conclude that the addition of plastic waste enhances the various properties of an ordinary bituminous road. Considering these factors we can assure that we can obtain a more stable and durable mix for the pavements by polymer modifications. This small investigation not only utilizes beneficially, the waste non- degradable plastics but also provides us an improved pavement with better strength and longer life period. This study will have a positive impact on the environment as it will reduce the volume of plastic waste to be disposed of by incineration and land filling. It will not only add value to plastic waste but will develop a technology, which is eco-friendly.

Vasudevan (2018), Vasudevan is an Indian scientist who has worked mainly in waste management. He is currently a professor in Thiagarajan College of Engineering. He developed an innovative method to reuse plastic waste to construct better, more durable and very cost-effective roads. He thought up the idea of shredding plastic waste, mixing it with bitumen and using the polymerized mix in road construction. This method will help in making roads much faster and also will save environment from dangerous plastic waste. He also visited Mahatma schools on 15 April 2008. The roads also show greater resistance to damages caused by heavy rains. Sasane et al. (2015) Investigated application of waste plastic as an effective construction material in flexible pavement. They explained that the addition of plastic is the innovative technology which strengthen the road construction and also increases the life of road. As the plastic content increase the property of bitumen and aggregate also increases compared to conventional flexible pavement the flexible pavement with the added plastic has good results. According to marshal stability test the optimum use of plastic is up to 10%.

Sabina (2001) Studied the comparative performance of properties of bituminous mixes containing plastic/polymer (PP) (8% and 15% by weight of bitumen) with conventional bituminous concrete mix (prepared with 60/70 penetration grade bitumen). Improvement in properties like Marshall Stability, retained stability, indirect tensile strength and rutting was observed in Plastic modified bituminous concrete mixes.

Rajasekaran et al (2013) Explains that by coating the aggregate with the polymer has many advantages and which ultimately helps in improving the flexible pavement quality not only it improves the pavement quality but also improve the aggregate quality. This technology also helps in the disposal of waste plastic obtained from the domestic and industrial packing materials. The dry process is more valuable as it disposes the 80 % of waste polymer in eco-friendly way. And use of polymer reduces the equivalent bitumen quantity and therefore reducing the construction cost of road.

Bharsakale et al. (2012) studied that it is possible to improve the performance of bituminous mixed used in the surfacing course of roads. Studies reported in the used of re-cycled plastic, mainly polyethylene, in the manufacture of blended indicated reduced permanent deformation in the form of rutting and reduced low – temperature cracking of the pavement surfacing. Plastic is a very versatile material. Due to the industrial revolution, and its large-scale production plastic seemed to be a cheaper and effective raw material. Looking forward the scenario of present life style a complete ban on the use of plastic cannot be put, although the waste plastic taking the face of devil for the present and future generation. We cannot ban use of plastic but we can reuse the plastic waste. In the construction of flexible pavements, bitumen plays the role of binding the aggregate together by coating over the aggregate. It also helps to improve the strength and life of road pavement. But its resistance towards water is poor. A common method to improve the quality of bitumen is by modifying the rheological properties of bitumen by blending with synthetic polymers like rubber and plastics. Use of plastic waste in the bitumen.

4. Materials

- Aggregate
- Bitumen
- Plastic waste (LDPE)

4.1 Aggregate

Aggregate is a collective term for the mineral materials such as sand, gravel and crushed stone that are used as binding medium in various ways in construction. The aggregate that are used for Bituminous pavements are gravel and crushed stone (stone dust).

Aggregates can either be natural or manufactured. Natural aggregates are generally extracted from larger rock formations through an open excavation (quarry). Extracted rock is typically reduced to usable sizes by mechanical crushing. Manufactured aggregate is often the by- product of other manufacturing industries.

In this project we are using a mix of gravel (coarse aggregate) and stone dust (fine aggregate). And the gradation of aggregate is used as per specifications mentioned in the MORTH 5^{th} revision (Ministry of Road Transport and Highways).

Table 1 Specified Gradation of Aggregate by MORTH

IS sieve size (mm)	Cumulative % passing of aggregate as per MORTH	Cumulative % passing of aggregate taken
19	90-100	100
13.2	56-88	80
4.75	16-36	35
2.36	4-19	15
0.3	2-10	5
0.075	0-8	0.9

Tests on Aggregate

- Specific Gravity
- Water Absorption
- Flakiness and Elongation Index
- Aggregate Crushing Value test
- Aggregate Impact Value test

All the tests are done as per IS-2386 1963 and the results are verified with IRC (Indian Road Congress) permissible limits.

4.2 Bitumen

Bitumen is a black and highly adhesive form of petroleum. It is also a by-product of crude oil. It is commonly used in road construction to act as a binder for aggregates in the production of asphalt and as a waterproofing agent in the form of bituminous membranes.

Grade of bitumen that is accepted for construction of bituminous pavements as per IRC (Indian Road Congress) are s S35 to S90 or A35 to A90 (30/40 to 80/100).

There are many grades of Bitumen and to find the grade the following tests are performed

- Penetration test
- Softening point test
- Ductility test
- Viscosity test

5. Waste Plastic Mix

Waste plastic bags were collected from roads, garbage trucks, dumpsites and compost plants, waste-buyers at Rs.5-6 per kg. Household plastic was also collected for the project work, like empty milk bags, used plastic bags etc. The collected Plastic waste was sorted as per the required thickness. Generally, polyethylene of 60 micron or below is used for the further process. Less micron plastic is easily mixable in the bitumen at higher temperature (160°c- 170°c). It is clean by de-dusting or washing if required. Collected Plastic was cut into fine pieces as far as possible. The plastic pieces were sieved through 4.75mm sieve and retaining at

2.36mm sieve was collected. Firstly, Bitumen was heated up to the temperature about 160°c-170°c which is its melting temp. Pieces were added slowly to the hot bitumen of temperature around 160-170°c. The mixture was stirred manually for about 20-30 minutes. In that time period temperature was kept constant about 160-170°c. Polymer bitumen mixtures of different compositions were prepared and used for carrying out tests i.e. Penetration test, Ductility test.

There are two types of field trials-:

1. Dry Process
2. Wet Process

Dry Process:

For the flexible pavement, hot stone aggregate (1700) is mixed with hot bitumen (160° C) and the mix is used for road laying. The aggregate is chosen on the basis of its strength, porosity and moisture absorption capacity as per IS coding. The bitumen is chosen on the basis of its binding property, penetration value and viscoelastic property. The aggregate, when coated with plastics improved its quality with respect to voids, moisture absorption and soundness. The coating of plastic decreases the porosity and helps to improve the quality of the aggregate and its performance in the flexible pavement. It is to be noted here that stones with <2% porosity only allowed by the specification.

- Plastic waste like bags, bottles, etc are cut into size between 2.36mm and 4.75mm using shredding machine.
- The aggregate mix is heated to 170° and then it is transferred to mixing chamber.
- Similarly, the bitumen is to be heated up to a maximum of 160°.
- At the mixing chamber, the shredded plastics waste is added over the hot aggregate.
- The plastics waste coated aggregate is mixed with hot bitumen. **Advantages of Dry Process**
- Plastic is coated over stones - improving surface property of aggregates. b. Coating is easy & temperature required is same as road laying temp.
- Use of waste plastic more than 15% is possible.
- Flexible films of all types of plastics can be used.
- Doubles the binding property of aggregates.
- No new equipment is required.
- Bitumen bonding is strong than normal.
- The coated aggregates show increased strength.
- As replacing bitumen to 15% higher cost efficiency is possible.
- No degradation of roads even after 5-6 yrs after construction.
- Can be practiced in all type of climatic conditions.
- No evolution of any toxic gases as maximum temperature is 180° C. **Disadvantages of Dry Process**
- The process is applicable to plastic waste material only.

Wet Process:

Waste plastic is ground and made into powder; 6 to 8 % plastic is mixed with the bitumen. Plastic increases the melting point of the bitumen and makes the road retain its flexibility during winters resulting in its long life. Use of shredded plastic waste acts as a strong "binding agent" for tar making the asphalt last long. By mixing plastic with bitumen the ability of the bitumen to withstand high temperature increases. The plastic waste is melted and mixed with bitumen in a particular ratio. Normally, blending takes place when temperature reaches 45.5° C but when plastic is mixed, it remains stable even at 55° C. The vigorous tests at the laboratory level proved that the bituminous concrete mixes prepared using the treated bitumen binder fulfilled all the specified Marshall mix design criteria for surface course of road pavement. There was a substantial increase in Marshall Stability value of the mix, of the order of two to three times higher value in comparison with the untreated or ordinary bitumen. Another important observation was that the bituminous mixes prepared using the treated binder could withstand adverse soaking conditions under water for longer duration.

- Waste plastics by direct mixing with hot bitumen at 160°C.
- Mechanical stirrer is needed.
- Addition of stabilizers and proper cooling.
- Since the wet process require a lot of investment and bigger plants.
- Not commonly used.

5. Sample Preparation

- The bitumen is heated up to 160°C
- The plastic in powdered form is added to the bitumen and stirred continuously either manually or by mechanically in order to maintain even mixture.
- Mixing is dine till the temperature reaches 70°C
- Plastic is added in proportions to wt of bitumen

Table 2. Plastic added in bitumen by % wt of Bitumen

Sample	% of Bitumen in the mix	% of Plastic in the mix
Sample 1	96	4
Sample 2	92	8
Sample 3	88	12
Sample 4	84	16

6. Tests performed on Polymer modified Bitumen

- Penetration test
- Softening point test
- Ductility test
- Stripping Value test on aggregates

7. MARSHALL STABILITY TEST (ASTM D6927 - 06 STANDARD TEST METHOD)

The mix design (wet mix) determines the optimum bitumen content. This is preceded by the dry mix design discussed in the previous chapter. There are many methods available for mix design which vary in the size of the test specimen, compaction, and other test specifications. Marshall method of mix design is the most popular one**.**

The Marshall stability and flow test provides the performance prediction measure for the Marshall mix design method. The stability portion of the test measures the maximum load supported by the test specimen at a loading rate of 50.8 mm/minute. Load is applied to the specimen till failure, and the maximum load is designated as stability. During the loading, an attached dial gauge measures the specimen's plastic flow (deformation) due to the loading. The flow value is recorded in 0.25 mm (0.01 inch) increments at the same time when the maximum load is recorded.

Sample preparation:

Approximately 1200gm of aggregates and filler is heated to a temperature of 175-190°C. Bitumen is heated to a temperature of 121-125°C with the first trial percentage of bitumen (say 3.5 or 4% by weight of the mineral aggregates). The heated aggregates and bitumen are thoroughly mixed at a temperature of 154-160°C. The mix is placed in a preheated mould and compacted by a rammer with 25 blows on while pouring $1/3^{rd}$ of mix in to the mould and after completing it reverse the mould and give 75 blows on other side at temperature of 138°C to 149°C. The weight of mixed aggregates taken for the preparation of the specimen may be suitably altered to obtain a compacted thickness of 63.5+/-3 mm. Vary the bitumen content in the next trial by +0.5% and repeat the above procedure.

Properties of mix:

The properties that are of interest include the theoretical specific gravity G_t, the bulk specific gravity of the mix G_m, percent air voids V_v, percent volume of bitumen V_b, percent void in mixed aggregate VMA and percent voids filled with bitumen VFB. These calculations are discussed next.

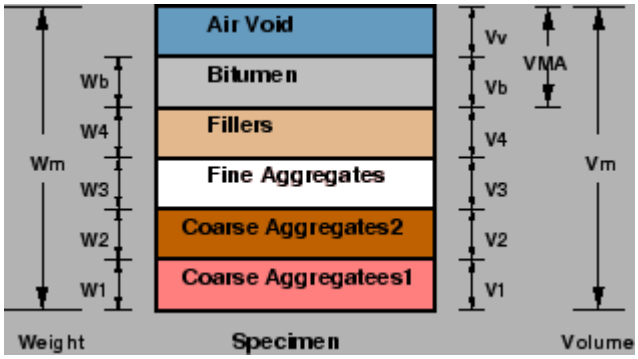


Fig 1 Phase Diagram of Bituminous mix

Preparation of Sample:

- Specimens are heated to 60 ±1°C either in a water bath for 30-40 minutes or in an oven for minimum of 2 hours.
- The specimens are removed from the water bath or oven and place in lower segment of the breaking head. The upper segment of the breaking head of the specimen is placed in position and the complete assembly is placed in position on the testing machine.
- The flow meter is placed over one of the post and is adjusted to read zero.
- Load is applied at a rate of 50 mm per minute until the maximum load reading is obtained.
- The maximum load reading in Newton is observed. At the same instant the flow as recorded on the flow meter in units of mm was also noted.

Table 3 Marshall Mix Design Specifications

Test Property	**Specified Value**
Marshall Stability (Minimum)	340 KgF
Flow value in 0.25 mm units	8 -17 (2 mm – 4.25 mm)
Percentage air voids in the mix Vv	3-5
Voids filled with Bitumen VFB	75 – 85

Table 4 Correction Factor for Marshall Stability

Volume of specimen	**Thickness of Specimen**	**Correction factor**
457 – 470	57.1	1.19
471 – 482	68.7	1.14
483 – 495	60.3	1.09
496 – 508	61.9	1.04
509 – 522	63.5	1.00
523 – 535	65.1	0.96

536 – 546	66.7	0.93
547 – 559	68.3	0.89
560 – 573	69.9	0.86

8. MARSHALL STABILITY TEST (PLASTIC MIX)

The process used to make the sample is a dry process

Procedure:

- Aggregate is heated to 170°C and then shredded plastic is added to the aggregate.
- The plastic is made to evenly coat on aggregate for a few seconds.
- And immediately the bitumen is added to the mix.

As we know that the OBC is 5% we add plastic in proportions to weight of bitumen.

Table 5 Plastic added in bitumen by % wt of Bitumen

Sample	% of Bitumen in the mix	% of Plastic in the mix
Sample 1	96	4
Sample 2	92	8
Sample 3	88	12
Sample 4	84	16

Table 6 % Wt. of each material by wt. of mix

Sample	% of Aggregate in the mix	% of Bitumen in the mix	% of Plastic in the mix
Sample 1	95	4.8	0.2
Sample 2	95	4.6	0.4
Sample 3	95	4.4	0.6
Sample 4	95	4.2	0.8

Table 7 Sample 1 (4% of plastic added to the wt of Bitumen)

Description	Specimen 1 (4.5% Bitumen Content)	Specimen 2 (5% Bitumen Content)	Avg values
Wt. of the specimen in air W_m (g)	1260 g	1259 g	1259.5 g
Wt. of specimen in water W_W (g)	746 g	743 g	744.5 g
Saturated surface dry core wt. W_{ssd} (g)	1270 g	1267 g	1268.5 g
Volume of core V (cc)	524 cc	524 cc	524 cc
Marshall stability before correction	1240	1296	-
Correction factor for marshall stability	0.96	0.96	-
Density of Core (g/cc)	2.4	2.4	2.4
Marshall Stability (KgF)	1190	1245	1217.5
Flow Value (mm)	3.315 mm	3.319 mm	3.317

9. Comparison between Plastic and Ordinary road

Table 8 Comparison b/w Plastic road and Ordinary road

TESTS	PLASTIC ROAD	ORDINARY ROAD
Marshall Stability Value	MORE	LESS
Binding property	BETTER	GOOD
Softening point	MORE	LESS
Penetration Value	MORE	LESS
Tensile strength	HIGH	LESS
Rutting	LESS	MORE
Seepage of water	NO	YES
Stripping Value	NO	YES
Durability of road	BETTER	GOOD
Cost of pavement	LESS	NORMAL
Maintenance cost	ALMOST NIL	MORE
Environmental Friendly	YES	NO

9.1 Advantage of Waste Plastic Bituminous Mix:

- Stronger road with increased Marshall Stability Value.
- Better resistance towards rain water and water stagnation.
- No stripping and no potholes.
- Increase binding and better bonding of the mix.
- Reduction in pores in aggregate and hence less rutting and ravelling.
- No effect of radiation like UV.
- The strength of the road is increased by 100%.
- The load withstanding property increases. It helps to satisfy today's need of increased road transport.
- For 1km X 3.75m road, 1 ton of plastic (10 lakh carry bags) is used and 1 ton of bitumen is saved.
- Value addition to the waste plastics (cost per kilogram increases from Rs 4 to Rs12).
- The cost of road construction is also decreased.
- The maintenance cost of road is almost nil.
- Disposal of waste plastic will no longer be a problem.
- The use of waste plastics on the road has helped to provide better place for burying the plastic waste without causing disposal problem.

9.2 Disadvantages of Waste Plastic Bituminous Mix:

- Cleaning process- Toxics present in the co-mingled plastic waste would start leaching.
- During the road laying process- in the presence of chlorine will release noxious HCL gas.

- After the road laying- It is opined that the first rain will trigger leaching. As the plastics will merely form a sticky layer, (mechanical abrasion).
- The components of the road, once it has been laid, are not inert.

10. CONCLUSION

The generation of waste plastics is increasing day by day. The major polymers namely polyethylene, polypropylene, polystyrene show adhesion property in their molten state Plastics will increase the melting point of the bitumen. The waste plastic bitumen mix forms better material for pavement construction as the mix shows higher Marshall Stability value and suitable Marshall Coefficient. Hence the use of waste plastics for pavement is one of the best methods for easy disposal of waste plastics.

- The strength of the pavement is increased by 21% by adding 8% of wt of plastic in bitumen content, thereby we found that the OPC (Optimum Plastic Content) of is 8% of plastic by wt. of bitumen.
- Plastic addition increases the hardness of the pavement by 31.6% for optimum plastic content i.e. 8%, thereby making the road more durable.
- The softening point of the mix also increases by 10.2 % for optimum plastic content i.e. 8%, thereby making pavement resistant for high temperatures
- The pavement also becomes water resistant as it reduces total air voids by 11% and mineral voids by 7.7% for optimum plastic content i.e. 8%, making it more durable and resistant to extreme weather conditions

The use of the innovative technology not only strengthened the road construction but also increased the road life as well as will help to improve the environment and also creating a source of income.

Plastic roads would be a boon for India's hot and extremely humid climate, where temperatures frequently cross 50°C and torrential rains create havoc, leaving most of the roads with big potholes. It is hoped that in near future we will have strong, durable and eco- friendly roads which will relieve the earth from all type of plastic-waste.

REFERENCES

1. Vamshi, J. Eng. 2(2013) 123-128.
2. W. Butu and S.S Mshelia, British J. Environ. Sci. 2 (2014) 10-26.
3. A.J. Chavan, Int. Innovation Eng. Manage. 2 (2013) 1-13.
4. V. S. Punith, A. Veeraragavan, Laboratory fatigue studied on bituminous concrete mixes utilizing waste shredded plastic modifier, Proceeding of the 21st ARRB and 11th REAAA Conference, Australia 2003.
5. Justo, C.E.G. and Veeraragavan, A. (2002) Utilization of Waste Plastic Bags in Bituminous Mix for Improved Performance of Roads. Banglore University, Bengaluru.
6. Vasudevan R,(2006) “Utilization of waste plastics for flexible pavement”, Indian Highways (Indian Road Congress), vol. 34, no.7, pp 105-111.
7. Vasudevan.R, S.K. Nigam, R. Velkennedy, A. Ramalinga Chandra Sekar1 and B. Sundarakannan (2007), “Utilization of Waste Polymers for Flexible Pavement and Easy Disposal of Waste Polymers”, Proceedings of the International Conference on Sustainable Solid Waste Management, September, pp 105-111.
8. Sasane Neha .B., Gaikwad.Harish, Dr. J R Patil And Dr. S D Khandekar, Application Of Waste Plastic As An Effective Construction Material In Flexible Pavement, International Research Journal Of Engineering And Technology,2015, 2(3),1943- 1948.

COST ANALYSIS OF BUILDING REINFORCEMENT METHODS

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ABSTRACT:

Considering the general characteristics of buildings in our cities that are not resistant to earthquakes, it becomes evident that significant differences exist compared to the newly constructed structures. The main differences are that the quality of concrete and reinforcement used in the building is low and the carrier systems are not well designed. One of the most important deficiencies of buildings that are not resistant to earthquakes is that they lack shear wall elements. If examined in terms of rigidity, in the case of b/6h shear wall with size ratios as defined in the Turkiye Building Earthquake Code (TBEC) 2018 instead of b/h wide column in the design of the bearing element, the cross-sectional area of the element increases by 6 times, but the inertial moment capacity in the direction of the earthquake increases by 216 times. In other words, it contributes in proportion to the cube of the shear wall element size against earthquake loads. The risk of total collapse in these structures can be eliminated by using high-strength concrete and ribbed steel to compensate for the lack of horizontal rigidity of low earthquake-resistant structures. To investigate this, reinforcement with the shear wall method and its contribution to earthquake performance were examined in some buildings where earthquake analysis was made. In the reinforcement with the shear wall retrofitting method, it has been a matter of curiosity that the brick walls are transformed into reinforced concrete by removing the brick wall and how the brick walls act like a shear wall by strengthening them with shotcrete technique, which is a more practical method, and how it will contribute to the horizontal rigidity. Related to this, the effects of transforming some wall elements into shear wall or strengthening with the shotcrete method on earthquake performances in a group of risky buildings, manufacturing and costs were compared.

Keywords: Earthquake-resistant design, structure retrofitting, shear wall effect, shotcrete method.

1. INTRODUCTION

The transformation of natural events occurring worldwide into disasters generally reveals the lack of unplanned construction and engineering design and implementation. To minimize the loss of life and property due to earthquakes, quickly reviewing the building stock and allowing the occupancy of only houses with sufficient strength is needed. Minimizing the loss of rights and strengthening the structure in terms of cost, practicality, and speed are issues that should be prioritized for the transformation of cities.

Different techniques are applied in building reinforcement. The prominent elements can be listed as column jacketing, earthquake shear wall addition, fibrous polymer wrapping, and steel retrofitting elements. It is also possible to strengthen non-load-bearing brick walls and integrate them into the system as shear wall elements. For this purpose, reinforcement can be made with shotcrete without removing the walls. The strengthening of the structure can be performed from

the inside, or it can be added to the system from the outside with the exoskeleton approach. In this work, different strengthening methods were studied in a sample building group, and the most effective, costly, and practical strengthening method in terms of earthquake performance was determined.

Ninety percent of Turkey is in earthquake zones, 67% of which are in high earthquake zones. It is known that in our country, on average, in the last century, a thousand people lost their lives in earthquakes annually (Anonymous, 2004). Although people want to live in earthquake-resistant buildings, they do not want to strengthen their buildings because strengthening buildings requires long, difficult, and expensive processes (Yılmaz, 2007). It has been presented and supported by state planning organizations in recent years that building reinforcement can be strengthened externally, as it negatively affects the usability of homeowners in their living spaces (Atımay et al, 2003). The strengthening of structures can be performed on an element or system basis, or it can be performed by reducing earthquake forces through seismic isolators. The purpose of building reinforcement is to ensure that the earthquake forces on the structure do not exceed the capacity beyond a certain rate. This can be done by reinforcing the elements or system, or it can be done with the approach of reducing earthquake forces.

Although the effect of infill walls in buildings is generally considered a load for ease of calculation, the results of these studies highlight the importance of taking this into account. In their experimental model, Klingner and Bertero (1978) reported that the stiffness of infilled frames was 5 times greater than that of pure frames and that the horizontal load–carrying capacity increased by a factor of 6. Gilmore et al. (1996) reported that post-tensioned steel braces increased the strength and rigidity of a low-filled frame system by up to 3 floors and eliminated the plan and vertical deficiencies of the structure. Additionally, many studies on reinforcement techniques involving fibrous polymer wraps have been reported in the literature. (Özcebe et al., 2003, Çetinkaya et al., 2004, Ustabaş et al., 2020, Aydın and Bayrak, 2021, Maraş, 2021). Sucuoğlu et al. (2006) reported that external intervention in strengthening buildings in Istanbul is approximately 50% more economical than internal intervention. In their study, Yılmaz (2007) reported that reinforcement with an external shear wall increased the horizontal load-carrying capacity of a structure by 306% and the structural rigidity by 12.5 times. Beyen (2021) focused on the damage diagnosis of the Fatih Mosque, which is a historical building, with his study. In further studies, structural reinforcement manufacturing can be monitored via operational modal analysis techniques, and the ability of reinforced structures to meet adequate performance levels can be determined.

2. PERFORMANCE CONCEPT AND REINFORCEMENT IN EARTHQUAKE CODES

Although even structures designed and constructed by current regulations provide life safety targets, the high levels of damage in load-bearing and/or non-load-bearing elements have revealed the need for a new approach that will replace traditional force-based design methods, and studies on the approach called **performance-based design** have gained momentum. The earthquake performance of buildings is a new concept. Earthquake performance can be defined as “the structural safety status determined by the level and distribution of damage that may occur in a building under a defined earthquake effect”. Many different interpretations have been made to express what is meant by performance-based design. The most appropriate of these is the statement “It is a method that includes structural design criteria used to achieve certain performance targets.” (Akbaş, 2004).

There are detailed studies on determining earthquake performance abroad, especially in the USA, where our earthquake regulations are inspired. ATC 40 was published by the Applied Technology Council (ATC), which carries out studies on earthquake safety in this country, FEMA 273, 274, 356, 440 published by the Federal Emergency Management Agency (FEMA), and the most recently published 547 are important studies aimed at developing methods for determining the earthquake safety of structures and making the analyses more realistic (Yılmaz, 2007). In Turkey, the concept of performance was included in the Regulation on Buildings to be Constructed in Earthquake Zones (DBYBHY) published in 2007 and was published as a separate section in the Turkiye Building Earthquake Code (TBEC) updated in 2018.

Some restrictions and suggestions are introduced in the regulations to ensure high earthquake performance of the building. The main ones are that the building system is simple, regular, continuous, ductile, and has high rigidity and strength. Collapse should not be allowed in the structure, and according to the strong column-weak beam principle, hinges should first start in the beams. (Celep and Kumbasar, 2000).

In the Turkiye Building Earthquake Code (TBEC) 2018, the information levels to be taken as the basis in the evaluation of structures are divided into two categories. These are defined as limited and comprehensive, and the number of measurements and test samples to be taken from the building are determined via both methods. The fracture types of the structural elements are divided into ductile and brittle, and the section damage limits are divided into limited, significant, extreme damage, and collapse states. Accordingly, the elements whose critical sections do not reach LD are in the limited damage state, the elements between LD and CD are in the significant damage state, the elements between CD and CL are in the extreme damage zone, and the elements exceeding CL are in the collapse state.

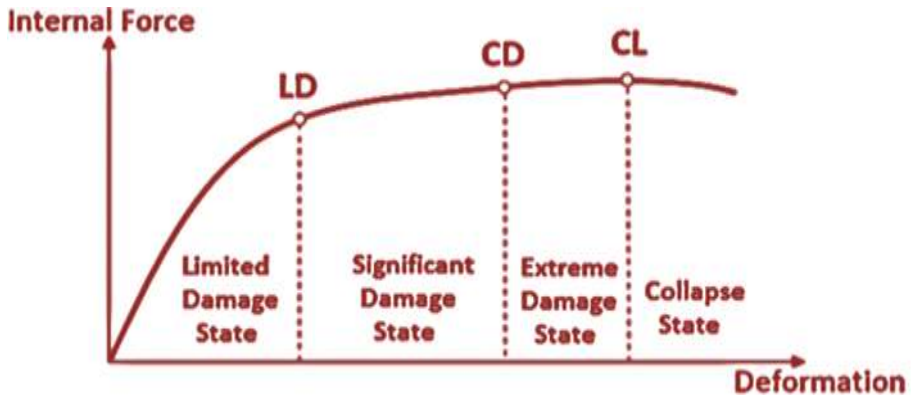


Figure 1. Internal Force–Deformation Graph (TBEC, 2018)

Structural analyses can be performed with linear or nonlinear methods. The main methods are the equivalent earthquake load method, modal or spectral analysis, and time history analysis. As a result, a limited damage (LD) performance level means that only 20% of the beams can pass into the significant damage zone, all other elements will remain in the limited damage zone, and a controlled damage (CD) performance level means that 35% of the beams will remain in the significant damage zone. The contribution of the vertical elements in the significant damage zone to the base shear force on each floor is less than 20%, and all other load-bearing elements remain in the limited damage zone or significant damage zone. The collapse limit (CL) performance level requires that a maximum of 20% of the beams can pass into the collapse zone and that all other load-bearing elements remain in the limited, significant, or extreme damage zone. However, the ratio of the shear forces carried by vertical elements whose significant damage limit has been

exceeded in both the upper and lower sections of any floor to the shear force carried by all vertical elements on that floor should not exceed 30%. Finally, collapse is defined as the building not providing the collapse prevention performance level. The prevention of immigration and the situation of collapse indicate that the current condition of the building is undesirable in terms of life safety. The disadvantages of occupying life-threatening buildings are revealed once again with every earthquake.

Regarding the strengthening of buildings, in Chapter 15, the terms element strengthening, and system strengthening are defined as types of reinforcement. Accordingly, in article 15.9.3.1, the processes applied to increase the strength and deformation capacities of the building's elements that meet earthquake loads, such as columns, beams, shear walls, and joints, are defined as element strengthening. In Article 15.9.3.2, the processes of increasing the strength and deformation capacity of a building's load-bearing system and ensuring continuity in the distribution of internal forces, adding new elements to the building, strengthening the connection areas, and reducing the mass of the building to reduce earthquake effects are defined as system strengthening.

In addition, the columns were wrapped with reinforced concrete, steel, and fibrous polymers (article 15.10.1), increasing the bending capacity of the columns (article 15.10.2), wrapping the beams (article 15.10.3), and strengthening the partition walls (article 15.10.4) and in situ reinforced concrete carrier system. Strengthening with cast-reinforced concrete shear walls (article 15.10.5) is defined in the relevant articles within the frame plane and adjacent to the plane. Additionally, adding new frames to the system (article 15.10.6) and reducing the mass of the reinforced concrete system (article 15.10.7) can also be considered strengthening methods. The system mass can be reduced by floor reduction or by replacing the roof with a lighter roof; lowering the water tanks on the upper floors to the ground; and replacing heavy balconies, parapets, partition walls, and façade coverings with lighter elements so that Newton's second principle of motion, force multiplied by mass and acceleration, can be reduced. Its future impact can be reduced with the mass reduction approach. In addition, the use of insulators to reduce the earthquake force in terms of acceleration other than the mass is described in Chapter 14 as special rules for the design of insulated building carrier systems.

3. ANALYTICAL STUDIES

One of the buildings considered as an example consists of a 6-story frame reinforced with a concrete carcass. The normal floor openings are 9.20 m by 12.80 m. The columns are 25/50, 30/50, and 25/70 cm^2. The beams were chosen as 20/60 and 25/70 cm^2. The floors were designed as slabs and were used in various regions of 10 cm and 12 cm. Floor plans appear in Figures 2 and 3. This structure is reinforced with FRP, column jacketing, an earthquake shear wall, and shotcrete. As a result of the strengthening techniques, the earthquake performances, manufacturing stages, and costs of the structures were compared.

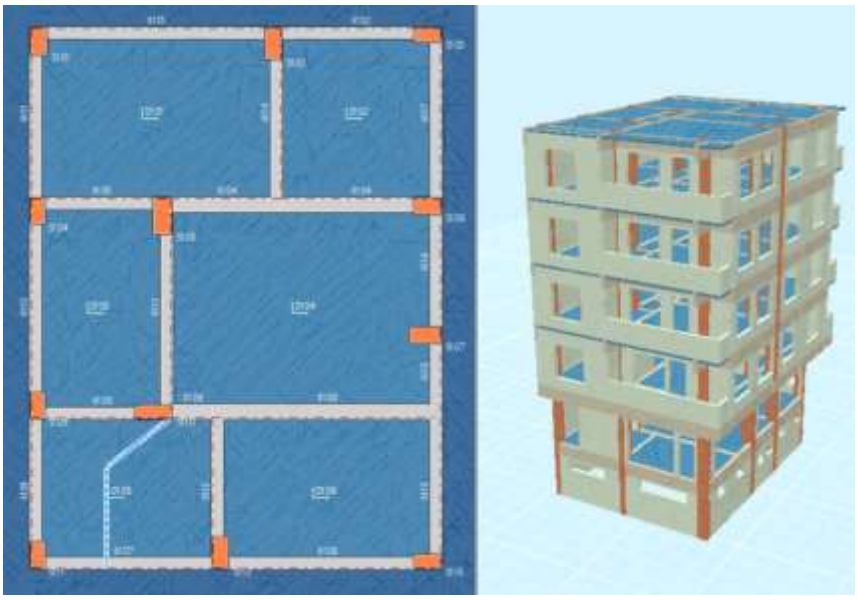


Figure 2. Basement Floor Plan and 3D View

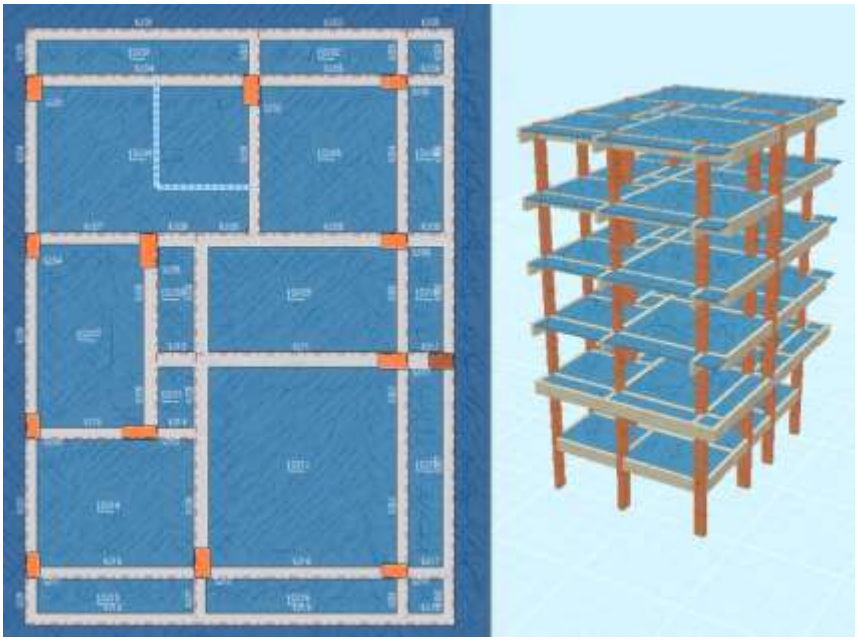


Figure 3. Ground Floor Plan and 3D Frame View

In the laboratory studies conducted on the building, the concrete strength was determined to be approximately 8.7 MPa, and corrosion occurred in the reinforcement. The reinforcement ratios and stirrup spacings in the sections were defined for the relevant elements considering the results obtained from stripping and x-rays. As a result of FRP studies, which constitute the first type of reinforcement technique, three-layer wrapping was applied to all columns in the Basement, Ground, 1st, and 2nd normal floors, and the earthquake performance of the structure could not reach a sufficient level. The reason for this is that the FRP application provides ductility rather than rigidity to the structure, and its applicability is possible in structures with relatively high concrete strength (e.g., the C15-17 range). The visuals of the relevant studies are shown in Figure 4.

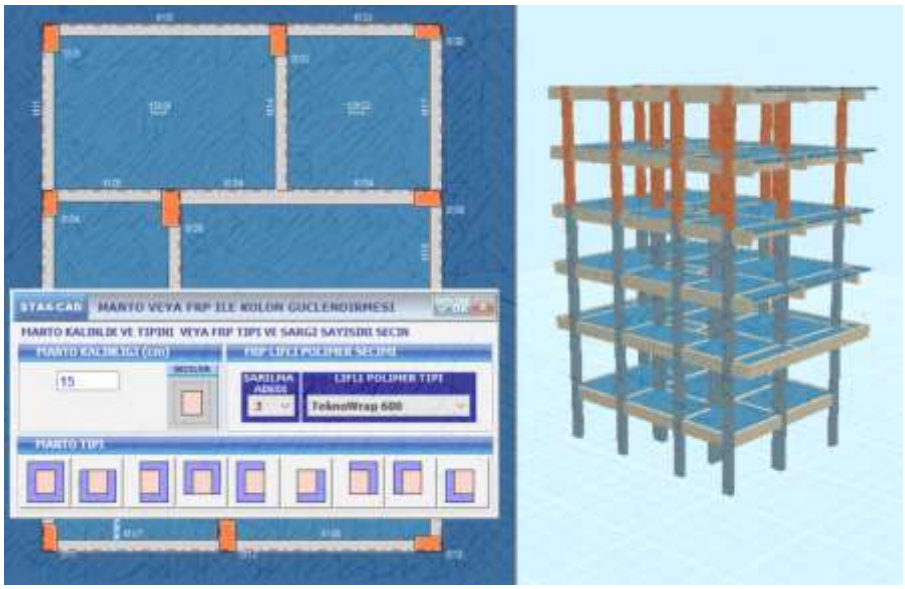


Figure 4. FRP reinforcement

The results of the analysis indicate that FRP reinforcement creates a shear force distribution in the columns at a level that cannot meet the controlled damage performance level and that the structure collapses. The analysis results are shown in Figure 5.

COLUMN SHEAR FORCE DISTRIBUTION

STORY NO	(-X)				(+X)				(-Y)				(+Y)			
	IO	LS	CP	CC	IO	LS	CP	CC	IO	LS	CP	CC	IO	LS	CP	CC
6	57.5	42.5	0.0	0.0	57.5	42.5	0.0	0.0	84.6	15.4	0.0	0.0	84.6	15.4	0.0	0.0
5	23.2	76.8	0.0	0.0	23.2	76.8	0.0	0.0	37.2	62.8	0.0	0.0	37.2	62.8	0.0	0.0
4	66.2	33.8	0.0	0.0	66.2	33.8	0.0	0.0	13.9	86.1	0.0	0.0	13.9	86.1	0.0	0.0
3	63.8	36.2	0.0	0.0	63.8	36.2	0.0	0.0	5.5	94.5	0.0	0.0	5.5	94.5	0.0	0.0
2	36.6	63.4	0.0	0.0	36.6	63.4	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0
1	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0
Max.									84.6	100.						

JOINTS COLUMN OVER MINIMUM DAMAGE SHEAR FORCE DISTRIBUTION

STORY NO	(-X)		(+X)		(-Y)		(+Y)	
	IO+LS	CP+CC	IO+LS	CP+CC	IO+LS	CP+CC	IO+LS	CP+CC
6	100.	0.0	100.	0.0	100.	0.0	100.	0.0
5	100.	0.0	100.	0.0	100.	0.0	100.	0.0
4	100.	0.0	100.	0.0	100.	0.0	100.	0.0
3	100.	0.0	100.	0.0	100.	0.0	100.	0.0
2	100.	0.0	100.	0.0	100.	0.0	100.	0.0
1	100.	0.0	100.	0.0	100.	0.0	100.	0.0
Max.	100.							

BUILDING PERFORMANCE RESULTS AT DD2 GROUND MOTION LEVEL:
Controlled Damage performance achieved ✓

Controlled damage zone case, sufficiency check:
Beam Damage ratio=(LS=%13.3<=%35 ✓),(CC=%0 ✓)
Column Damage Ratio=(LS=%0.0<=%20 ✓),(CC=%0 ✓)
Top story Vc ratio=(LS=%0.0<=%40 ✓),(CC=%0 ✓)
Plastic Column Vc ratio=(LS+CP=%0.0<=%30 ✓

Figure 5. FRP reinforcement earthquake performance

In the second strengthening technique, column jacketing, all columns in the Basement, Ground, 1st, and 2nd Normal floors were covered with a 15 cm reinforced concrete jacket, and the structure was brought to the controlled damage performance level. Considering the current material and labor prices, the cost of this will be approximately ₺1,150,000 (assuming that the labor cost is as high as the material cost). To strengthen the building, all the walls touching the columns on the relevant floors are partially broken, and the building is evacuated. It is estimated that production will take 2-3 months. The reinforcement model, performance results, and length of the building can be seen in Figures 6, 7, and 8.

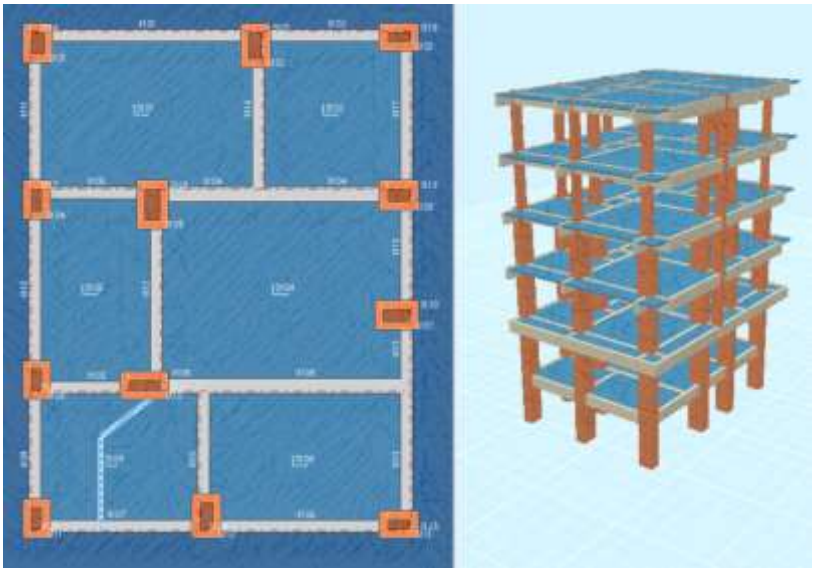


Figure 6. Strengthening with Column Jacketing

COLUMN SHEAR FORCE DISTRIBUTION

STORY NO	(-X)				(+X)				(-Y)				(+Y)			
	IO	LS	CP	CC	IO	LS	CP	CC	IO	LS	CP	CC	IO	LS	CP	CC
6	26.2	73.8	0.0	0.0	26.2	73.8	0.0	0.0	37.3	62.7	0.0	0.0	37.3	62.7	0.0	0.0
5	21.8	78.2	0.0	0.0	21.8	78.2	0.0	0.0	6.8	93.2	0.0	0.0	6.8	93.2	0.0	0.0
4	98.0	2.0	0.0	0.0	98.0	2.0	0.0	0.0	87.2	12.8	0.0	0.0	87.2	12.8	0.0	0.0
3	96.7	3.3	0.0	0.0	96.7	3.3	0.0	0.0	88.6	11.4	0.0	0.0	88.6	11.4	0.0	0.0
2	99.2	0.8	0.0	0.0	100.	0.0	0.0	0.0	96.1	3.9	0.0	0.0	96.1	3.9	0.0	0.0
1	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0
Max.					100.					93.2						

JOINTS COLUMN OVER MINIMUM DAMAGE SHEAR FORCE DISTRIBUTION

STORY NO	(-X)		(+X)		(-Y)		(+Y)	
	IO+LS	CP+CC	IO+LS	CP+CC	IO+LS	CP+CC	IO+LS	CP+CC
6	100.	0.0	100.	0.0	100.	0.0	100.	0.0
5	100.	0.0	100.	0.0	100.	0.0	100.	0.0
4	100.	0.0	100.	0.0	100.	0.0	100.	0.0
3	100.	0.0	100.	0.0	100.	0.0	100.	0.0
2	100.	0.0	100.	0.0	100.	0.0	100.	0.0
1	100.	0.0	100.	0.0	100.	0.0	100.	0.0
Max.	100.							

BUILDING PERFORMANCE RESULTS AT DD2 GROUND MOTION LEVEL:
Controlled Damage performance achieved ✓

Controlled damage zone case, sufficiency check:
Beam Damage ratio=(LS=%14.3<=%35 ✓),(CC=%0 ✓)
Column Damage Ratio=(LS=%0.0<=%20 ✓),(CC=%0 ✓)
Top story Vc ratio=(LS=%0.0<=%40 ✓),(CC=%0 ✓)
Plastic Column Vc ratio=(LS+CP=%0.0<=%30 ✓

Figure 7. Earthquake Performance of Strengthening with Column Jacketing

harun_01_manto_a.ST4 BLDG. ESTIMATED QUANTITY SUMMARY (RETROFIT)

Ops.Pos	Unit price description	Unit price	Quantity	Total
15.150.1005	C25/30 FACTORY CONCRETE	2.500.00	46.3 m³	115.703.70
15.180.1003	PLAIN SURFACE CONCRETE FORM	100.00	701.1 m²	70.114.80
15.160.1003	8-12 mm REINFORCEMENT	24.500.00	3.7 tn	89.680.71
15.160.1004	14-50 mm RIBBED REINFORCEMENT	24.500.00	5.5 tn	135.006.67
TRANSPORT % 10				41.050.59
TOTAL				451.556.46
SALES TAX % 18				81.280.16
TOTAL				532.836.63
MONTHLY FINANCE CHARGE % 1 x 8				42.626.93
TOTAL				575.463.56

Figure 8. Estimated Quantity with Column Jacketing

In the third strengthening technique, the seismic shear wall was built in the staircase on the first five floors, and the structure was brought to the controlled damage performance level. Considering the current material and labor prices, the cost of this reinforcement will be approximately ₺346,000. Since the reinforcement of the structure will be performed only in the staircase, the structure can be partially evacuated for manufacturing. It is estimated that production will take 1-2 months. The reinforcement model, performance results, and length of the building can be seen in Figures 9, 10, and 11.

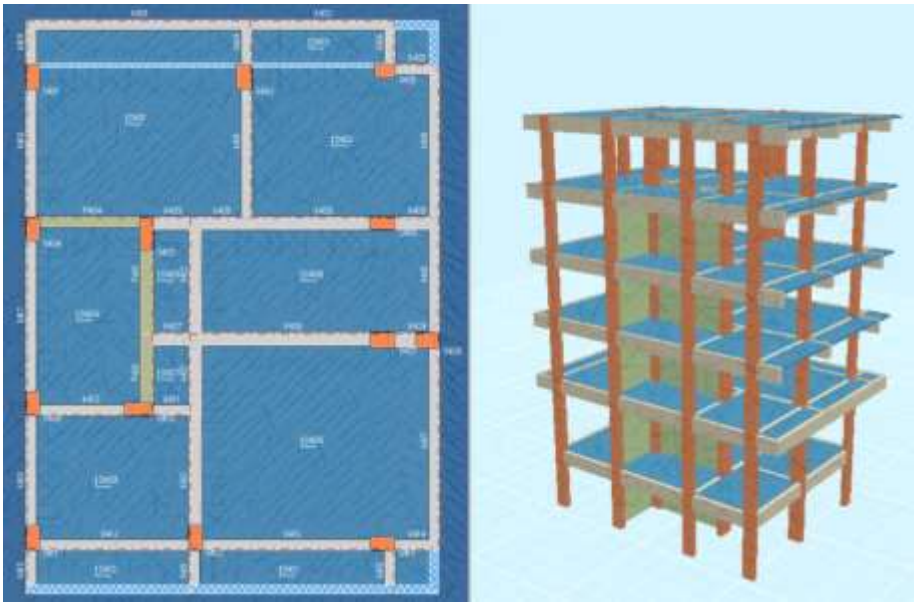


Figure 9. Reinforcement with Seismic Shear Wall

COLUMN SHEAR FORCE DISTRIBUTION

STORY NO	(-X) IO	LS	CP	CC	(+X) IO	LS	CP	CC	(-Y) IO	LS	CP	CC	(+Y) IO	LS	CP	CC
6	64.6	35.4	0.0	0.0	45.5	54.5	0.0	0.0	43.7	56.3	0.0	0.0	43.7	56.3	0.0	0.0
5	95.8	4.2	0.0	0.0	95.8	4.2	0.0	0.0	96.5	3.5	0.0	0.0	96.5	3.5	0.0	0.0
4	81.7	18.3	0.0	0.0	81.7	18.3	0.0	0.0	95.4	4.6	0.0	0.0	95.4	4.6	0.0	0.0
3	77.3	22.7	0.0	0.0	75.5	24.5	0.0	0.0	93.4	6.6	0.0	0.0	93.4	6.6	0.0	0.0
2	90.8	9.2	0.0	0.0	90.8	9.2	0.0	0.0	96.1	3.9	0.0	0.0	96.9	3.1	0.0	0.0
1	90.7	9.3	0.0	0.0	90.7	9.3	0.0	0.0	97.6	2.4	0.0	0.0	97.6	2.4	0.0	0.0
Max.									97.6					56.3		

JOINTS COLUMN OVER MINIMUM DAMAGE SHEAR FORCE DISTRIBUTION

STORY NO	(-X) IO+LS	CP+CC	(+X) IO+LS	CP+CC	(-Y) IO+LS	CP+CC	(+Y) IO+LS	CP+CC
6	100.	0.0	100.	0.0	100.	0.0	100.	0.0
5	100.	0.0	100.	0.0	100.	0.0	100.	0.0
4	100.	0.0	100.	0.0	100.	0.0	100.	0.0
3	100.	0.0	100.	0.0	100.	0.0	100.	0.0
2	100.	0.0	100.	0.0	100.	0.0	100.	0.0
1	100.	0.0	100.	0.0	100.	0.0	100.	0.0
Max.	100.							

BUILDING PERFORMANCE RESULTS AT DD2 GROUND MOTION LEVEL:
Controlled Damage performance achieved ✓

Controlled damage zone case, sufficiency check:
Beam Damage ratio=(LS=%7.1<=%35 ✓),(CC=%0 ✓)
Colums Damage Ratio=(LS=%0.0<=%20 ✓),(CC=%0 ✓)
Top story Vc ratio=(LS=%0.0<=%40 ✓),(CC=%0 ✓)
Plastic Column Vc ratio=(LS+CP=%0.0<=%30 ✓

Figure 10. Earthquake Performance of Reinforcement with a Seismic Shear Wall

harun_01_perde.ST4 BLDG. ESTIMATED QUANTITY SUMMARY (RETROFIT)

Ops.Pos	Unit price description	Unit price	Quantity	Total
15.150.1005	C25/30 FACTORY CONCRETE	2.500.00	21.8 m³	54.412.17
15.180.1003	PLAIN SURFACE CONCRETE FORM	100.00	174.3 m²	17.425.25
15.160.1003	8-12 mm REINFORCEMENT	24.500.00	1.8 tn	44.674.80
15.160.1004	14-50 mm RIBBED REINFORCEMENT	24.500.00	0.3 tn	7.545.98
	TRANSPORT % 10			12.405.82
	TOTAL			136.464.02
	SALES TAX % 18			24.563.52
	TOTAL			161.027.55
	MONTHLY FINANCE CHARGE % 1 x 8			12.882.20
	TOTAL			173.909.75

Figure 11. Reinforcement Measurement with Seismic Shear Wall

Finally, the basement floor walls were strengthened with the shotcrete technique, and the structure was brought to the performance level of continuous use. Considering the current material and labor prices, the cost of this reinforcement will be approximately ₺58,000. Since the reinforcement of the building will be performed only on the basement floor, there is no need to evacuate the building for production. It is estimated that production will take 1-2 weeks. The reinforcement model and performance results of the structure are shown in Figures 12, 13, and 14.

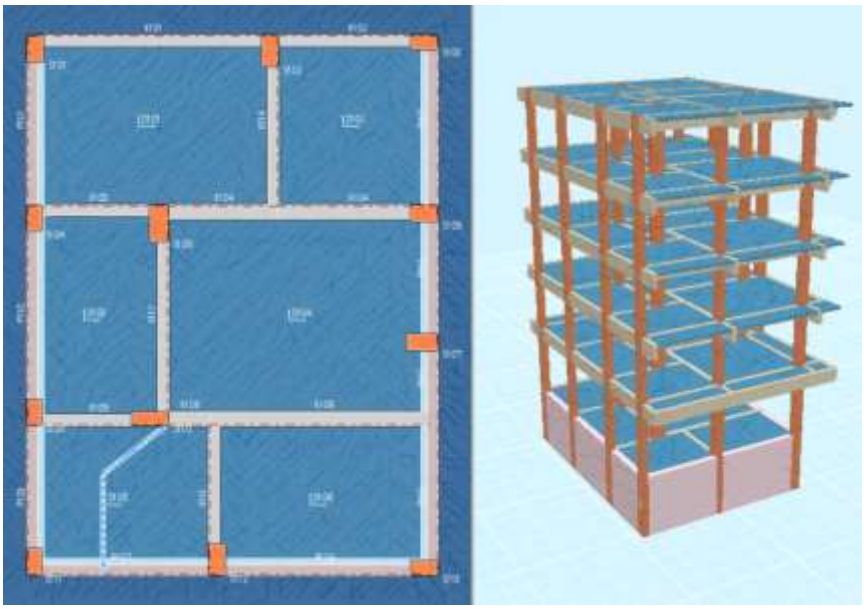


Figure 12. Reinforcement with Shotcrete

COLUMN SHEAR FORCE DISTRIBUTION

STORY NO	(-X) IO	LS	CP	CC	(+X) IO	LS	CP	CC	(-Y) IO	LS	CP	CC	(+Y) IO	LS	CP	CC
6	85.7	14.3	0.0	0.0	85.7	14.3	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0
5	39.8	60.2	0.0	0.0	46.0	54.0	0.0	0.0	78.5	21.5	0.0	0.0	59.0	41.0	0.0	0.0
4	22.4	77.6	0.0	0.0	22.4	77.6	0.0	0.0	37.8	62.2	0.0	0.0	37.8	62.2	0.0	0.0
3	6.1	93.9	0.0	0.0	13.2	86.8	0.0	0.0	6.2	93.8	0.0	0.0	0.0	100.	0.0	0.0
2	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0
1	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	100.	0.0	0.0	0.0	62.1	37.9	0.0	0.0
Max.									100.					100.		

JOINTS COLUMN OVER MINIMUM DAMAGE SHEAR FORCE DISTRIBUTION

STORY NO	(-X) IO+LS	CP+CC	(+X) IO+LS	CP+CC	(-Y) IO+LS	CP+CC	(+Y) IO+LS	CP+CC
6	100.	0.0	100.	0.0	100.	0.0	100.	0.0
5	100.	0.0	100.	0.0	100.	0.0	100.	0.0
4	100.	0.0	100.	0.0	100.	0.0	100.	0.0
3	100.	0.0	100.	0.0	100.	0.0	100.	0.0
2	100.	0.0	100.	0.0	100.	0.0	100.	0.0
1	100.	0.0	100.	0.0	100.	0.0	100.	0.0
Max.	100.							

BUILDING PERFORMANCE RESULTS AT DD2 GROUND MOTION LEVEL:
Controlled Damage performance achieved ✓

Controlled damage zone case, sufficiency check:
Beam Damage ratio=(LS=%0.0<=%35 ✓),(CC=%0 ✓)
Column Damage Ratio=(LS=%0.0<=%20 ✓),(CC=%0 ✓)
Top story Vc ratio=(LS=%0.0<=%40 ✓),(CC=%0 ✓)
Plastic Column Vc ratio=(LS+CP=%0.0<=%30 ✓

Figure 13. Earthquake Performance of Reinforcement with Shotcrete

harun_01_shotcrete.ST4 BLDG. ESTIMATED QUANTITY SUMMARY (RETROFIT)

Ops.Pos	Unit price description	Unit price	Quantity	Total
15.150.1005	C25/30 FACTORY CONCRETE	2.500.00	8.3 m³	20.860.00
15.180.1003	PLAIN SURFACE CONCRETE FORM	100.00	0.0 m²	.00
TRANSPORT % 10				2.086.00
TOTAL				22.946.00
SALES TAX % 18				4.130.28
TOTAL				27.076.28
MONTHLY FINANCE CHARGE % 1 x 8				2.166.10
TOTAL				29.242.38

Figure 14. Estimated Quantity with Shotcrete

Considering the current material, labor, and rebar prices, this reinforcement will cost approximately 88,000 TL.

Table 1. Comparison of Strengthening Techniques

BUILDING TYPE	PERFORMANCE LEVEL	STRUCTURE EVACUATION	PRODUCTION TIME	COST
Current structure	Collapse Status	-	-	-
FRP Reinforcement	Collapse Status	need	2-3 months	₺700,000
Column Jacketing	Controlled Damage	need	2-3 months	₺1,150,000
Earthquake Shear Wall	Controlled Damage	partial	1-2 Months	₺346,000
Shotcrete	Immediate Occupancy	not necessary	1-2 Weeks	₺88,000

The cost calculation is only for the reinforced concrete part.

4. RESULTS

When the reinforcement techniques are compared, the shotcrete method is the most effective, economical, and practical method. This method stands out because it does not require evacuation of the structure during reinforcement and is low-cost and fast. If reinforcement is not necessary from the inside of the building, this method can be applied from the outside with the exoskeleton approach and will not cause any loss of space. This method causes the structure to behave above the controlled damage performance level. The reason for this is that shear wall reinforcement methods increase the structure rigidity and inertia to a much higher level than columns do, and since the basement floor is changed from a frame state to a shear wall state, it reduces the number of floors in earthquake calculations. Considering that one of the greatest factors that reduce the strength of concrete in buildings is moisture, in addition to structural strengthening, this issue should be addressed together with insulation, and this method should be applied to as many floors as necessary, starting from the basement floor, to both strengthen and protect the structural elements so that our cities, especially those awaiting earthquakes, can be strengthened quickly, practically and economically. It is recommended to prepare for an earthquake. It can be concluded that the FRP method can only be used to increase ductility in structures with sufficient concrete strength and that the reinforced concrete shear wall and shotcrete methods are advantageous in terms of earthquake performance and cost.

REFERENCES

Akbaş, B. (2004). Performance-based design course notes, YTU, Institute of Science and Technology, Istanbul.

Anonymous, (2004) Existing Structures Examination and Building Inspection Commission Report, Ministry of *Public Works and Settlement Earthquake Council – 2004.* Technical Report. Ankara.

Atımtay, E., Kaplan, H., Haktanır, T., Kaltakçı, MY, Yılmaz, Ç., Evidence, R., Altun, F., Türkmen, M., Demir, F., Tama, YS, Şenel, Y. S., İnel , M., Toprak, S., İlgün, A., Yılmaz, S., Çetinkaya, N., Nohutcu , H., Yılmaz, Ü. S., Arslan, M. H., Tekeli, H., Çırak, İ. F., Erdal, M., Can, Ö., Kayhan, AH, and Arı, K. (2003-2007) "Repair of Earthquake Damaged Structures" and Strengthening of Undamaged Existing Structures: Exterior Shear Wall Application. DPT-YUUP project. Project code: BAP-08-11-DPT.2004K120760.

Aydın, A. C. and Bayrak, B. (2021), Evaluation of Reinforced Concrete Shear Walls in Terms of Different Building Materials, Niğde Ömer Halisdemir University Journal of Engineering Sciences, **10(1)**: 217-240.

Celep, Z. and Kumbasar, N. (2000). Introduction to Earthquake Engineering and Earthquake Resistant Building Design. Beta Distribution, Second Edition, Istanbul, 596 p.

Çetinkaya, N., Kaplan, H., Şenel, Ş. M. (2004), Repair and Strengthening of Reinforced Concrete Beams Using Fibrous Polymer (FRP) Materials, Pamukkale University Journal of Engineering Sciences, **10(3)**: 291-298.

Gilmore, A.T., Bertero, V. V. and Youssef, N. F. G. (1996) Seismic Rehabilitation of Infilled Non-Ductile Frame Buildings Using Post-Tensioned Steel Braces, *Earthquake Spectra*. **12(4)**: 863-882.

Klingner, R. E. and Bertero, V. V. (1978) Earthquake Resistance of Infilled Frames. *ASCE Journal of Structural Engineering*. **104**: 973-989.

Maraş, M. M. (2021), The Effect of FRP Composite Used in Strengthening Reinforced Concrete Structures on Structural Performance, European Journal of Science and Technology, **(23)**: 108-119.

Özcebe, G., Ersoy, U., Tankut, T., Erduran, E., Keskin, RSO and Mertol, C. (2003) Strengthening of Brick-Infilled RC Frames with CFRP, Technical Report, *Middle East Technical University*, Ankara. 69 p.

Sucuoglu, H., Jury, R., Ozmen, A., Hopkins, D. and Ozcebe, G. (2006) Developing Retrofit Solutions for the residential building Stocks in Istanbul, *100th Anniversary Earthquake Conference*, California, USA.

Ustabas, I., Gürbüz, A., Kurt, Z., Deşik, F. (2020), Experimental and Analytical Comparison of CFRP Winding Application in Concrete, Journal of Engineering Sciences and Design, **8(3)**: 921-930.

Yılmaz, S., (2007), Strengthening of Reinforced Concrete Buildings with Shear Walls from the Outside of the Building, PhD thesis, Department of Civil Engineering, Pamukkale University, Denizli, Turkey.

Beyen, K., (2021). Damage Identification Analyzes of a Historic Masonry Structure in TF Domain. Technical Journal, vol.32, no.2, 10577-10610.

OPTIMIZING HANDOVER MECHANISMS BETWEEN LIFI AND WIFI NETWORKS: TECHNIQUES AND PERFORMANCE ANALYSIS

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ABSTRACT

The optimization of handover techniques between LiFi and WiFi networks is investigated in this paper, with an emphasis on smooth transitions that improve network performance in dynamic contexts. Combining WiFi, known for its extensive coverage, with LiFi, which uses visible light for high-speed data transmission, provides a supplementary way around each technology's shortcomings. LiFi is especially appealing for safe, high-bandwidth applications due to its intrinsic security benefits and resilience to radio frequency interference, whereas WiFi offers widespread access. To decrease packet loss, increase throughput, and shorten handover delays, the study suggests novel handover strategies such as dynamic frequency selection, adaptive transmission settings, predictive algorithms, and signal strength analysis. The study offers important insights into the variables that affect effective network transitions by analyzing several situations in a controlled experimental system that replicates real-world conditions, such as fluctuating light intensities. Important discoveries show that LiFi stabilizes at light intensities greater than 200 lux, resulting in a notable decrease in handover failures and an improvement in the dependability of hybrid networks. The study delves deeper into the possible uses of these integrated networks in smart environments, virtual reality (VR), augmented reality (AR), and healthcare settings—environments that require fast, dependable, and secure connectivity. This study demonstrates how well LiFi and WiFi networks can be integrated for optimal performance, and it suggests that future research concentrate on improving these mechanisms, resolving any security issues, and developing standardized protocols for wider application in a variety of industries.

Keywords: Handover Mechanisms, LiFi-WiFi Integration, Network Optimization, Predictive Algorithms, Wireless Communication.

SON 10 YILDA İLETİŞİM ALANINDA DEPREMLE İLGİLİ YAZILMIŞ TEZLERİN İNCELENMESİ

EXAMINATION OF THESIS WRITTEN ON EARTHQUAKE IN THE FIELD OF COMMUNICATIONS IN THE LAST TEN YEARS

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ÖZET
Türkiye, tektonik oluşumu, jeolojik yapısı, topografyası ve iklim özellikleri nedeniyle her zaman doğal afetlerden kaynaklanan birçok riskle karşı karşıya bir ülke olmuştur ve ülkenin fiziksel-sosyal kırılganlığı yüksek olduğundan, meydana gelen depremler önemli can kayıplarına, yaralanmalara ve maddi kayıplara neden olmaktadır. Türkiye'de yaşanan son Şubat depreminin ardından Türkiye'deki deprem gerçeğiyle tekrar yüzleşilmiştir ve konu hakkında akademik araştırmalara da önem verilmesi gerektiği anlaşılmıştır. Bu araştırmanın amacı da son on yılda iletişim konusunda gerçekleştirilen ve Yükseköğretim Kurulu Başkanlığı Tez Merkezi veritabanında yayımlanan tez çalışmalarının sistematik derleme metoduyla incelenmesi olarak belirlenmiştir. Bu amaç doğurltusunda elde edilen verilerden hareketle araştırmacılar tarafından çeşitli önerilerde bulunulmuştur ve sonuçlar, iletişimin yükseköğretimde nasıl incelendiğine dair daha iyi bir anlayışa katkıda bulunarak, ülkemizdeki iletişim araştırmalarının evrimi ve mevcut durumuna ilişkin araştırmacılar için bir kaynak sunmaktadır.

Anahtar kelimeler: Deprem, İletişim, Sistematik derleme.

ABSTRACT
Turkey has always been a country facing many risks from natural disasters due to its tectonic formation, geological structure, topography and climate characteristics, and since the country has a high physical and social vulnerability, earthquakes cause significant loss of life, injuries and financial losses. After the recent February earthquake in Turkey, the reality of earthquakes in Turkey has been faced again and it has been understood that academic research on the subject should also be given importance. The aim of this research has been determined as the systematic compilation method of examining thesis studies on communication conducted in the last decade and published in the Thesis Center database of the Council of Higher Education. Various suggestions have been made by the researchers based on the data obtained in line with this aim, and the results contribute to a better understanding of how communication is examined in higher education and provide a resource for researchers regarding the evolution and current status of communication research in our country.

Keywords: Earthquake, Communication, Systematic review.

GİRİŞ

Afetler her yıl önemli insani ve ekonomik kayıplara neden olmaktadır. Bu felaketlerden depremler en yıkıcı doğa olaylarından biridir. Bu olaylar 1902 ve 2011 yılları arasında 23 milyondan fazla ölüme, önemli fiziksel, sosyal, ekonomik ve bazen kurumsal, kültürel ve çevresel kayıplara neden olmuştur (Oluwafemi ve ark., 2016). Bir depremin ardından, nüfusun konumu, tahliye yolları, kaynakların mevcudiyeti, etkilenen alanın büyüklüğü ve hasarın dağılımı hakkında mekansal bilgi için önemli bir talep ve ihtiyaç vardır. Daha sonra, acil durum aşamasında, binaların yapısal bileşenlerindeki hasarlar hakkında daha ayrıntılı veri toplamak gerekir (Doocy ve ark., 2013).

Depremlerin etkisini en aza indirmedeki temel faktörlerden biri, olaydan önce, olay sırasında ve olaydan sonra etkili iletişimdir. Ayrıca acil servisler, kaynakları etkili bir şekilde dağıtmak ve ihtiyacı olanlara yardımı önceliklendirmek için birbirleriyle iletişim kurabilmelidir. Bu bağlamda sağlık sektörü için de deprem olgusunda iletişim faktörü ön plana çıkmaktadır. Etkili iletişim sayesinde hükümetler, kuruluşlar ve toplumlar, sağlam iletişim sistemlerine ve stratejilerine yatırım yaparak depremlere ve diğer doğal afetlere daha iyi hazırlanabilir, bunlara yanıt verebilir ve bunlardan kurtulabilir ve dikkat edilmesi gereken öncüllerin başında yer almaktadır (Ggüneş, 2015).

Bu araştırmanın amacı da son on yılda iletişim konusunda gerçekleştirilen ve Yükseköğretim Kurulu Başkanlığı Tez Merkezi veritabanında yayımlanan tez çalışmalarının sistematik derleme metoduyla incelenmesi olarak belirlenmiştir. İlişkin literatür incelendiğinde iletişim konusunda yapılan tez çalışmalarının sistematik derleme yönemiyle analiz edilmediği belirlenmiştir ve bu çalışmamızın özgün yönünü oluşturmaktadır.

LİTERATÜR

Doğal Afetler ve İletişim

Doğal hayatın akışını aniden ve keskin bir şekilde değiştiren, uyum sağlama yeteneğini ortadan kaldıran; yerel, ulusal ve hatta dış yardımları kaçınılmaz kılan, insan, canlı, maddi ve doğal kaynaklarda önemli kayıplara neden olan olaylar afet kavramı altında değerlendirilmekte olup, afetlerin neden olduğu faktörler arasında aşağıdakiler yer almaktadır (Pourebrahim ve ark., 2019);

- Ekolojik dengenin bozulması,
- İnsan, mal ve kayıpların fazlalığı,
- Devam eden yaşam biçiminin ortadan kalkması,
- Afetin ardından meydana çıkan sorunlarla başetme yeteneğinin bireysel ve yerel kapasiteyi aşabilmesi,
- Dış yardıma ihtiyaç duyulması.

Yukarıda sıralanan özelliklere sahip olan afetlerin insan müdahalesi sonucu meydana gelenleri yapay; insan müdahalesi dışında meydana gelenlerine ise doğal afet adı verilmektedir ve doğal afetlerin birçok çeşidi mevcuttur. Her zaman hazırlıklı olunması gereken afetlerde, hazırlık aşamasında olay anı ve sonrasında hızlı iletişimin sağlanması ve toplum adına önlemler alınması gerekmektedir (Midtbust ve ark., 2018). Öncesinde de iletişimin, toplumun bilinçlendirimesi, eğitilmesi ve olaya karşı hazır hale getirilmesi sağlanabilmektedir. İletişim anlamında daha büyük gelişimlerin sağlanabilmesi bakımından bilim ve teknolojinin ilerlemesine dayalı olarak altyapının güçlendirilmesine yönelik projeler geliştirilmelidir. Afet anında afet yönetim birim ve kuruluşlarının yanı sıra toplum ve sayıları giderek artan sivil toplum örgütleri de bilgilendirilmektedir. Öte yandan afet durumlarında erişilen veriler ve sağlık bilgilerinin korunması sosyal fobinin önlenmesini sağlayıcı niteliktedir. Veri güvenliği ve doğruluğu, etkin iletişim yöntemleri ile mümkün olup, bu durumla ilgili birimlerin de olaylardan haberdar olmaları ile hazırlıklarının artırılması sağlanabilmektedir (Platania ve ark., 2022). Bilgiler internet ve sosyal medya aracılığıyla kamuoyuna duyurularak olayla ilgili bilinç sağlanabilmektedir. Afete hazırlık bilgilerinin iletilmesi afet yöneticilerinin sorumluluğundadır. Ancak afet yöneticileri, risk iletişiminde medya da dahil olmak üzere çeşitli paydaşlara ihtiyaç duyarlar. Etkili bir ortaklığın

kurulabilmesi adına medya mensupları ve afet yöneticilerinin birbirini anlayan ve destekleyen bir tutum sergilemeleri gerekmektedir. Afet yöneticileri medya mensuplarına yol göstermeli, onları risk iletişimi sürecine etkin bir şekilde dahil etmelidir (Kušen ve Strembeck, 2021).

Ülkemizde ise afet iletişiminin sağlanmasında başarılı ve etkin olarak ne tür materyallerin mevcut olduğu hakkında çok az bilgi mevcuttur. Üstelik son dönemde sosyal medyanın aktif kullanımıyla birlikte afet iletişiminin sağlanmasında hem büyük bir fayda hem de bilgi kirliliği ve kötü niyetli paylaşımların da bulunması nedeniyle iletişim anlamında bir karmaşanın olduğu görülmüştür (Ilgın ve ark., 2023). Afet durumlarında sağlanan iletişim risk iletişimi kategorisine girmektedir. Risk iletişimi, insanların tehlikeler hakkında bilgilendirildiği ve davranışlarını değiştirmeleri için etkilendiği ve risk konuları hakkında karar verme sürecine katılabilecekleri sosyal bir süreci ifade etmektedi. Kavram kendi içerisinde; bilgi, iletişim, eğitim ve yönetim görevlerini içermektedir. Bir süreç olarak gerçekleştirilen bu iletişim türünde temel anlamda üç süreç bulunmaktadır ve bunlar arasında (Hong ve ark., 2018):

- İnsanların tehlikelerle nasıl başa çıktıkları;
- Risk bilgilerini nasıl işledikleri ve değerlendirdikleri;
- Kabul edilen bilgilerin risk algısını, değerlendirmesini ve davranışını nasıl etkilediği yer almaktadır.

Afet durumlarında bireylerin gösterdikleri tepkilere bağlı olarak davranış değişikliği veya benimseme, birçok faktörden etkilenen çok karmaşık bir konudur. Hem ülke kültürü hem de araştırılan tehlikeye bağlı olarak, insanları ihtiyati tedbirler almaya teşvik eden veya engelleyen faktörlerde farklılıklar olsa da insanların tehlikelere karşı tepkilerinde bazı ortak noktalar vardır. Bu konuya ilişkin gerçekleştirilen araştırmalarda daha yüksek risk altındaki bölgelerde yaşamanın tedbir uyarılarına ya da yeni afet haberlerine daha temkini tepkiler veridğini göstermiştir. Öte yandan bireylerin ekonomik ve eğitim düzeyi, sosyo-ekonomik düzeyleri ve yaşadıkların şakmet birimi gibi fakrlerin de tedbir ve iletişim açısından etkili faktörler oldukları belirlenmiştir (Spence ve ark., 2007). Örneğin, Türkiye'de, Amerika Birleşik Devletleri'nde ve Japonya'da yapılan araştırma sonuçlarına göre daha yüksek bir gelir veya ekonomik düzeyin depreme karşı önlem alma ile ilişkili olduğunu gösterirken, daha yüksek bir eğitim düzeyinin depreme karşı önlem almada kilit faktörlerden biri olarak belirtildiğini göstermiştir (Hong ve ark., 2017; Pourebrahim ve ark., 2019; Diwanji ve ark., 2020; İnal Önal ve ark., 2022). Ayrıca bir felaketin doğrudan ya da dolaylı deneyimi, çeşitli çalışmalarda hazırlıklı olmanın güçlü bir motivasyon kaynağı olarak değerlendirilmiştir. Depreme hazırlık önlemleri hakkında farkındalık veya bilgi alma konusu çoğu ülkede toplum tarafından afet öncesinde önemsenmeyen bir konu olarak değerlendirilse de afetin meydana gelmesinin ardından önemi anlaşılmaktadır. Ancak yine de özellikle ülkemizde sürecin daha sağlıklı yönetilebilmesi açısından bir çalışma yapılmamıştır. Etkili risk iletişiminin temel özellikleri de aşağıdaki gibi sıralanabilmektedir (Verma ve ark., 2015);

- Farklı kilit oyuncu ve izleyici grupları arasındaki alışverişi içeren dinamik ve etkileşimli bir süreçtir,
- Sosyal güvene, güvenilirliğe ve açıklık gereklidir,
- İzleyiciyi anlamanın ve dinlemenin temel adımları yer almalıdır,
- İyi bir planlama ve finansmana ihtiyaç vardır.

Özetle afet durumlarında kullanılan risk iletişiminde medya iletişimi, sosyal medya, kitlesel bilinçlendirme kampanyaları, sağlığın teşviki ve geliştirilmesi, paydaş katılımı, sosyal seferberlik ve toplum katılımı dahil (ancak bunlarla sınırlı olmamak üzere) iletişim ve katılım stratejileri ve taktiklerinin bir karışımı kullanılmaktadır (Saleem ve arkk., 2019).

Deprem

Depremler dünyanın yüzeyindeki hareketlerden kaynaklanan doğa olaylarıdır. Depremlerin ana nedeni tektonik plakaların hareketidir. Yer kabuğu irili ufaklı birçok plakadan oluşur ve bu plakalar birbirlerine göre hareket ederler. Plakaların sürtünmesi, kayması veya ayrılması nedeniyle kuvvet artar ve bu enerji aniden serbest bırakıldığında deprem meydana gelir. Bu süreç düzlem

bölgelerdeki fay hatlarına odaklanmaktadır (Shi ve ark., 2021). Boyutları ve şiddetleri değişiklik gösteren depremler, bazen ciddi boyutlarda olmak üzere insan yaşamını ve çevreyi etkilemektedir. Depremler özellikle deprem riskinin yüksek olduğu bölgelerde yaşayan insanlar için ciddi bir tehdittir. İnsanların kendilerini ve sevdiklerini koruyabilmeleri için deprem gerçeğini kabul etmeleri ve depreme hazırlanmaları önemlidir (Meacham, 2016).

Depremler büyüklüklerine ve konumlarına bağlı olarak farklı etkilere sahiptir. Büyük depremler, güçlü sarsıntılar, yapısal hasarlar, heyelanlar, tsunamiler ve artçı şoklar dahil olmak üzere çok çeşitli etkilere neden olabilmektedir. Güçlü depremler de binaların yıkılmasına ve ölüme neden olabilmektedir (Abdulhalim ve ark., 2021). Ayrıca depremler ekonomik kayıplara, sosyal hasarlara ve psikolojik etkilere de neden olması ile sosyolojik ve psikolojik açıdan önemli bir olgudur. Depremlerle ilgili bilimsel araştırmalar ve uzman görüşleri, deprem gerçeğinin kabul edilmesinde ve kamuoyunun bilinçlendirilmesinde önemli rol oynamaktadır. Bilimsel araştırmaları ve uzman görüşlerini toplumla paylaşabilmek için erişim şarttır (Sellnow ve ark., 2019). Bu, bilimsel literatürün ve uzman görüşlerinin halkın anlayabileceği şekilde sunulması anlamına gelir. Günümüzde deprem gerçeğinin kabul edilmesinde ve deprem konusunda farkındalığın arttırılmasında temel faktör eğitimdir. Deprem konusunda doğru bilgiye sahip olan kişiler riskleri daha iyi anlayabilir ve önlem alabilir. Ne yazık ki deprem bilgisine sahip olmak ve anlayışa sahip olmak deprem sonrasında ortaya çıkan sorunların çözümü için yeterli değildir ve toplumsal olarak bilinçlenebilmek adına daha fazla çalışmaya ihtiyaç duyulmaktadır.

Türkiye'de Deprem

Türkiye, dünyanın en güçlü deprem bölgelerinden biri olan Akdeniz, Alpler ve Himalayalar'ın deprem bölgelerinde yer almaktadır. Alpler, Asya ve Avrupa kıtalarının göreceli hareketlerinin yarattığı kuvvetlerden oluşmuştur. Ayrıca Himalayalar Hindistan ile Asya kıtasının birleşmesiyle oluşmuştur (Cansız, 2022). Türkiye, Avrupa-Asya, Arabistan ve Afrika gibi üç büyük tektonik levha ile Ege ve Anadolu levhaları gibi iki küçük levhanın arasında yer alması nedeniyle de deprem konusunda en fazla dikkat edilmesi gereken ülkeler arasında yer almaktadır. Türkiye'deki deprem gerçeği ile ilişkili olarak aşağıdaki teknik verilere ulaşılmıştır (Şahin ve ark., 2018);

- Sert bir blok olan Anadolu levhası, Avrasya levhasına göre yılda 25 mm batıya doğru hareket etmektedir.
- Anadolu yılda 30 mm hızla batı-güneybatıya doğru hareket etmektedir.
- Batı Anadolu, kuzeydoğu ve batıya maruz kalması nedeniyle yılda 15 mm hızla hareket etmektedir.
- Arap Yarımadası yılda 23 mm hızla kuzeye ve kuzeydoğuya doğru hareket etmekte olup, bu hareketin sonucunda Kafkas Dağları yılda 10 mm kısalmakta, Doğu Anadolu'da ise bu hareket Bitlis doğu-batı bindirme bölgesinde yılda 15 mm'lik bir hareketle karşılık vermektedir.
- Afrika plakası, Avrupa-Asya plakasına göre yılda 10 mm hızla kuzeydoğuya doğru hareket etmektedir.

Türkiye, esasında başta deprem olmak üzere birçok doğal tehlikeyle karşı karşıya olsa da ülkemizin yaklaşık %96'sı değişen derecelerde sismik aktivite riski altında olarak tanımlanabilmektedir. Özellikle İstanbul'da yakın gelecekte bir deprem yaşaması beklenmektedir ve felaket senaryolarına göre 30.000-40.000 ölüm ve 120.000'den fazla yaralının olacağı tahmin edilmektedir. Buna rağmen, bireysel düzey de dahil olmak üzere çeşitli düzeylerde bir depreme hazırlanmaya olan ilgi sınırlı görünmektedir (Tekeli-Yeşil ve ark., 2018). İstanbul'da daha önce yapılan çalışmalar, risk farkındalığının deprem için harekete geçme sürecinde bireyler için çok önemli bir faktör olduğunu ortaya koymuştur. Katılımcılar depremler ve hasar riski hakkında nispeten geniş bilgiye sahip olsalar da bu bilgi genellikle yüzeyseldi ve hasarın nasıl azaltılacağı ve kendilerini nasıl hazırlayacakları değil, riskin kendisiyle sınırlı olmuştur (Güneş, 2015). Bu nedenle, bilgilerin içeriği genellikle bireysel hazırlanmaya uygun değildir ve hasarın nasıl azaltılacağı veya depreme nasıl hazırlanılacağı da dahil olmak üzere deprem bilgisindeki değişkenler hakkında detaylı bir kamu araştırması bulunmamaktadır (Telli ve Altun, 2023).

YÖNTEM

Metodoloji

Bu çalışmada nitel araştırma yöntemlerinden sistematik derleme metodu tercih edilmiştir. Sistematik derleme, belirli bir alanda yayınlanmış olan çalışmaların kapsamlı bir şekilde analiz edilerek, çeşitli dahil etme ve hariç tutma kriterlerini kullanarak, çalışma kalitesini değerlendirerek ve dahil edilen çalışmaların sonuçlarını özetleyerek ilişkin konuya dair mevct durumun belirlenmesini sağlamaktadır (Karaçam, 2013). Mevcut çalışmalar incelenirken Yükseköğretim Kurulu Başkanlığı Tez Merkezi'nde "deprem, iletişim" anahtar kelimeleri ile aramma yapılmıştır.

Evren ve Örneklem

Araştırmanın evrenini Yükseköğretim Kurulu Başkanlığı Tez Merkezi veritabanında deprem konusu çerçevesinde şimdiye kadar hazırlanmış olan tüm çalışmalar oluşturmaktadır. İlişkin kriterlere uygun 2907 çalışma mevcut olup, örneklem ise iletişim konusunda son on yıl olarak belirlendiği için 3 tez çalışmasını kapsamaktadır. Örneklem olarak belirlenen çalışmaların künyelerine ilişkin bilgiler Tablo 1'de paylaşılmıştır.

Tablo 1. İncelemeye Dahil Edilen Tez Çalışmalarına İlişkin Bilgiler

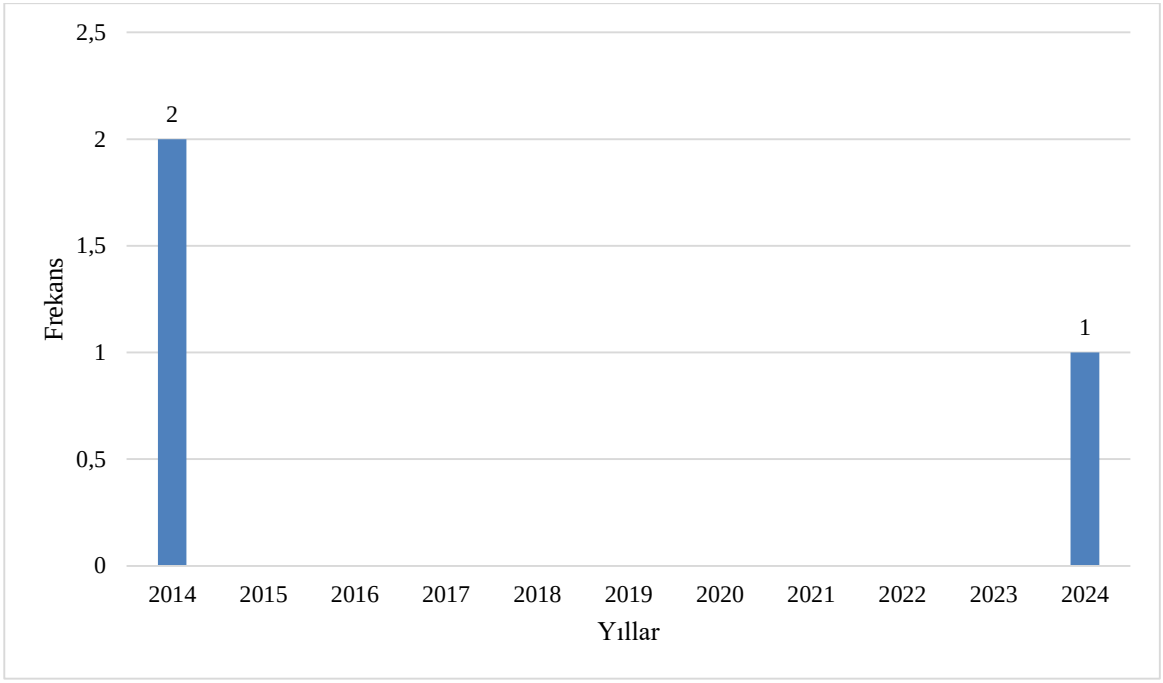
Tez No	Tez Adı	Yazar
367637	Deprem kurtarma uygulaması için pasif kablosuz sensör ağ mimarisi	Orkhan Badirkhanli
866157	Şubat depremleri sonrasında yeni medyada görünürleşen nefret söylemi: Suriyeli göçmenler örneği	Mine Özel
870261	Siyasi güven bağlamında deprem sonrası toplumsal hareketlilik	Didem Mina Kara

Bu çalışmada sistematik derleme metodolojisi kapsamında aşağıdaki sorulara yanıt aranmıştır;

- İncelenen tez çalışmalarının yıllara göre dağılımı nedir?
- İncelenen tez çalışmalarının türlerine göre dağılımı nedir?
- İncelenen tez çalışmalarının anabilim dalına göre dağılımı nedir?
- İncelenen tez çalışmalarının yöntemlerine göre dağılımı nedir?
- İncelenen tez çalışmalarının anahtar kelime dağılımı nedir?

BULGULAR

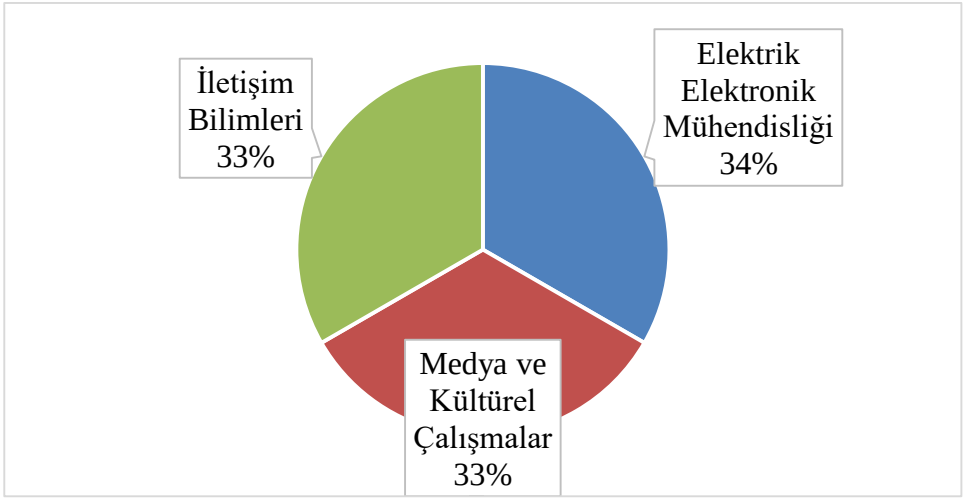
Çalışmanın bu bölümünde dahil edilen tez çalışmalarının belirlenen araştırma problemlerine göre incelenmesi sağlanmıştır. İlk olarak çalışmaların yıllara göre dağılımları incelenmiştir (Grafik 1).



Grafik 1. İncelenen Tez Çalışmalarının Yıllara Göre Dağılımı

Yukarıdaki sütun grafiği incelendiğinde son on yılda iletişim alanında deprem konusunda gerçekleştirilen 3 tez çalışmasından 2'sinin 2014, 1'inin de 2024 yılında gerçekleştirildiği belirlenmiştir. 2014-2024 arasında ise bu konuda hiç çalışma yapılmamıştır.

Çalışmada bir sonraki araştırma sorusuna yönelik oalrak çalışma türlerine göre dağılım incelenmiştir ve çalışmaların tümünün yüksek lisans türünde hazırlandığı belirlenmiştir. Sonrasında incelemede anabilim dallarına göre dağılım değerlendirilmiştir ve Grafik 2'de paylaşılmıştır.



Grafik 2. İncelenen Tez Çalışmalarının Anabilim Dallarına Göre Dağılımı

Grafik 2'de görüldüğü üzere, incelenen çalışmalardan 1'si İleitişim Bilimleri, 1'i Elektrik Elektronik Mühendisliği, 1'i ise Medya ve Kültürel Çalışmalar anabilim dalında hazırlanmıştır. Bu bağlamda anabilim dalına göre eşit dağılım gösterdikleri belirlenmiştir. İncelemenin devamında tez çalışmalarının yöntemlere göre dağılımları değerlendirilmiştir

(Tablo 2).

Tablo 2. İncelenen Tez Çalışmalarının Yöntemlere Göre Dağılımı

Yöntem	Araştırma Deseni	N	%
Nitel	Doküman Analizi	1	33,33
Nitel	Eleştirel Söylem Analizi	1	33,33
Nicel	Deneysel	1	33,33

Tablo 2'de görüldüğü üzere incelenen çalışmalardan 2'sinde nitel, 1'inde ise nicel yöntem tercih edilmiş olup, araştırma deseni olarak ise doküman analizi, eleştirel söylem analizi ve deneysel metottan yararlanılmıştır. Araştırmamızda son olarak incelenen tez çalışmalarının anahtar kelime dağılımları incelenmiştir (Tablo 3).

Tablo 3. İncelenen Tez Çalışmalarının Anahtar Kelimelere Göre Dağılımı

Anahtar Keliemeler	N	%
Yeni medya	1	9,09
Nefret söylemi	1	9,09
Suriyeli göçmenler	1	9,09
Taban hareketleri	1	9,09
Güven	1	9,09
Siyasi kurumlar	1	9,09
Doğal afetler	1	9,09
Deprem	1	9,09
Şubat depremleri	1	9,09
Göç	1	9,09
Eleştirel söylem analizi	1	9,09

Tablo 3'te görüldüğü üzere iki tez çalışmasında kullanan anahtar kelimeler sıralanmıştır. Deprem kelimesinin sadece bir çalışmada, iletişim kelimesinin ise hiç kullanılmadığı belirlenmiştir. 367637 Nolu tez çalışmasında ise anahtar kelimelere çalışma içerisinde yer verilmemiştir.

SONUÇ

Son on yılda iletişim konusunda gerçekleştirilen ve Yükseköğretim Kurulu Başkanlığı Tez Merkezi veritabanında yayımlanan tez çalışmalarının sistematik derleme metoduyla incelenmesinin amaçlandığı bu araştırmada toplamda üç araştırma incelenmiş ve çeşitli sonuçlara erişilmiştir.

Grafik 1'de yer alan veriler incelendiğinde 2014 ve 2024 yıllarında iletişim alanında depremle ilgili yalnızca 3 tez çalışmasının yapıldığı belirlenmiştir. Türkiye gibi aktif deprem kuşaklarının yer aldığı ve deprem gerçeğinin oldukça ciddi sonuçlara yol açtığı bir ülkede daha fazla çalışma yapılması gerekmektedir. Bu bağlamda alanyazında bir boşluk olduğu görülmektedir ve gelecek araştırmalar için konu seçiminde dikkat edilmesi önerilmektedir. Bu araştırmanın bir diğer bulgusu tüm çalışmaların yüksek lisans tezi olarak hazırlandığıdır. Depremlerde yaygın kullanılan iletişim biçimi risk iletişimidir ve kavramsal çerçeve olarak geniş bir inceleme alanı sunmaktadır. Böylesine geniş inceleme alnına sahip, yeteri kadar terik altyapının bulunduğu ve deprem ülkesi olarak nitelendirilen Türkiye gibi bir ülkede geniş çapra gerçkeleştirilecek bir doktora çalışmasının henüz ortaya koyulmamış olması da akademik anlamda bir eksikliği gün yüzüne çıkarmaktadır. Bu nedenle tez aşamasına gelmiş ve iletişim konusunda çalışmayı düşünen araştırmacı ve danışmanların üzerinde düşünmesi gereken konular arasında girmesi önerilebilir. Ayrıca çalışmada elde edilen sonuca göre yine incelenen çalışmaların anabilim dalları değerlendirildiğinde özellikle iletişim anabilim dalında yalnızca bir çalışmanın yapılmış olması oldukça yetersizdir.

Araştırmamızın bir sonraki bulgusu tez çalışmalarında kullanılan yöntemlerdir. Yöntemlerin birbirinden farklı çalışılmasının ise anabilim dallarındaki farklılıklardan kaynaklandığı düşünülmektedir. İletişim konu başlığı altında yapılan bu çalışmalarda saha araştırmalarına yer

verilmesi gerektiği kanaatindeyiz. Özellikle nitel araştırmalardan örüşme tekniğinin kullanıldığı, sosyal verilerin toplandığı çalışmaların yapılamsı gerektiği düşünülmektedir. Anahtar kelime incelemesinde ise ilginç olarak 367637 nolu tez çalışmasında anahtar kelime bilgisinin paylaşılmadığı belirlenmiştir ve bir tez çalışması için olmazsa olmaz niteliklerden biris olan anahtar kelime kullanımında dikkat edilmesi gerekmektedir. Son olarak iletişim çalışmalar iletişim konusunda girilmiş olsa da yalnızca bir çalışmada iletişimin anahtar kelime olarak kullanılması da beklenmeyen bir bulgu olmuştur.

Yapılan bu inceleme ışığında ülkemiz için önemli bir olgu olan deprem hakkında, iletişim konu çerçevesinde daha fazla araştırmaya yer verilmesi gerektiği ve bu anlamda akademik bir boşluk olduğu görülmüş olup bu boşluğun giderilmesi gerektiği düşünülmektedir.

KAYNAKLAR

Abdulhalim, I., Mutch, C., González, V. A., & Amor, R. (2021). Improving post-earthquake evacuation preparedness for deaf and hard of hearing children: A conceptual framework. *International Journal of Disaster Risk Reduction*, *62*, 102360.

Badirkhanli, O. (2014). *Rescue: Passive wireless sensor network architecture for earthquake rescue application.* Yüksek Lisans Tezi, Koç Üniversitesi. İstanbul.

Cansız, S. (2022). Türkiye'de Kullanılan Deprem Yönetmeliklerinin Özellikleri ve Deprem Hesabının Değişimi. *International Journal of Engineering Research and Development*, *14*(1), 58-71.

Diwanji, V. S., Arpan, L., Ulak, M. B., Hou, J. J., Ozguven, E. E., & Arghandeh, R. (2020). Understanding citizens' communication channel preferences during natural disasters: a synchronicity-based, mixed-methods exploration using survey and geospatial analysis. *International journal of disaster risk reduction*, *47*, 101646.

Doocy, S., Daniels, A., Packer, C., Dick, A., & Kirsch, T. D. (2013). The human impact of earthquakes: a historical review of events 1980-2009 and systematic literature review. *PLoS currents*, *5*.

Gunes, O. (2015). Turkey's grand challenge: Disaster-proof building inventory within 20 years. *Case Studies in Construction Materials*, *2*, 18-34.

Hong, L., Fu, C., Torrens, P., & Frias-Martinez, V. (2017, June). Understanding citizens' and local governments' digital communications during natural disasters: the case of snowstorms. In *Proceedings of the 2017 ACM on web science conference* (pp. 141-150).

Hong, L., Fu, C., Wu, J., & Frias-Martinez, V. (2018). Information needs and communication gaps between citizens and local governments online during natural disasters. *Information Systems Frontiers*, *20*, 1027-1039.

Ilgın, H. Ö., Şahin, A., & Kurtulmuş, M. (2023). Afet İletişimi Çerçevesinden Afet Döneminde Dijital Kanalların Kullanımı; Üniversiteler Üzerine Bir Analiz. *Yeni medya araştırmaları dil, imaj, fenomenler, teknoloji, dezenformasyon*, 37-59.

Inal Onal, E., Tekeli-Yeşil, S., & Okay, N. (2022). The Use of Twitter by Official Institutions in Disaster Risk Communication and Resilience: A Case Study from Turkey. *Journal of Emergency Management and Disaster Communications*, *3*(01), 25-40.

Kara, D. M. (2024). *Siyasi güven bağlamında deprem sonrası toplumsal hareketlilik.* Yüksek Lisans Tezi, Hacettepe Üniversitesi. Ankara.

Karaçam, Z. (2013). Sistematik derleme metodolojisi: Sistematik derleme hazırlamak için bir rehber. *Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi*, *6*(1), 26-33.

Kušen, E., & Strembeck, M. (2021). "Evacuate everyone south of that line" Analyzing structural communication patterns during natural disasters. *Journal of Computational Social Science*, *4*(2), 531-565.

Meacham, B. J. (2016). Post-earthquake fire performance of buildings: Summary of a large-scale experiment and conceptual framework for integrated performance-based seismic and fire design. *Fire Technology*, *52*, 1133-1157.

Midtbust, L. G. H., Dyregrov, A., & Djup, H. W. (2018). Communicating with children and adolescents about the risk of natural disasters. *European journal of psychotraumatology*, *9*(sup2), 1429771.

Oluwafemi, J. O., Ofuyatan, O. M., Sadiq, O. M., Oyebisi, S. O., Abolarin, J. S., & Babaremu, K. O. (2018). Review of world earthquakes. *International Journal of Civil Engineering and Technology*, *9*(9), 440-464.

Özel, M. (2024). *Şubat depremleri sonrasında yeni medyada görünürleşen nefret söylemi: Suriyeli göçmenler örneği.* Yüksek Lisans Tezi, Çanakkale Onsekiz Mart Üniversitesi. Çanakkale.

Platania, F., Hernandez, C. T., & Arreola, F. (2022). Social media communication during natural disasters and the impact on the agricultural market. *Technological Forecasting and Social Change*, *179*, 121594.

Pourebrahim, N., Sultana, S., Edwards, J., Gochanour, A., & Mohanty, S. (2019). Understanding communication dynamics on Twitter during natural disasters: A case study of Hurricane Sandy. *International journal of disaster risk reduction*, *37*, 101176.

Saleem, M., Khan, M. A., Abbas, S., Asif, M., Hassan, M., & Malik, J. A. (2019). Intelligent FSO link for communication in natural disasters empowered with fuzzy inference system. In *2019 International Conference on Electrical, Communication, and Computer Engineering (ICECCE)* (pp. 1-6). IEEE.

Sellnow, D. D., Jones, L. M., Sellnow, T. L., Spence, P., Lane, D. R., & Haarstad, N. (2019). The IDEA model as a conceptual framework for designing earthquake early warning (EEW) messages distributed via mobile phone apps. In *Earthquakes-Impact, community vulnerability and resilience*. IntechOpen.

Shi, M., Cao, Q., Ran, B., & Wei, L. (2021). A conceptual framework integrating "building back better" and post-earthquake needs for recovery and reconstruction. *Sustainability*, *13*(10), 5608.

Spence, P. R., Lachlan, K. A., & Griffin, D. R. (2007). Crisis communication, race, and natural disasters. *Journal of Black Studies*, *37*(4), 539-554.

Şahin, Ş., Çiftçi, C., Okyar, M., & Öksüm, E. (2018). Doğu Akdeniz'in Kabuk Yapısı ve Sismik Hız Dağılımının Üç Boyutlu Sismik Tomografi ile Belirlenmesi. *Süleyman Demirel Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, *22*(2), 961-971.

Tekeli-Yesil, S., Kaya, M., & Tanner, M. (2019). The role of the print media in earthquake risk communication: Information available between 1996 and 2014 in Turkish newspapers. *International journal of disaster risk reduction*, *33*, 284-289.

Telli, S. G., & Altun, D. (2023). Türkiye'de deprem sonrası çevrimiçi öğrenmenin vazgeçilmezliği. *Üniversite Araştırmaları Dergisi*, *6*(2), 125-136.

Verma, H., & Chauhan, N. (2015, May). MANET based emergency communication system for natural disasters. In *International Conference on Computing, Communication & Automation* (pp. 480-485). IEEE.

İKİ FARKLI TATLI SU MİKROALGİNİN (*ARTHROSPİRA PLATENSİS* VE *CHLORELLA SOROKİNİANA*) BİYOKÜTLE KONSANTRASYONU İLE HÜCRE SAYILARI ARASINDAKİ KORELASYONUNUN BELİRLENMESİ

DETERMINATION OF THE CORRELATION BETWEEN BIOMASS CONCENTRATION AND CELL COUNTS OF TWO DIFFERENT FRESHWATER MICROALGAE (*ARTHROSPIRIA PLATENSIS* AND *CHLORELLA SOROKININIANA*)

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Özet
Mikroalgler farklı su ortamlarında (tatlı, acı, tuzlu su) bulunabilen çoğunlukla tek hücreli fotosentetik özelliğe sahip koloniler oluşturan organizmalar olarak tanımlabilmektedirler. Mikroalg kültürleri hem açık hemde kapalı su sistemlerinde özellikle biyoyakıt ve gıda takviyeleri için üretimi yapılmaktadır. Ticari olarak önemli bir potansiyele sahip olsada mikroalgler dünyadaki ilk yaşam formları arasında olup atmosferimizdeki yaklaşık olarak % 40 ila 50 arasındaki oksijenin oluşumuna katkı sağlamaktadır. Mikroalgler arasında üretim açısından önemli bir yer alan iki tatlısu algi mevcuttur. Bu mikroalgler spirulina olarak bilinen *Arthrospira platensis* ve *Chlorella sorokiniana* dır. *Arthrospira platensis* tıbbı olarak ilgi oluşturan yüksek protein içeren, fotosentetik ve flamentli bir yapıya sahip mavi-yeşil alglerden biridir. *Chlorella sorokiniana* ise 7-10 mikron boyutunda oval şekilli tek hücreli bir mikroalgdir. Çok hızlı büyüme özelliği gösteren % 50-60 proteine sahip ideal bir besin kaynağı olarak bildirilmektedir. Çalışmamızda bu iki farklı mikroalg türünün biyokütle konsantrasyonu ile ışık mikroskobunda sayımı yapılan hücre sayıları arasındaki korelasyon ilişkisinin bağıntısının belirlenmesi amaçlanmıştır. bu amaçla kültüre alınan iki farklı mikroalgin 5000 ml lik plastik oval kutulara ekimleri yapılarak *Arthrospira platensis* için 565 nm de, *Chlorella sorokiniana* için ise 750 nm de spektrofotometrik ölçümleri yapılarak biyokütle konsantrasyon değerleri belirlenmiş ve yine ışık mikroskobunda bu iki mikroalg için günlük olarak toma lamında hücre sayıları sayılmıştır. Hasat sonunda SPSS programında yapılan korelasyon analizi sonucunda her iki mikroalg için biyokütle artışı ile hücre sayıları bağlılık arasında güçlü düzeyde pozitif ve anlamlı bir ilişki bulunmuştur ($p<0,05$).

Anahtar Kelimeler: *Arthrospira platensis*, biyokütle konsantrasyonu, *Chlorella sorokiniana*, hücre sayısı.

Abstract
Microalgae can be defined as mostly unicellular, photosynthetic, colony-forming organisms that can occur in different water environments (fresh, brackish, salt water). Microalgae cultures are produced in both open and closed water systems, especially for biofuels and food supplements.

Although they have significant commercial potential, microalgae are among the first life forms on earth and contribute to the formation of about 40 to 50% of the oxygen in our atmosphere. There are two freshwater algae that occupy an important place in the production of microalgae. These microalgae are *Arthrospira platensis*, known as Spirulina, and *Chlorella sorokiniana*. *Arthrospira platensis* is one of the blue-green algae that are of medical interest, have a photosynthetic and filamentous structure and contain a lot of protein. *Chlorella sorokiniana* is a unicellular microalgae with an oval shape of 7-10 micrometres. It is considered an ideal food source with 50-60% protein and has very fast growth characteristics. The aim of our study was to determine the relationship between the biomass concentration of these two different microalgae species and the cell numbers counted under the light microscope. For this purpose, two different microalgae were cultured in oval 5000 ml plastic boxes and spectrophotometric measurements were performed at 565 nm for *Arthrospira platensis* and at 750 nm for *Chlorella sorokiniana* to determine the biomass concentration values, and the cell count was also counted daily on the slide under the light microscope for these two microalgae. As a result of the correlation analysis performed with the SPSS program at the end of the harvest, a strong positive and significant relationship was found between the increase in biomass and the dependence of cell counts for both microalgae ($p<0.05$).

Keywords: *Arthrospira platensis*, biomass concentration, *Chlorella sorokiniana*, cell count.

GİRİŞ

Mikroalgler, suda serbest yüzen ve farklı su koşullarına yüksek adaptasyon yeteneği gösteren koloniler oluşturan fotosentetik mikroorganizmalar olarak tanımlanmaktadır (Oncel, 2013). Mikroalglerin biyolojik süreçleri hakkında geçmişten günümüze yeterince bilgi edinilmiş olmasına rağmen, mikroalg üretimi ile ilgili ilk çalışmalar 1950' li yıllara dayanmaktadır (Garrido-Cardenas, Manzano-Agugliaro, Acien-Fernandez, ve Molina-Grima, 2018). Bu tarihten itibaren, farklı üretim yöntemleri kullanılarak, örneğin kanal ve boru sistemleri geliştirilerek mikroalglerin yaygın üretimine başlanmış ve günümüzde dünya çapında yaygın olarak üretilen mikroalg türleri arasında *Chlorella* ve *Spirulina* öne çıkmıştır (Garrido-Cardenas vd., 2018).

Arthrospira platensis, yaygın olarak spirulina olarak bilinen, mavi-yeşil algler arasında yer alan ve oldukça zengin besin içeriği ile tanınan bir mikroalg türü olup ilk olarak 1970' lerde bilimsel olarak tanımlanan bu organizma, yüksek protein içeriği, vitaminler (özellikle $B1_2$), mineraller (demir, kalsiyum) ve antioksidan bileşikler açısından dikkat çekici özelliğe sahiptir (Ciferri, 1983). Spirulina'nın protein içeriği, kuru ağırlığının yaklaşık % 60-70' ini oluşturur ve bu proteinler temel amino asitler bakımından oldukça zengindir (Saranraj ve Sivasakthi, 2014; Thevarajah vd., 2022).

Chlorella sorokiniana ilk olarak 1953' de Sorokin tarafından izole edilen % 40 protein, % 30-38 karbonhidrat ve % 18-22 lipidden oluşan ticari öneme sahip bir mikroalgdir (Lizzul, Lekuona-Amundarain, Purton, ve Campos, 2018).

YÖNTEM

Kültür

Tekirdağ Namık Kemal Üniversitesi Fen Edebiyat Fakültesi Sucul Omurgalı Deney Ünitesi Mikroalg Laboratuvarında *Arthrospira platensis* standart zarrouk ortamı kullanılarak 32 ^{0}C su sıcaklığında devamlı havalandırma yapılarak 16 saat aydınlık ve 8 saat karanlık ortamda yetiştirilmiştir (Şekil 1). Kültürün büyümesinin belirlenmesi amacıyla spektrofotometre kullanılarak OD ölçümleri gerçekleştirilmiştir. Bu ölçümler her gün biyokütle konsantrasyonu (OD_{565}), bulanıklık (OD_{750}) ve klorofil a içeriği (OD_{680}) ölçülmüştür.

Chlorella sorokiniana F2 ortamı kullanılarak su sıcaklığı 28 ^{0}C de sürekli havalandırma yapılarak 16 saat aydınlık ve 8 saat karanlık ortamda yetiştirilmiştir. Ölçümler her gün biyokütle konsantrasyonu (OD_{750}) nanometrede yapılmıştır.

Her iki kültürün hücre sayımı her gün Fush-rosenthal toma lamında SOİF marka mikroskop ile yapılmıştır (Şekil 2).



Şekil 1. Kültür ortamları

Hasat

Arthrospira platensis 30-50 mikrometre gözenekli bir ipek elek kullanılarak filtrelendi. Filtrelenen kültürler 40 ˚C'nin altındaki ortalama bir sıcaklıkta kızılötesi bir lamba ile 12 saat kurutuldu ve kuru ağırlıkları ölçüldü.

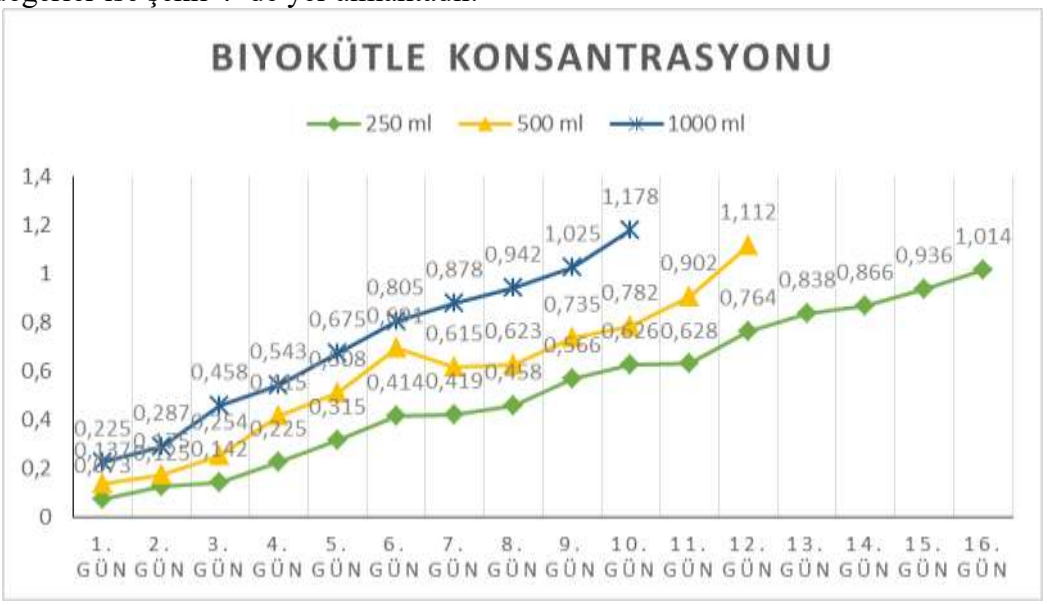
Chlorella sorokiniana ise 1 gr/5000 ml oranında alüminyum sülfat kültüre eklenerek kültürün çökelmesi sağlandı ve 40 ˚C' nin altındaki ortalama bir sıcaklıkta kızılötesi bir lamba ile 12 saat kurutuldu.



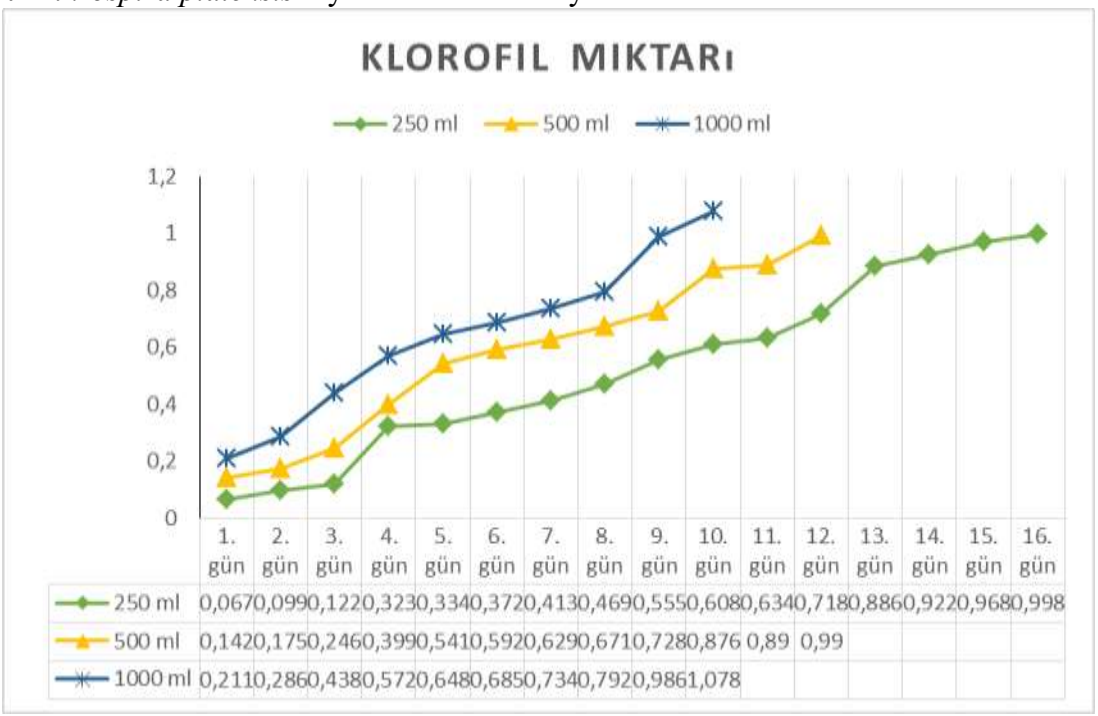
Şekil 2. *Arthrospira platensis*, Fush-rosenthal toma lamı, Chlorella sorokiniana

BULGULAR

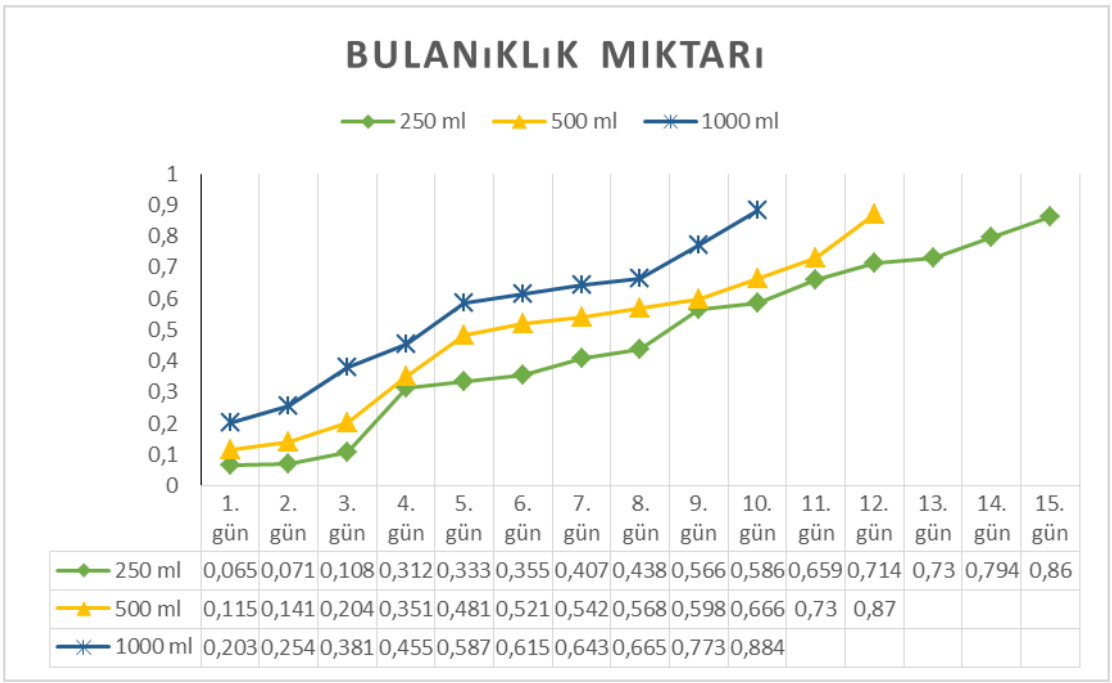
Arthrospira platensis mikroalginin biyokütle konsantrasyonu, klorofil, bulanıklık miktarı günlük olarak spektrofotometrede ölçülmüştür. Bu ölçümler şekil 1, 2 ve 3' de verilmiştir. Toma lamında ölçülen değerler ise şekil 4' de yer almaktadır.



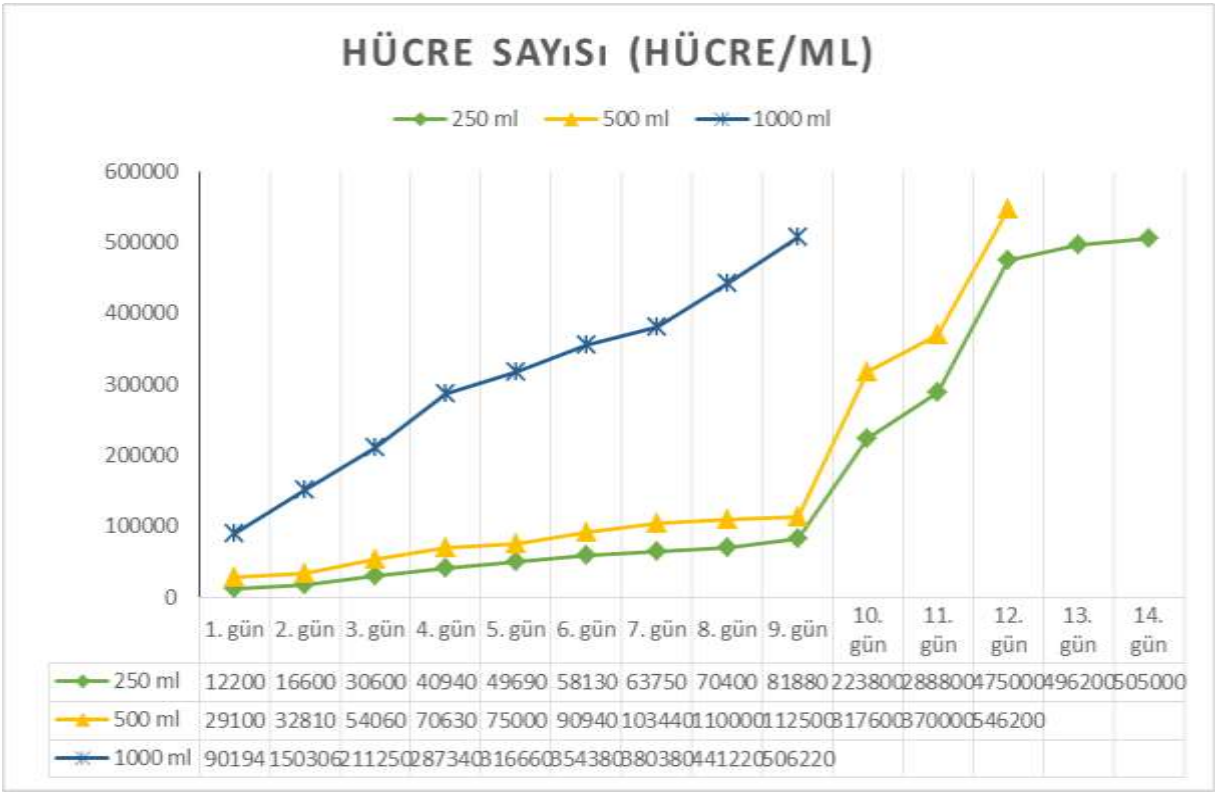
Şekil 1. *Arthrospira platensis* biyokütle konsantrasyonu



Şekil 2. *Arthrospira platensis* klorofil miktarı

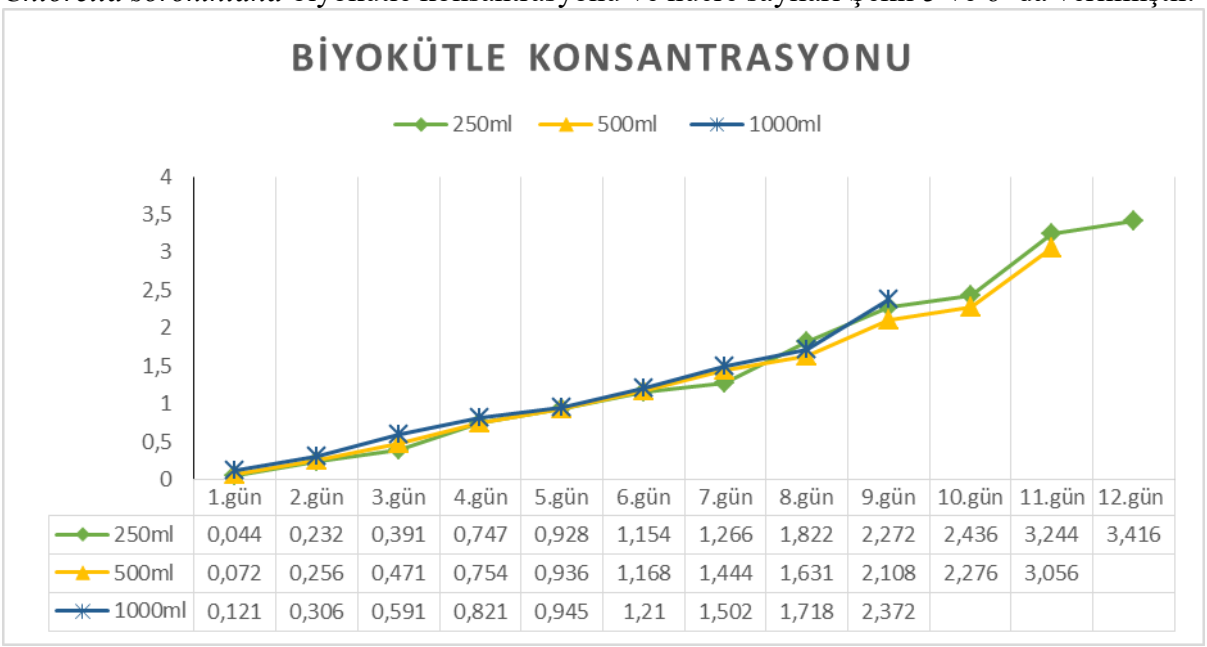


Şekil 3. *Arthrospira platensis* bulanıklık miktarı

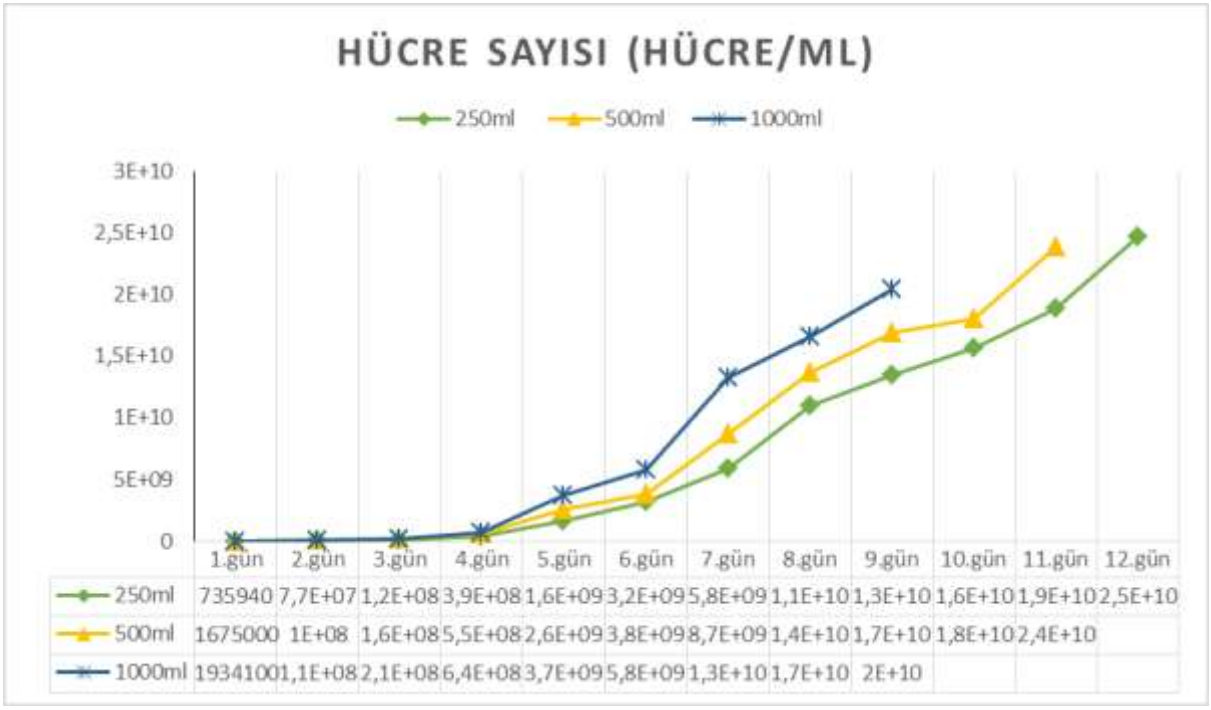


Şekil 4. *Arthrospira platensis* hücre sayısı

Chlorella sorokiniana biyokütle konsantrasyonu ve hücre sayıları Şekil 5 ve 6' da verilmiştir.



Şekil 5. *Chlorella sorokiniana* biyokütle konsantrasyonu



Şekil 6. *Chlorella sorokiniana* hücre sayısı

Çalışmada kullanılan iki farklı mikroalgin hasat gün sayıları kullanılan ana kültürün artan miktarına göre azalma göstermektedir (Şekil 7).



Şekil 7. *Arthrospira platensis* ve *Chlorella sorokiniana* hasat gün sayısı

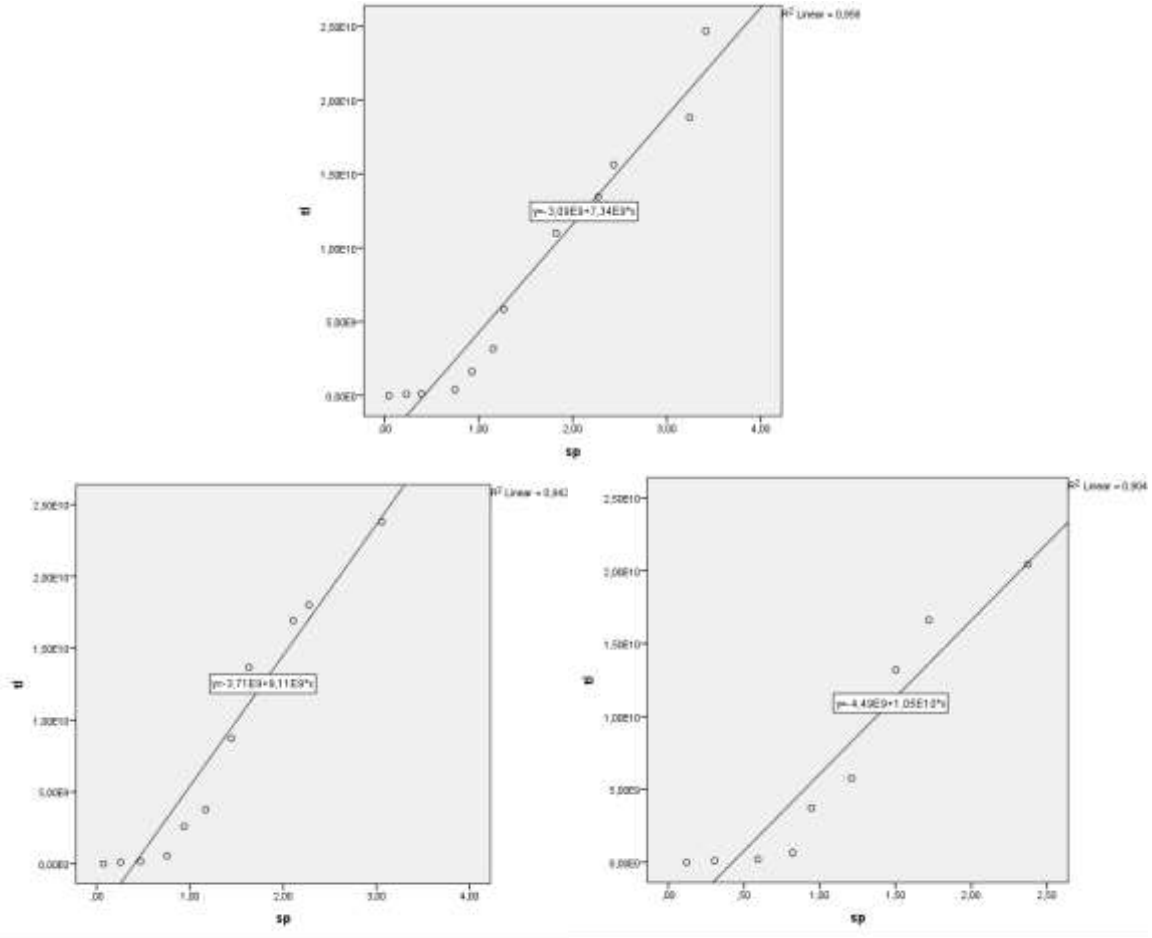
Chlorella sorokiniana biyokütle artışı ile toma lamında sayılan hücre sayıları bağlılık arasındaki ilişkiyi tespit etmek amacıyla Pearson Korelasyon analizi kullanılmıştır. Elde edilen bulgular tablo 1' de gösterilmiştir.

Tablo 1. *Chlorella sorokiniana* biyokütle artışı ve hücre sayıları bağlılık arasındaki ilişki

Ana kültür 250 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (750 nm)	Pearson r	,978*
	t	,000
	n	12
Ana kültür 500 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (750 nm)	Pearson r	,971*
	t	,000
	n	11
Ana kültür 1000 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (750 nm)	Pearson r	,951*
	t	,000
	n	9

*Korelasyon p<0,01 düzeyinde anlamlıdır.

Chlorella sorokiniana biyokütle artışı ve hücre sayıları bağlılık arasında güçlü düzeyde pozitif (p_{250}=0,978, p_{500}=0,971, p_{1000}=0,951) ve anlamlı (p<0,05) bir ilişki bulunmuştur. Yani *Chlorella sorokiniana* biyokütle artışı ve hücre sayıları bağlılıkları güçlü bir ilişki ile ve anlamlı olarak birlikte artmaktadır. Değişkenlerin birbirleri üzerinde açıkladıkları varyans % 95,64, % 94,28, % 90,44 dür. Yani toma lamında sayılan hücre sayısının 250, 500, 1000 ml için % 95,64' ü, % 94,24' ü ve %90,44' ü biyokütle konsantrasyonundan kaynaklanıyor olabilir. Bu ilişki şekil 1' de sırasıyla (250-500-1000 ml) gösterilmiştir.



Şekil 8. Hücre sayısı ve Biyokütle konsantrasyonu arasındaki ilişki grafiği

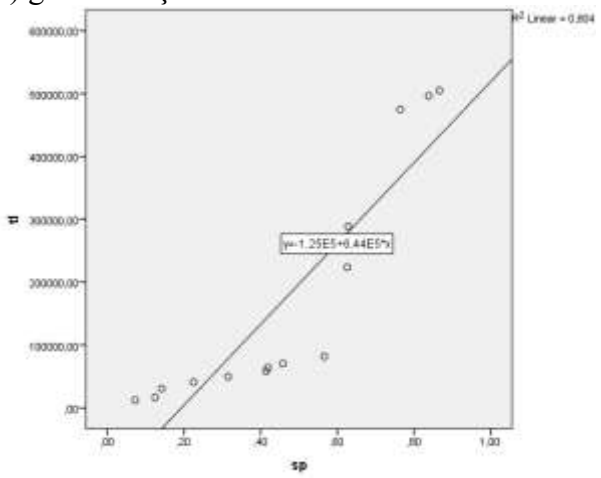
Arthrospira platensis biyokütle artışı ile toma lamında sayılan hücre sayıları bağlılık arasındaki ilişkiyi tespit etmek amacıyla Pearson Korelasyon analizi kullanılmıştır. Elde edilen bulgular tablo 2' de gösterilmiştir.

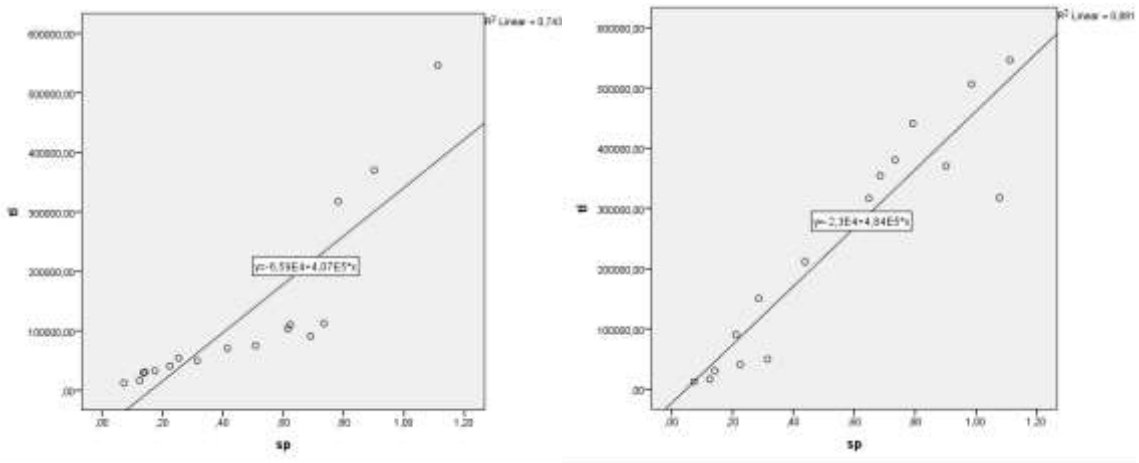
Tablo 2. *Arthrospira platensis* biyokütle artışı ve hücre sayıları bağlılık arasındaki ilişki

Ana kültür 250 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (565 nm)	Pearson r	,896*
	t	,000
	n	14
Ana kültür 500 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (565 nm)	Pearson r	,862*
	t	,000
	n	17
Ana kültür 1000 ml/5000 ml		Toma lamı hücre sayımı
Biyokütle konsantrasyonu (565 nm)	Pearson r	,939*
	t	,000
	n	17

*Korelasyon p<0,01 düzeyinde anlamlıdır.

Arthrospira platensis biyokütle artışı ve hücre sayıları bağlılık arasında güçlü düzeyde pozitif (p_{250}=0,896, p_{500}=0,862, p_{1000}=0,939) ve anlamlı (p<0,05) bir ilişki bulunmuştur. Yani *Arthrospira platensis* biyokütle artışı ve hücre sayıları bağlılıkları güçlü bir ilişki ile ve anlamlı olarak birlikte artmaktadır. Değişkenlerin birbirleri üzerinde açıkladıkları varyans % 80,28, % 74,30, % 88,17 dür. Yani toma lamında sayılan hücre sayısının 250, 500, 1000 ml için % 80,28' i, % 74,30' u ve % 88,17' si biyokütle konsantrasyonundan kaynaklanıyor olabilir. Bu ilişki şekil 2' de sırasıyla (250-500-1000 ml) gösterilmiştir.





Şekil 9. Hücre sayısı ve Biyokütle konsantrasyonu arasındaki ilişki grafiği

TARTIŞMA VE SONUÇ

Bu çalışmada elde edilen veriler, her iki mikroalg türü için biyokütle konsantrasyonu ile hücre sayıları arasındaki korelasyonun belirlenmesine olanak sağlamıştır. Sonuçlar, mikroalg üretim süreçlerinin optimizasyonu ve verimliliğin artırılması açısından önemli bilgiler sunacaktır.

KAYNAKLAR

Ciferri, O. (1983). Spirulina, the edible microorganism. *Microbiological reviews*, *47*(4), 551-578.

Garrido-Cardenas, J. A., Manzano-Agugliaro, F., Acien-Fernandez, F. G., & Molina-Grima, E. (2018). Microalgae research worldwide. *Algal research*, *35*, 50-60.

Lizzul, A. M., Lekuona-Amundarain, A., Purton, S., & Campos, L. C. (2018). Characterization of Chlorella sorokiniana, UTEX 1230. *Biology*, *7*(2), 25.

Oncel, S. S. (2013). Microalgae for a macroenergy world. *Renewable and Sustainable Energy Reviews*, *26*, 241-264.

Saranraj, P., & Sivasakthi, S. (2014). Spirulina platensis–food for future: a review. *Asian J. Pharm. Sci. Technol*, *4*(1), 26-33.

Thevarajah, B., Nishshanka, G. K. S. H., Premaratne, M., Nimarshana, P. H. V., Nagarajan, D., Chang, J. S., & Ariyadasa, T. U. (2022). Large-scale production of Spirulina-based proteins and c-phycocyanin: A biorefinery approach. *Biochemical Engineering Journal*, *185*, 108541.

DETOURS FROM MONETARY POLICY IN TURKEY AND THE EXTERNAL BUFFERS IN REDUCING RISK PREMIUMS

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ABSTRACT
This study examines the role of fiscal external buffers on the negative effects of deviations in overcoming possible risks that may arise from monetary policies within the framework of recent trends of departure from monetary policies in Turkey and the relationship of these effects with monetary policies. In this context, the study's primary objectives are to examine the defence mechanisms used to protect institutional financial stability and increase resilience against external economic shocks and to reveal the recent effects of these mechanisms by considering the impact values of fiscal external buffers and their impact values. The effectiveness of external buffers is an essential reference source in managing economic fluctuations and mitigating the effects of external financial shocks during crisis periods. In addition, it is emphasized within the scope of this study that budgetary and monetary external buffers are included in the process as a tool used to restructure external debts between countries at the global level and to ease debt burdens by reducing interest rates. It is observed that fiscal flexibility tools are a priority in Turkey's practices, especially in managing economic crises, to reduce the effects of possible external economic shocks and ensure stability. In this context, there is a monetary policy structure in which the impact values of external buffers are evaluated based on factors such as high debt levels, exchange rate volatility and borrowing costs that may negatively affect economic growth. Recently, it has been observed that Turkey has taken necessary steps to support crisis management and ensure financial stability in monetary policies through external buffers. This essential reality regarding Turkey's recent practices reveals that it is inevitable to consider monetary and fiscal external buffers' impacts on monetary policies, including budgetary-fiscal flexibility, especially within the scope of foreign exchange reserves and international financial relations.

Key Words: External Buffers, External Economic Shocks, Financial Stability, Fiscal Flexibility, Monetary Policies,

JEL Codes: E42, G18, G32.

INTRODUCTION
It is possible to talk about a process in which external buffers have come to the forefront, especially because of the recent increases in financial fragility in Turkey, especially external support and aid, and in which Turkey has come to the forefront to increase its resilience against possible shocks and exchange rate volatility. The recent financial crises in Turkey have brought these events to the forefront more frequently, with significant changes depending on the exchange rate variable, and have created significant macroeconomic negative formations. In more concise terms, it should be emphasized that the most critical goal for Turkey regarding the ongoing negative structure in the recent financial crises and the discussed financial values phenomenon is to ensure Turkey's institutional financial stability through financial buffers and to maintain this stability, and to create an increasing foreign exchange reserves portfolio to increase its financial resilience against external economic shocks. It brings to the agenda that the most crucial goal of the external buffers' phenomenon, especially in monetary and financial analyses, is to overcome

financial fragilities. At the same time, it has made a target with a substantial contribution level to fiscal discipline and low institutional debt level being reviewed again, public debt level, and coming to the forefront in sustainable budget deficits (Özkaya, 2013).

To ensure sustainable economic growth in Turkey, this phenomenon means keeping economic shocks under control and using them rationally by creating a critical balance and target element between financial analysis and monetary targets, especially in protecting the existing macroeconomic balances (Agénor & Montiel, 1999). Therefore, controlling financial shocks and over-strengthening unexpected negative fiscal values that may arise after financial shocks, especially the financial discipline of the country with financial buffers, is brought to the process as an essential policy tool in economic crises. When we look at the applications, it is seen that the external buffers are frequently included in the process as risk premiums in the approaches of financial institutional structures in the applications. This structure often brings to the agenda a structure that can be provided internationally, especially regarding existing values related to this happening within the international scope. This phenomenon also reveals that all kinds of issues that can be expressed with existing values and external buffers, especially in the context of global financial institutions such as it, have emerged as an essential contribution value regarding the use of credit lines and all kinds of financial structures that countries will need in primary and urgent situations. On the other hand, foreign exchange reserves, with certain mass agreements, have brought the importance of external buffers to the forefront (Tunca & Ferah, 2022). This can be expressed as the improvement of the conditions of this structure in Turkey, where financial fragility has increased today.

This fact has been accepted as a meaningful structure that contributes to sustainable economic growth in the long term. On the other hand, external buffers also play a crucial role in reducing risk premiums related to external foreign investors. For Turkey's external investors, the importance of financial resources in protecting the financial stability of their countries by increasing their confidence contributes to the process. The dependence on external buffers will decrease, especially with the introduction of external buffers, and the cost of external financial resources will also reduce the cost of borrowing conditions. External buffers will provide critical support against debt repayments, primarily based on foreign exchange reserves, with decreased risk breaks (Payne et al, 2008). This structure, which can emerge with external buffers and external financial buffers, further increases the capacity to pay foreign exchange debts at the national level. This position undoubtedly means that the financial fragility in Turkey will be reduced, and the debts will be restructured, especially with services such as investments, and the interest rates related to the restructuring of borrowers and the cost of borrowing will be further improved. It is seen that the certainty of a significant effect communication between financial policies and financial policies has frequently been brought to the agenda, especially with the introduction of external buffers, and from the present situation on, it is also seen that the financial discipline in Turkey will be re-established, and these policies will increase financial support regarding the economic crisis and the financial support supported by the financial support (Özen et al, 2013).

THE IMPORTANCE OF EXTERNAL BUFFERS IN REDUCING RISK PREMIA, AND BALANCES IN TURKEY

In Turkey, especially in the medium and long term, the establishment of monetary authorities and their decision to reduce the risk premiums for monetary policies can be the primary critical reason for strengthening external buffers significantly. In other words, it is understood that there is a decision process that monetary authorities and monetary policy implementers should establish, which is quite complex and complicated (Aydin & Igan, 2010). Macroeconomic balance also comes to the forefront as reducing interest rates to reduce some rational existing debt burden and to encourage growth in recent years. This phenomenon in Turkey has brought to the agenda the current rational compensation policies in reducing risk premiums and the implementations that

these compensation policies have recently come to the forefront with a cost reduction policy, especially with the structure that they can support financial values with external buffers. The issue that should be particularly emphasized is that financial policies as compatible policies can effectively lead to the depreciation of the national currency in Turkey and ongoing increases in inflation or a decrease in inflation rates via external financial buffers (Uysal, 2017).

Effects of Deposits External Buffer as Related to International Liquidity and Domestic FX

This balancing process can be expressed with some negative balances of currency pressures, which can be described as an excessively expansionary monetary policy, which can lead to further dollarization. It frequently has brought up the possibility of increased risk, especially after 2020 and 2021, with the money supply rising 12% in 2020 and 10% in 2021, which mainly triggered high inflation expectations. In this context, on the other hand, it is observed that underground currencies are frequently on the agenda for global monetary expansion and that this money, which comes to the agenda, especially with interest rate adjustments, has often brought to the agenda the idea that monetary incentive cannot be the driving force of recovery. The main issue is that it has also frequently brought to the agenda the idea that monetary incentives cannot be the driving force of recovery. It has also revealed that specially modified financial policies harm the depreciation of the currency and the reversal of the decline in inflation at the point where the driving force of the amount other than money in the increasing money rates with monetary incentives remains weak (Benli et al, 2022). In this context, especially the situation that monetary policy will be balanced with external buffers with dollarization policies, especially in reducing the decrease in monetary and risk parity, reveals that global monetary expansion policies have found a place in the process as an essential driving force of recovery in a more controlled process (Kara, 2016).

On the other hand, it is necessary to mention some statical policies that may lead to the depreciation of currencies and harmonious monetary policy deviations in Turkey, which are the opposite of the progress made by decreased rates in inflation rates. This situation for Turkey shows that external financial buffers have not reached the desired level and are following an international trend, especially like South Africa, Malaysia and Ukraine. In this regard, it is understood that the degree of impact of external buffers on international debts is relatively high in countries such as Thailand, Russia and India and that it creates a severe increase in gross international reserves (Köse et al, 2020). In the graphs below, it is possible to see the effect variability in the creation of external buffers that can provide external financial buffer support, especially by comparing reserves at the world international level Turkey's world reserves on a country basis. Graph 1 below shows the distribution of values that may arise with the level of effectiveness of external buffers, in balance elements in the distribution of international liquidity indicators and external debt comparisons across countries and regionally:



Source: World Bank (2019). *Turkey Economic Monitor-October 2019: Charting A New Course*, Washinton, D.C: International Bank for Reconstruction and Development / The World Bank, p.22.

Graphic 1. International Liquidity Indicators and Domestic FX Deposits External Buffer Effects

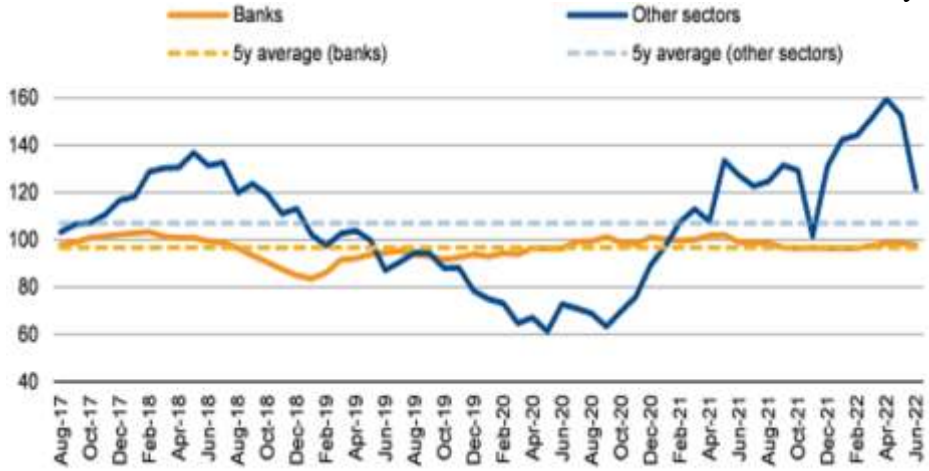
As can be seen in Graph 1, especially when it beat Turkey and despite the increasing external debt trends of approximately 35%, it is observed that the increases in the international reserves are low. This value is also an indicator of global liquidity. It can be stated that with a variable value structure, Turkey's external debt has increased significantly more with the rapprochement line as the same trend as South Africa's line, and it is seen that it reveals a global measure that does not have enough external buffer effects in terms of international reserves. It is impossible to say that the period has changed much, especially after 2020 and 2021. It should not be said that the significant increase in the export potential of Thailand, Russia, and India in a more increasing value trend has created a significant external buffer effect with the decrease in borrowing values (ASEAN, 2023). It is important to note that a significant amount of foreign exchange is needed to meet short-term liabilities in Turkey. It is seen that external buffers have an essential function in supporting the decisions taken by the Central Bank, especially in preventing a security crisis in the national currency, to help the free loading of foreign currency debt in the country (Yared, 2019).

Undoubtedly, any value that can be taken to support debt service obligations has negative effects and the effect of supporting reserves, especially for the Central Bank. It is possible that the Central Bank's gross foreign exchange reserves, especially in the uncertainty and volatility processes, will increase through reserve requirements due to Turkey's tendency to hold foreign exchange abroad. In this context, a structure in which external buffers are especially compared with external financial buffers means a more meaningful precautionary level to support foreign exchange payments in a sudden situation for countries with large foreign exchange deposits. It is observed that those countries that continue below these precautionary reserve levels are underdeveloped and developing countries in the negative processes of the criteria evaluated more with reserve levels. On the other hand, one of the critical issues in Turkey that is based on foreign exchange trade, especially the strengthening of a trade option-FX supported by external buffers (CBRT, 2022-a). It is important to emphasize that foreign exchange trading (FX), in terms of external buffers, is a monetary phenomenon in which a country trades its currency with another country's currency. In this respect, especially in Turkey, strengthening external buffers in financial terms is essential, and Türkiye is a meaningful need to strengthen external buffers to reduce market pressures. This also expresses the principle of enhancing external buffers as a key to ensuring confidence in the ongoing economic changes and reducing risk premiums in Turkey.

External Debt Rollover Ratios in Turkey and Effects of External Financial Buffers on This Fiscal Status

This phenomenon, in practice, is a monetary policy instrument that directly affects external buffers, as a process in which a foreign currency of the relevant type is given by the country and another kind of currency is received in return at a quoted price. This situation is primarily the process of trading Turkey's national currency with another country's currency, usually in dollars, or purchasing another type of foreign currency at a price by announcing a significant quotation in return for giving it in foreign currency. From the perspective of the Central Bank of the Republic of Turkey, this structure is a structure where monetary policy can be further strengthened, especially by supporting external financial buffers. Again, a subject that can be expressed significantly, the increase in the precautionary levels of reserves, especially the provision of foreign trade deposits, especially a liquidity structure that external debts can provide, should also be mentioned (Republic of Türkiye Ministry of Treasury and Finance, 2023). This structure, an essential phenomenon for the CBRT, is emphasized by international indicators of external debts, especially on an international scale, and constitutes a meaningful trend. On the other hand, the issue that should be particularly emphasized here is the risk that the approaches to companies in

Turkey, especially in terms of monetary policy, have turned into an overly expansionary monetary policy due to a complex balance. Considering the short-term financing requirements and low demand in this regard, the delay in possible companies' market interventions is reflected in the process as a delay in the financial inadequacies in the markets and a phenomenon that can significantly increase the financial fragility in Turkey (CBRT, 2023). Regarding finance and institutions, banks, average bank values, and structural variability of other sectors outside the bank reveal an important effect mechanism, especially for external debt rollover by external financial buffers. This effect mechanism is especially significant regarding the effect of external buffers on external debts. Regarding finance and institutions, banks, average bank values, and structural variability of other sectors outside the bank reveal an important effect mechanism, especially for external debt rollover by external financial buffers. This effect mechanism is especially significant regarding the effect of external buffers on external debts. In the following Graph 2, it is possible to see the effects of external financial buffers on external debt rollover ratios in Turkey:



* %, six-month moving average

Source: Levon Kameryan (2022). *Türkiye: Balance-Of-Payments Tension Rises; Stopgap Efforts to Stabilize Lira Increase Risks*, https://scoperatings.com/ratings-and-research/research/EN/172105 (Accessed September, 24.2024).

Graphic 2. Effects of External Financial Buffers on External Debt Rollover Ratios in Turkey

At the same time, it also expresses some positions regarding the financing problems in Turkey and the above Graph 2. It is seen that the private sector is more prominent than public sector debts, especially in Turkey's financing difficulties. In this context, it is essential to emphasize that the external financing requirement of 225 billion US dollars will represent an external debt with a maturity of approximately 183.5 billion US dollars. In this context, it should be emphasized that the transfer of private external debts outside the public sector and the provision of the debt cycle, especially after the pandemic crisis in 2020, has carried a structure in which the CBRT reserves will be under even more pressure, even if there is no continuous decrease, to 2021 and 2022. However, a structure in which there is a decrease of approximately 1.5 billion US dollars in local government debts and 15.4 billion US dollars in stocks, especially by the end of the second quarter of 2022, also reveals that the reserve change pressure has increased significantly in the amount of non-resident capital in Turkey. The increasing pressure on reserves has a negative effect on resident capital formation (European Commission, 2023).

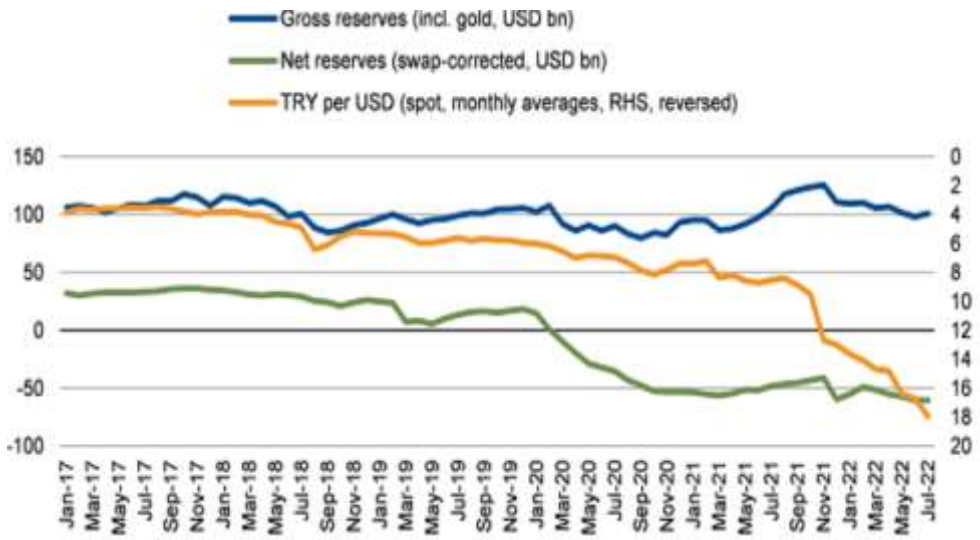
The evaluation of the issue, especially regarding foreign exchange, based on external financial buffers also means that borrowing costs have increased for emerging markets like Turkey. The structure of this approach, which increases the costs of debts, also expresses a financial fragility risk, especially for emerging financial markets in Turkey, which also reveals that debts of 2 billion

US Dollars due in 2027 can be issued as Euro Bound. The image that debt accumulation after 2020 will increase more than its return means a structural contradiction with the process indicated by the CBRT's economic views, monetary policy, and inflation rate increases. In this context, since external buffers are based on the principle of establishing a balance between the increasing foreign exchange reserves of the CBRT together with external borrowings aimed at providing rational benefit from financial loans, it has been reflected in the process by creating a significant handicap in terms of supporting financial lobbies, especially in overcoming financial crisis policies. It is challenging to say that external financial buffers are sufficient and meet the expected positive impact values in helping to reduce these vulnerabilities caused by foreign currency borrowing and high debt crises in Turkey due to market vulnerabilities and limited market access. In recent periods, when there is a situation in Turkey where especially corporate debt is high, overcoming a difficulty that may hinder the medium-term investments of these companies and, therefore, the challenges in overcoming the distressed assets in the banking sector have frequently brought the need for external financial campaigns to the agenda in Turkey (Turkic Academy, 2023).

Variability in Exchange Rate for Turkey and Effects of External Buffers on Exchange Reserves

It also reveals that the impact of external financial buffers is felt more as a need. Compared to the annual inflation rates of the negatively affected units, more meaningful monetary stability and a more meaningful possibility of achieving it with increasing external financial buffers are inevitable. There has been an external position of the buffers in Turkey, especially in terms of gold and US dollars, and a proportional increase or decrease structure against the dollar with the value of the Turkish lira as net reserves in swap transactions and billions of dollars. In particular, in understanding the external financial impact values that can be expressed in a regular manner, such as the number of central bank reserves, while it is clearly in the bank wallet, on the other hand, how much of the reserves used on a monthly average have increased, the reserve platforms that can be followed and explained at a significant level at the point of proportional increase or decrease of the Turkish currency against the US dollar and the spot value that can be clearly expressed in billions of dollars are pretty meaningful in terms of the proportional change events of the Turkish lira against the US dollar (CBRT, 2022-b).

In this sense, it points to a compassionate financial fragility process affected by external financial buffers for Turkey. The expression of net and gross reserves in Turkey can also be interpreted as a position where the scale variability of gold-based reserves and swap transactions are affected by external financial buffers. Even if the institutional static qualified policies create an effect opposite to the external financial buffers in terms of content and the depreciation of the national currency and even make an impact value that is discussed in this respect, especially in the depreciation of the currency in inflation, external buffers are aimed to be an essential tool in reducing currency pressures that may become more complicated due to the balance sheet inconsistencies of companies in Turkey (Pienkowski, 2023). The US dollar directly impacted the external buffer effect and entered a negative process as a unit after 2017. The purpose of expressing net reserve values in US dollar is to clearly understand the variability of external financial buffers' global exchange rate effect. Chart 3 below, show this situation more clearly and explicitly regarding the position of the real effect variability after 2017:



Source: Levon Kameryan (2022). *Türkiye: Balance-Of-Payments Tension Rises; Stopgap Efforts to Stabilize Lira Increase Risks*, https://scoperatings.com/ratings-and-research/research/EN/172105 (Accessed September, 24.2024).

Graphic 3. Effects of External Financial Buffers on Reserves and Exchange Rate for Turkey

Even if it is thought that this volatility in the Turkish currency against the dollar is a gain for the CBRT with a structure that makes direct reserves more costly, as observed in Graph 3 above, the significant depreciation of the Turkish currency against the dollar and the fact that this depreciation lost approximately 30% of its value in foreign exchange in 2022 also shows that the Turkish lira is increasingly at risk of further depletion against foreign exchange reserves. This financial location and situation also reveal that it is expressed with a structure that aims to create a positive effect against the Turkish lira and sectors and to prevent the depreciation of the Turkish lira. However, it is difficult to say that even if this trend creates a significant effect and a positive contribution value to the approaches expected from them. In the fight against inflation, they should cause a cost reduction that will be gained over time. These approaches have been revealed to cause a purchasing power parity deviation that negatively affects inflation by increasing the cost effect (Allen, et al, 2002).

In this context, exporters are positively affected by a recently increased structure from the Central Bank's foreign exchange, and incentive policies are more prominent with increasing export values. It is seen that the CBRT is aimed at improving the external buffer effect with an effect it has created, and therefore, in terms of monetary policies, especially net reserves in 2022, compared to the 18.5 billion US dollars at the end of 2019, turned into a reserve trend deviation of almost a record low of 60.1 billion dollars. With the effect of this decrease in reserve trouble via the external buffers, the balancing policy with an exchange rate effect on a global basis has caused Turkey's recent increases in the market to be prevented by inflation and to have a positive impact on current deficits by creating a buffer towards prices to avoid price increases. Thus, this phenomenon has justified the place of a monetary policy as the main target in the fight against inflation related to external buffers (IMF, 2023).

This feature of external buffers also aimed to change interest rate policies along with monetary policies and create a positive effect on exchange rate increases by accepting political interest rates, especially in increasing trends, by the government through external financial buffers. One of the essential features in expressing external financial buffers is understanding the impact values in Turkey and presenting and discussing the impact values related to inflation. This approach, in other words, means understanding the extent to which the balance between domestic political decisions regarding inflation and the critical external imbalance of the economy is achieved. In

this context, the position of GDP is directly affected by the effects of financial buffers, especially the state credit power, which is more positively affected by reducing the cost effect of external financial buffers (Pastor, 2023). With the limited structure of approaches to monetary policy in Turkey, where possible changes in monetary and fiscal policies are always in question, external financial buffers as a balance mechanism that economic imbalances at all levels can lead to political issues, make external financial buffers effective with its compatibility with socio-political approaches.

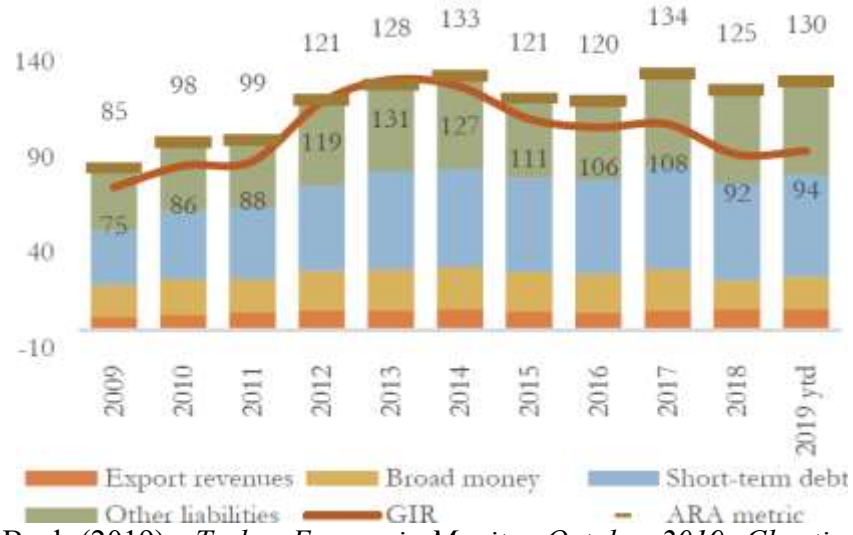
This approach, especially in the correction of foreign exchange credit ratings and understanding the effects of foreign exchange credit ratings on foreign markets in Turkey, reveals a significant relationship between the external buffer effect and the account balances of the TCMB that can be understood with both US dollar swaps and net reserves via based on external financial buffers. This external application practice also means an application that aims to clearly and significantly contribute to understanding the TCMB net reserves, especially the impact value of swap transactions and the position of the Turkish lira, especially against the US dollar, in understanding the relative volatility value. There is an absolute dominance of opinion that it will provide an important buffer, especially in Turkey's international situation. It should be emphasized that external buffers will constitute an essential mechanism of influence and impact value, primarily because the international reserve positions of the CBRT are lower than the countries and other estimated needs. The external buffers will be evaluated according to liquidity demands, and the potential impact on reserves will be sufficiently considered (CBRT, 2022-c).

With all this, it may also be that during a process where there is no significant change in the international reserve level financing needs, a considerable balance in Turkey's financing needs can always be provided by supporting the financing requirements with external buffers. It is always possible to talk about a structure where external financing needs can be supported, especially in a position excluding foreign loans and foreign trade loans. This approach, especially in 2023, when international reserves exceed 100 billion US dollars for 12 months, means a level of income that can meet possible financing requirements. The impact values of external buffers and the increase in expectations for an effective monetary policy reveal a position where the effectiveness of financial policies enters a different trend, and the debt restructuring policies expected from external buffers are directly reflected in the process (AMRO, 2022).

DISCUSSION

The expectations for this positive effect of external buffers are also the countries' external buffers in terms of external debts and current deficits also reveal a structural reality, which means that increases in short-term debt trends, together with export revenues and other liabilities, are also affected by significant fluctuations in the structure of debts. However, it should be noted that the difficulties of this phenomenon in Turkey regarding financial vulnerabilities are an investment blockage that can be expressed with limited markets and low demand.

When we look at the world scale, it aims to shape a structure that can be expressed with some investment and economic growth trends beyond expectations in Turkey, especially in the reform policies that have significantly positively affected the exit from crisis policies by supporting them with external buffers in East Asia and especially in overcoming the Asian financial crisis (Sangsubhan & Basri, 2012). This approach also includes the importance of external buffers, especially in the economic growth policies beyond the financial policy reforms after the Asian crisis. It is possible to say that especially the basic money trend in money values, has created an increase in different financial liabilities with a significant increase from 2009 to the present and has reduced the effect of external buffers. In Graph 4 below, the change process, export revenues, and broad monetary base in Turkey after 2009, as well as the level of gross international reserves and short-term debt, can be monitored:



Source: World Bank (2019). *Turkey Economic Monitor-October 2019: Charting A New Course*, Washinton, D.C: International Bank for Reconstruction and Development / The World Bank, p.21.

Graphic 4. Reserve Adequacy Metric and Reserves Prudential Levels in Türkiye

The distribution of crucial target variables at different levels of variability has been observed in Turkey after 2009, especially in the financial impact values of external buffers, as seen in Graph 4. Given the importance of different values to outside buffers, the degree of reserves in Turkey as a preventive control and status in Turkey have the same effect. Another substantial structure is that the sustainability of export revenues corresponds to a deficient level, and a trend that may be slightly above 0% continues, as shown. Besides, one could unsubscribe all the exporting revenues to a monetary base inflation and expect economic growth would come with a corresponding inflated monetary base expansion. Short-term borrowings have increased as the most significant trend over gross domestic product, particularly after 2013 and have continued in various trends, but the long-term speed with a very high metric of borrowing has contributed more to the issue, mainly in external buffers.

Nevertheless, the gross level of international reserve (GIR) levels remain well above international benchmarks even as net increased liabilities are mainly a result of credit borrowings. This trend also prevails in external buffers, which surge through higher commercial deposits in foreign cur-p be taken out in foreign currency as well. In the short-term provisions, external buffers have succeeded at a highly remarkable point regarding values converted with a monetary effect in commercial terms for the CBRT. Turkey's gross international reserves (GIR) fluctuated significantly in 2012 and afterwards. The economic growth rate and uncertainties arising in global financial conditions are some of the main reasons for the fluctuations in Turkey's gross international reserves (GIR) (World Bank, 2020). In a similar period, price fluctuations in the international community, especially in foreign markets, were another important factor affecting the gross reserves of developing countries by presenting a source of funds cost of zero to these countries. In the period following 2012, the year of external buffers, Turkey's external borrowing from the international financial system, international monetary agreements and additional financing agreements to international currency swaps led to an increase in various foreign exchange supply sources in the total international reserve supply. Such fluctuations, especially experienced at levels following 2012, can be associated with factors such as movements in exchange rates, capital movements and outflows. However, these data indicate that, on the positive side, Turkey's export revenues and external debts have a sustainable structure, and their adequacy has reached a significant level with the positive effect of the external buffer.

CONCLUSION

External financial buffers play a critical role in strengthening countries' reserves and increasing their capacity to meet their external debts, especially during periods of economic crisis. Turkey

has adopted various strategies to improve its external financial buffers since 2012. Swap agreements, expansion of external borrowing opportunities and agreements with international financial institutions are at the forefront of these strategies. Such contracts have contributed mainly to reducing fluctuations in foreign exchange reserves and making short-term debts more sustainable. External buffers have been a critical balancing factor in meeting Turkey's short-term debt obligations. Thanks to external buffers, Turkey has become more resilient to global economic fluctuations and increased its capacity to maintain reserve adequacy. In this context, the effect of external buffers on reserves has been not only to maintain reserve levels but also to strengthen the country's economic stability. In this context, external financial buffers play a critical role in meeting the country's short-term financing needs in times of external crisis and positively affect liquidity agreements at the international level by increasing target foreign exchange reserves, which is a more critical matter for Türkiye.

It is understood that it also aims to create a rational infrastructure where currency fluctuations will find a place in the process in a more controlled manner. This structure in Turkey is expressed with different values, especially a control mechanism regarding exchange rate volatility. The exact process has been experienced recently, and the same process is also represented with a structural-institutional effect process in which inflation rates are controlled and macroeconomic balance policies are controlled. The increase in Turkey's reserves is directly related to the success of the country's debt management strategies and external buffers. Managing short-term debts in a more controlled process has significantly reduced external financial liabilities and preserved reserves. Especially in the post-pandemic period, the management of external debts has become even more critical. The CBRT's reserves have created a sufficient buffer when considering short-term debts and external financing needs during this process. The stability of reserves during this period is directly related to the improvement in Turkey's external debt payment capability and external buffers. Turkey's reserve adequacy is critical regarding the CBRT's foreign exchange reserves and gold stocks' ability to meet international economic obligations. The fluctuations observed in gross international reserves after 2012 have settled into a certain balance with the effect of external financial buffers. The decrease in reserves experienced with the pandemic process has been partially offset by external buffers such as international financing sources and swap agreements. Turkey's success in short-term debt management and the effect of external financial buffers have significantly contributed to the reserves remaining sustainable. In this context, Turkey's reserve adequacy metric has created a positive trend regarding the adequacy of international reserves compared to external debts and export revenues. Strengthening external financing opportunities and adapting to global economic conditions will be critical regarding the future course of reserves. Although the Corona-19 pandemic process has caused a decrease in Turkey's reserve adequacy metrics in general, the total level of reserves still provides precautionary adequacy. In other words, although the pandemic caused a reduction in the CBRT's reserves, they remained at a certain level of balance. However, this balance was due to the activation of Turkey's remaining external financial buffers and the opportunities to activate additional foreign exchange inflows through international agreements. In addition, despite the decrease in foreign exchange reserves, reserves continued uninterruptedly despite the controlled management of short-term debts and the stability of the exchange rate policy.

REFERENCES

Agénor, P.R. and Montiel, P.J. (1999). *Development Macroeconomics (2nd ed.),* Princeton, New Jersey: Princeton University Press, 1999.

Allen, M., Rosenberg, C., Keller, C., Setser, B. & Roubini, N. (2002), *A Balance Sheet Approach to Financial Crisis*, IMF Working Paper 02/210, Washington, D.C.: International Monetary Fund (IMF), 2023.

AMRO (2022). *Rebuilding Fiscal Buffers in the Post-Pandemic Era: Fiscal Normalization, Consolidation, and Structural Reform*, Policy Perspectives Paper PP/22-02, Singapore: ASEAN Macroeconomic Research Office (AMRO)
ASEAN (2023). *ASEAN and Global Value Chains: Locking in Resilience and Sustainability*, Asian Development Bank Publication Stock No. SPR230100-2, Manila: Asian Development Bank, 2023.
Aydin, B. and Igan, D. (2010). *Bank Lending in Turkey: Effects of Monetary and Fiscal Policy*, IMF Working Papers, No 10/233, Washington, D.C.: International Monetary Fund (IMF), 2010.
Benli, M., Ekinci, A. ve Orhan, B. (2022). "The Long-Run Effect of International Reserves on Economic Growth in Developing Economies", *Eskişehir Osmangazi Üniversitesi İİBF Dergisi*, 17(3): 822 – 836. DOI: 10.17153/oguiibf.114552.
CBRT (2022-a). *Financial Stability Report - May 2022*, Central Bank of Republic of Turkey, Vol. 34, Ankara: Central Bank of Republic of Turkey (CBRT), 2022.

CBRT (2022-b). *Monetary Policy and Liraization Strategy For 2023*, Ankara: Central Bank of Republic of Turkey (CBRT), 2022.
CBRT (2022-c). *Box 1.1. Recent Credit, Collateral and Liquidity Policy Steps*, in Inflation Report - CBRT, 2022-III. https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/ Main+ Menu/Publications/Reports/Inflation+Report/2022/Inflation+Report+2022+-+III/Boxes. (Accessed October, 09.2024)
CBRT (2023). *Financial Stability Report - May 2023*, Vol. 36, Ankara: Central Bank of Republic of Turkey (CBRT), 2023. https://www.tcmb.gov.tr/wps/wcm/connect/en/tcmb+en/main+menu/publications/reports/financial+stability+report/2023/financial+stability+report+-+may+2023%2C+volume+36. (Accessed October, 09.2024).
European Commission (2023). *Commission Staff Working Document: Türkiye 2023 Report*, SWD(2023) 696 final, Brussels: European Commission (2023).
IMF (2023). *Republic of Türkiye Staff Report for The 2022 Article IV Consultation*, IMF Country Report, 23/303, Washington, D.C.: International Monetary Fund (IMF), 2023.
Kameryan, L. (2022). *Türkiye: Balance-Of-Payments Tension Rises; Stopgap Efforts to Stabilize Lira Increase Risks*, https://scoperatings.com/ratings-and-research/research/EN/172105 (Accessed September, 24.2024).
Kara, H. (2016). "Turkey's experience with macroprudential policy", *Bank for International Settlements (BIS),* Papers No. 86, 123–139.
Kose, M. A., Nagle, P., Franziska, O. & Naotaka, S. (2020). *Global Waves of Debt: Causes and Consequences*, The World Bank Advance Ed., Washington, D.C.: International Bank for Reconstruction and Development / The World Bank, 2020.
Özen, E., Şahin, C. & Ünalmış, İ. (2013). "External Financial Stress and External Financing Vulnerability in Turkey: Some Policy Implications For Financial Stability", *Central Bank Review*, 13, 65-74.
Özkaya, Ata (2013). "Public Debt Stock Sustainability in Selected OECD Countries", *Central Bank Review*, 13, 31-49.
Pastor, P. S. (2023). "Turkey: Macro-Financial Situation", *Banco de Espana Economic Bulletin,* 2023/Q1, Madrid: Banco de Espana, 2023.
Payne, J.E., H. Mohammadi and M. Cak., 2008, "Turkish Budget Deficit Sustainability and the Revenue-expenditure Nexus", *Applied Economics*, 40, 823-830.
Pienkowski, A. (2023). *Foreign Currency Balance Sheets in Türkiye: Exposure and Interconnectedness*, IMF Working Paper WP/23/132, Washington, D.C.: International Monetary Fund (IMF) European Department, 2023
Republic of Türkiye Ministry of Treasury and Finance (2023). *Public Debt Management Report-September 2023*, Ankara: Republic of Türkiye Ministry of Treasury and Finance, 2023.

Sangsubhan, K. & Basri, C. (2012). "Global Financial Crisis and ASEAN Fiscal Policy Response", *Asian Economic Policy Review*, 7, 248-269.
Tunca, H. Ö. & Ferah, A. (2022). "Turkey's Preventive Operations Against Terrorists Across Southern Border". *International Journal of Politics and Security*, 4(1): 106-142. DOI: 10.53451/ijps.1004432.
Turkic Academy (2023). *Report on Turkic Economies 2023: Digital Trade and Investment*, Astana: Organization of Turkish States, 2023.
Uysal, M. (2017). "Financial Stability and Macroprudential Policy in Turkey", *Bank for International Settlements (BIS)*, Papers No. 94, 349-369.
World Bank (2019). *Turkey Economic Monitor-October 2019: Charting A New Course*, Washinton, D.C.: International Bank for Reconstruction and Development / The World Bank, 2019.
World Bank (2020). *Turkey Economic Monitor-August 2020: Adjusting the Sails*, Washinton, D.C.: International Bank for Reconstruction and Development / The World Bank, 2020.
Yared, P. 2019. "Rising Government Debt: Causes and Solutions for a Decades-Old Trend", *Journal of Economic Perspectives*, 33(2): 115–140.

DİNÎ METİNLER BAĞLAMINDA İSLAM İLE JAPON KÜLTÜRÜ ARASINDAKİ AHLAKÎ BENZERLİKLER

ETHICS SIMILARITIES BETWEEN ISLAM AND JAPANESE CULTURE IN THE CONTEXT OF RELIGIOUS TEXTS

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ÖZET
Coğrafî uzaklık göz önünde bulundurulduğunda Japonya'nın İslam beldelerinde yaşayan Müslümanlarca çok farklı bir kültüre sahip olduğu düşünülmekte ve bu anlamda Japon kültürü hakkında çeşitli önyargılar olduğu görülmektedir. Bu durumun bir ada ülkesi olan ve kendi içinde özel bir toplum yapısına sahip olan Japonlar için de aynı görüldüğü düşünülmektedir. Nitekim son yıllara kadar Japonya'da İslam'ın ve Müslümanların belli bir medya algısı üzerinden yanlış şekilde tanıtıldığı bilinmektedir. Bunun bir sonucu olarak da iki kültüre mensup insanların birbirini doğru şekilde tanıması pek mümkün olmamış veyahut da bu ünsiyetin gelişimi belli bir sınırda kalmıştır. Ancak globalleşen dünyada insanların teknolojinin de sağladığı imkanlarla önyargıları kenara bırakarak farklı kültürleri keşfetme arzusunda oldukları anlaşılmaktadır. İşte biz de bu noktadan hareketle birbirinden uzak gibi sanılan ancak hem ahlakî hem de manevî değerler açısından birbirine yakın olduğunu tespit ettiğimiz İslam ile Japon kültürünü ele almayı uygun gördük. Bu anlamda çalışmamızda 2019 yılında Japonya'ya gerçekleştirdiğimiz ziyaret sonucunda İslam ve Japon kültürü arasında tespit ettiğimiz benzerliklerin her iki kültüre ait dinî metinler ışığında ortaya çıkarılması hedeflenmektedir. Çalışmamızda iki kültürün ahlakî olarak birbirine sanıldığı kadar uzak olmadığı gösterilmeye çalışılmaktadır. Bu doğrultuda çalışmamızda ana konu olarak "Dinî Metinler Bağlamında İslam ile Japon Kültürü Arasındaki Ahlakî Benzerlikler" ele alınmaktadır. Bildirimizde iki kültür arasındaki ahlakî benzerliklerin gözler önüne serilmek suretiyle etkileşimin daha da arttırılması amaçlanmaktadır. Bu amaca binaen çalışmamız üç ana başlıktan oluşmakta ve sırasıyla *"Ahlak Kavramının Etimolojik Tanımı"*; "*İslam ile Japon Kültürünün Etkilendiği Çeşitli Dinî Kaynaklar*" ve "*Dinî Metinler Bağlamında İslam ile Japon Kültürü Arasındaki Ahlakî Benzerlikler*" şeklindeki başlıklar ele alınmaktadır.

Anahtar Kelimeler: İslam, Japonya, Ahlak.

ABSTRACT
Considering the geographical distance, Japan is thought to have a very different culture by Muslims living in Islamic lands, and in this sense, there are various prejudices about Japanese culture. It is thought that this situation is also seen the same for the Japanese, who are an island country and have a special social structure. Indeed, it is known that until recent years, Islam and Muslims in Japan were incorrectly introduced through a certain media perception. Indeed, it is known that until recent years, Islam and Muslims were incorrectly portrayed in Japan through a certain media perception. As a result, it was not possible for people from the two cultures to get to know each other properly, or the development of this familiarity remained limited. However, in a globalizing world, it is understood that people want to leave their prejudices aside and explore different cultures with the opportunities provided by technology. From this point of view, we

found it appropriate to examine Islam and Japanese culture, which are thought to be distant from each other but we found to be close to each other in terms of both moral and spiritual values. In this sense, our study aims to reveal the similarities we identified between Islamic and Japanese cultures as a result of our visit to Japan in 2019, in the light of religious texts belonging to both cultures. Our study attempts to show that the two cultures are not as morally distant from each other as is thought. In this context, the main subject of our study is "Moral Similarities Between Islam and Japanese Culture in the Context of Religious Texts". Our work aims to further increase the interaction by revealing the moral similarities between the two cultures. In line with this purpose, our study consists of three main titles, and the titles of “Etymological Definition of the Concept of Morality”, “Various Religious Sources Affecting Islamic and Japanese Culture” and “Moral Similarities Between Islamic and Japanese Culture in the Context of Religious Texts” are discussed respectively.

Keywords: Islam, Japan, Morality.

GİRİŞ

İnsanoğlunun bu dünyaya geliş amacına uygun davranabilmesi için uyması gereken birtakım ilkeler vardır. Ahlak ilkeleri olarak bilinen bu kaideler bireylerin ve toplumların huzur içinde yaşamalarını sağlayan erdemler bütünüdür. Bu ilkelere göre yaşamlarını sürdüren toplumlar diğerlerine nispetle ilerleme kaydetmişler ve örnek medeniyet seviyesine ulaşmışlardır. Bunun tersi olarak kendilerine tavsiye edilmiş ilkelere riayet etmeyen ve istenilen medeniyet seviyesine ulaşamayan toplumlar da bulunmuştur. Ancak bu toplulukların da zamanla farklı kültürlerle etkileşime girerek içinde bulundukları hali iyileştirme yoluna gittikleri görülmüştür.

Biz de çalışmamızda bu durumun günümüzdeki tezahürleri olarak Japon ve İslam toplumlarını örnek vermeyi uygun gördük. Bağlayıcı dinî kuralları olmamasına rağmen Japonların ahlak ilkelerine bağlı kalarak yaşamlarını idame ettirmeleri ve örnek bir medeniyet inşa etmeleri ibretler barındırmaktadır. Nitekim günümüz Müslüman beldelerinin Kur’an’da ve sünnette yer alan ahlak kaidelerini yerine getirmekte aciz kalması olması gereken İslam Medeniyeti’nin de oluşmasını olumsuz yönde etkilemiştir. Ancak Müslümanların unutmuş oldukları değerleri hatırlamaları ve ibret almaları için kendilerine örneklik teşkil eden kültürlerle iletişim halinde bulunması önem arz etmektedir. Bu noktadan hareketle çalışmamızda Japonların medeniyet konusunda gelişmesine sebebiyet veren ahlak ilkeleri ortaya konulmaya çalışılmış ve birbirinden uzak olduğu düşünülen bu iki kültürün aslında ne kadar ortak haslete sahip oldukları gözler önüne serilmiştir.

YÖNTEM

Japon dini inanış ve geleneklerinde İslam’a uygun olmayan pek çok hususun bulunduğunu da belirtmemiz gerekmektedir. Bu zaviyeden bakıldığında iki kültür arasında benzerlikler bulunduğu gibi farklılıkların da bulunduğunu söylememiz mümkündür. Ancak çalışmamızda Japonların İslam hakkındaki ön yargılarının kırılması ve Müslümanlara yeni bir kültürün tanıtılması amaçlandığından sadece iki kültür arasındaki benzerliklerden söz edilecektir. Ayrıca İslam ahlakını belirleyen pek çok temel unsurun bulunduğunu ancak çalışmamızda daha çok Kur’an ayetlerine yer verileceğini de belirtmemiz gerekmektedir.

Çalışmamız, uzun yıllardır ilgi duyduğumuz ve birçok hususta yakından takip ettiğimiz ve bu durumun bir neticesi olarak 2019 senesi Eylül ayında Japonya’ya gerçekleştirmiş olduğumuz ziyaretimize ve oradaki deneyimlerimize dayanmaktadır. Ziyaretimiz başta Japonya’nın başkenti olan Tokyo, Kyoto ve Kobe olmak üzere üç şehri ve buradaki etkileşimlerimizi kapsamaktadır. Özellikle Tokyo’da Tokyo Cami’ne, Kobe’de Japonya’nın ilk ve en eski camisi olan Kobe Cami’ne ve Kyoto’da ise çeşitli Şintoist ve Budist tapınaklarına yapmış olduğumuz ziyaretler bu deneyimlerimizi daha da kuvvetlendirmiştir.

Bildirimizde iki kültür arasındaki ahlakî benzerliklerin gözler önüne serilmek suretiyle etkileşimin daha da arttırılması amaçlanmaktadır. Bu amaca binaen çalışmamız üç ana başlıktan oluşmakta ve sırasıyla *"Ahlak Kavramının Etimolojik Tanımı"*; "*İslam ile Japon Kültürünün Etkilendiği Çeşitli Dinî Kaynaklar*" ve "*Dinî Metinler Bağlamında İslam ile Japon Kültürü Arasındaki Ahlakî Benzerlikler*" şeklindeki başlıklar ele alınmaktadır.

Ahlak Kavramının Etimolojik Tanımı

Kelime anlamı itibariyle ahlak, *h-l-k* yani خلق kökünden türemiş ve *hulk/huluk* kelimelerinin çoğulu olup sözlükte, "*seciye, huy, tabiat, karakter*" anlamlarına gelmektedir.[11] Terim anlamı olarak ahlak, "*kişiden sadır olan iyi ve kötü huyları, fazilet ve reziletleri*" kapsamaktadır.[12]

Ahlak kelimesi genel olarak, "*insanoğlunun kabul etmiş olduğu ve başka kesinlik ölçüleriyle belirlenemeyen hareketlerine dair değerlerin bütünü*" şeklinde tanımlanmaktadır.[13] Bu anlamda ahlakın, insanlar arası ilişkileri ve düzeni sağlayan bir erdemler ve ilkeler sistemi olduğunu söylemek mümkündür.[14] İslami literatürde ahlak kelimesi genelde *edeb* kelimesi ile eş anlamda kullanılmıştır. Bunun dışında güzel huy ve davranışları tanımlamak üzere *hüsnü'l-huluk*, *mehâsinü'l-ahlak*, *mekârimü'l-ahlak*, *el-ahlaku'l-hasene* ve *el-ahlaku'l-hamîde* kavramları da geçmektedir.[15]

İslam ile Japon Kültürünün Etkilendiği Çeşitli Dinî Kaynaklar

Müslüman toplumlarda Kur'an ve Sünnet'in belirlemiş olduğu ahlak ilkeleri ve ibadetler esas alınmakta ve her insan bu esaslara göre yetiştirilmeye çalışılmaktadır. Buna göre Müslümanlar için Allah ve Rasulü'nün belirlemiş olduğu iyi huy ve eylemler güzel, kötü huy ve eylemler ise kötü ahlak olarak kabul edilmektedir. İslam'da iyi ahlaka uygun amellerde bulunma sonucunda sevap, kötü ahlaka yönelik eylemlerde bulunma durumunda ise günah kazanılacağı bilinmektedir. Müslümanlar da buna göre kendilerini ve davranışlarını gözden geçirmeye çalışmaktadırlar. Nitekim bu hususa önemli bir delil olarak Hz. Peygamber'in (sav), "*Doğrusu ben güzel ahlakı tamamlamak için gönderildim*."[16] şeklinde hadisi örnek gösterilebilir. O (sav), Müslümanlara hem kişilik anlamında hem de ibadet anlamında örnek teşkil etmiş ve ahlakın hem maddi hem de manevi yönünü tamamlayarak insanları irşad etmiştir.

Güzel ahlakla ilgili emir ve yasakların Kur'an ayetleri kapsamında genel olarak "*ahlakı güzelleştirme ve yayma*", *"pis olan şeylerden uzak durma",*[17] *"kibirlenmemek ve mütevazi olmak", "sabırlı* ve *hoşgörülü olmak", "cömert olmak", "gayret göstermek", "yalan söylemekten kaçınmak", "ihanette bulunmamak", "kınamamak", "saldırgan olmamak", "kaba olmamak", "affedici olmak", "israf yapmama*" şeklinde geçtiğini söylemek mümkündür. Bu anlamda ahlakın, İslam'da önemli olduğu ve dininin temellerini oluşturan erdemler bütünü olduğu da ifade edilebilir.

Japonlardan bahsedilecek olunduğunda, karadan herhangi bir ülke ile sınır paylaşmadıklarından dolayı kendilerine has din, dil ve kültürlerini oluşturmuş ve korumuşlardır. Böylece kendi içinde homojen bir ulus olarak varlık göstermiş oldukları anlaşılmaktadır. Geldikleri coğrafyanın etkisiyle yaşam tarzlarında Budizm'in, Konfüçyanizm'in ve Taoizm'in etkileri fazlaca görülmektedir. Ancak daha sonraki yıllarda diğer topluluklardan uzak inziva tarzı yaşayışı benimsemeleri kendilerine ait dinin veya yaşam tarzının da oluşmasına sebebiyet vermiştir. Japonca ***神の道****/Kami no Michi* olarak bilinen ve aslen Çince "Şen-Tao*"* kelimesinden türemiş olan Şintoizm, "*Tanrılar yolu*" anlamına gelmektedir.[18] Şintoizm'de belirli bir tanrı, peygamber ve

[11] İbn Manzûr, *Lisânü'l-Arab*, "hlk md.", c. I-XV, Dar Sâder, Bulak 1299-1308, Beyrut, ts., ss. 61-65.
[12] Mustafa Çağrıcı, "Ahlâk", *TDV İslam Ansiklopedisi*, c. II, İstanbul 1989, ss. 10-14.
[13] Hilmi Ziya Ülken, *Ahlak*, M. Sadık Kağıtçı Maatbası, İstanbul 1946, s. 9.
[14] Erol Güngör, *Ahlak Psikolojisi ve Sosyal Ahlak*, Ötüken Neşriyat, İstanbul 1997, s.19.
[15] Richard Walzer, *The Encyclopaedia of Islam (new edition)*, "Akhlaḳ", EI (İng.), c. I, Leiden 1954-2002, s. 336.
[16] İmam Mâlik, *el-Muvaṭṭa*, "Huluk", Takıyyüddin en-Nedvî (nşr.), c. I-III, Dımaşk-Beyrut 1991, s. 8.
[17] Mustafa Altundağ, "Kur'an Vahyinin İlk Mesajlarında Ahlaki Boyut", *Baku Devlet Üniversitesi İlahiyat Fakültesi Elmi Mecmuası,* Bakü 2004, s. 131.
[18] W. G. Aston, *Shinto: The Ancient Religion of Japan*, London 1907.

kutsal kitap inancı görülmemektedir. Bunun yerine doğadaki ve kainattaki her şeyin içinde var olduğuna inanılan 神/*kami* yani bir tür *yaşayan ruh* inancı bulunmaktadır. Bu anlamda Japonlar vefat eden büyüklerin ruhlarına ve her çeşit canlıların ruhlarına saygı duymakta ve bu ruhların kaynağının ise *Güneş kamisi* olan *Amaterasu* olduğuna inanmaktadırlar.

Şintoizm'in milli bir hüviyet göstermesi ve yayılmacı bir politika izlememesi açısından tam bir din olduğu söylenemez. Bunun yerine Şintoizm'in, Japonların zaman içerisinde farklı din ve kültürlerden etkilenerek, kendilerine uyarlamış oldukları bir yaşam felsefesi ve yolu olduğu söylenebilir. Nitekim Şintoizm'in ortaya çıkışından sonra oluşturulmuş *Kojiki* ve *Nihongi* türü metinlerin Japonya'ya, kamilere ve yaratılışa ait sürece dair efsaneleri içerdikleri bilinmektedir. Bu metinlerin dini, mitolojik ve politik unsurları içerisinde barındırdığı görülmekle birlikte Japon ahlak ilkelerinin oluşumunda tek başına yeterli olamadıkları anlaşılmaktadır. Bu metinlerle ilgili olarak Japon tarihçi Taro Sakamoto'nun (ö. 1987) "*anlatım tarzı olarak sanattan uzak ve muhteva olarak da çocukça"*[19] şeklindeki ifadeleri bu tespitimizi daha da kuvvetlendirmektedir. Şu hâlde Japon kültürünün oluşumunun daha çok Japonya'ya göç eden Çin, Kore ve Orta Asya halklarının beraberinde getirmiş oldukları dinlerinden kaynaklandığını ifade edebiliriz. Nitekim sözü edilen topluluklar bir ada ülkesi olan Japonya'da yaşamaya başladıktan ve birbirlerinin inançlarından etkilendikten sonra Japonya'ya özgü bir kimliğe sahip olmuşlardır. Böylece Konfüçyanizm, Budizm ve Taoizm gibi inançlardan etkiler taşıyan ancak Japonya'ya özel milli bir inanış olan Şintoizm meydana gelmiştir. Japonya'da bu etkiler sadece Şintoizm'i oluşturmakla kalmamış aynı zamanda Zen Budizmi[20] ve Buşido[21] gibi daha nice anlayış ve yaşayış biçimlerinin oluşmasına etki etmiştir.

Bu anlamda Japonların, dinleri sentezleyerek kendilerine uyarladığı da ifade edilebilmektedir. Zikri geçen dinlerin sosyal hayatta birtakım durumların gerçekleştirilmesinde sınıflandırıldığı da görülmektedir. Örneğin Konfüçyanizm'in, Japon sosyolojik yapısal ahlakında ve aile ilişkilerinde; Budizm'in ruhsal ve bedensel arınmayı ve kurtuluşu icra etmede; Şintoizm'in ise günlük hayatta[22] ortaya çıktığı ve insanların bunlardan öğrendiklerine göre eylemlerde bulundukları gözlemlenmektedir. Bu doğrultuda çalışmamızda İslam kültüründeki ahlakî değerler Kur'ân ve Sünnet; Japon kültüründeki ahlakî değerler ise beslendiği dini kaynaklar olan Konfüçyanizm, Budizm ve Taoizm'deki öğretiler doğrultusunda ele alınacaktır. Bununla birlikte Japon Millî Eğitim Bakanlığınca belirlenmiş ahlak kurallarına başvurulacak ve bunlar kendi gözlemlerimizden de yola çıkılarak değerlendirilmeye çalışılacaktır.

BULGULAR

Dinî Metinler Bağlamında İslam ile Japon Kültürü Arasındaki Ahlakî Benzerlikler

Bu kısımda İslam ahlak ilkeleri ve Japon ahlak ilkeleri arasındaki benzer normlar, alt başlıklara ayrılarak çeşitli dinî ve kültürel kaynaklar bağlamında ele alınacaktır.

a.Dürüst Olmak

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[19] Sakamoto Taro & John S. Brownlee, *The Six National Histories of Japan*, UBC Press, (mitolojik hikayeler) 1991; John S. Brownlee, *Political Thought in Japanese Historical Writing from Kojiki* (712) to Tokushi Yoron (1712), Wilfrid Laurier University Press, Kanada, 1991, Notes: Chapter I, s.142; Sakamoto Taro, *Nihon no Shiishi to Shigaku Shibundo*, Tokyo 1980, s. 13.

[20] İlhan Güngören, *Zen Budizmi Bir Yaşama Sanatı*, Yol Yayınları, B. 6, 2013, s. 24. "Zihni düşüncelerin ötesine taşımak yani Nirvana'ya ulaşmaktır."

[21] Kubilay Akman, "Buşido: Japon Samuraylarının Felsefesi", *Yalova Sosyal Bilimler Dergisi*, 2011, S. 1, s. 132. "Samuray savaş felsefesiyle alakalı olan kavram, sadece savaş stratejilerini içermemekte bunun yanı sıra kişisel gelişim ve ruhsal olgunlaşmayı da ifade etmektedir."

[22] Yoshida Oda, "Japonya'da Din Eğitimi", *Din Eğitimi Araştırmaları Dergisi*, Hamit Er (çevr.), İstanbul 2004, S. 14, s. 98.

İlk olarak ele alacağımız ahlak ilkesi dürüstlüktür. Kültürlü bir bireyin ve dolayısıyla medeni bir toplumun inşasında ilk öğretilmesi ve öğrenilmesi gereken temel erdem dürüstlüktür. Kur'an'da dürüstlükle ilgili pek çok ayet mevcuttur. Ancak burada birkaç tanesine yer vermekle yetineceğiz. Bakara suresinin, 42. ayetinde "Hakkı bâtılla karıştırıp da bile bile hakkı gizlemeyin." şeklinde buyrulmaktadır.[23] Ayette dikkat çekildiği şekliyle hakkın ortaya çıkarılması konusunda dürüst davranılması gerektiği ve hakkı gizlemenin dürüstlüğe uygun düşmeyeceği vurgulanmaktadır.
Çeşitli ayetlerle dürüstlük kavramı daha da örneklendirilebilir. Ancak şimdi Japon ahlak ilkelerinde yer alan şekliyle dürüstlüğü delillendirmeye çalışacağız. İslam'da olduğu gibi Japonların ahlak ilkelerine dair net çıkarım yapabileceğimiz bir kutsal kitap formatı bulunmadığından dolayı daha önce bahsettiğimiz ve Japonların ahlak yapısına etkide bulunmuş çeşitli din ve inanışları delil olarak kullanmaya çalışacağız.
Buna göre Budizm'in sekiz dilimli yol kaidesi içerisinde yer alan erdemler ve bu erdemlerden özellikle "*doğru söz*" ve "*doğru davranış"* ilkeleri insanların sözlerinde ve eylemlerinde doğru ve dürüst davranmaları gerektiğini vurgulamaktadır.[24] Yine Konfüçyüs (M.Ö. 551) de kutsal metinlerinde dürüstlüğün en temel erdemlerden olduğunu "Gerçekten iyi olan kişi, hiçbir zaman mutsuz olmaz. Olgun kişi bunalıma düşmez. Yiğit olan korkmaz, kişinin yaşantısı bütünüyle dürüstlük olmalı yoksa üzüntülerden, tehlikelerden hiç kurtulamaz. İnsanın en değerli şeyi dürüstlüktür. Dürüstlük ise doğruluğa bağlıdır." şeklinde zikretmiştir:[25]

b.Adaletli Olmak

Ele alacağımız bir diğer erdem adalet kavramıdır. Bu önemine binaen Kur'an'da çeşitli ayetlerde adalet kavramı geçmekte ve adaletle ilgili davranışlardan da söz edilmektedir. Örneğin Nisâ suresinin, 58. ayetinde "Allah size, emanetleri mutlaka ehline vermenizi ve insanlar arasında hükmettiğiniz zaman adaletle hükmetmenizi emrediyor. Doğrusu Allah, bununla size ne güzel öğüt veriyor! Şüphesiz ki Allah hakkıyla işitendir, hakkıyla görendir.[26]" şeklinde buyrulmaktadır. Ayette Allah'ın insanlara vermiş olduğu güzel bir öğüt olarak adalet tavsiye edilmekte ve insanlar arasında hükme varırken adaletin gözetilmesinden bahsedilmektedir.
Japon toplumunda adaletten söz edecek olursak, Japon ahlak yapısını etkileyen çeşitli inanç ve akımlarda adaletin önemli bir yer tuttuğu anlaşılmaktadır. Örneğin daha önce bahsettiğimiz Bushido ilkelerinin başında "*Dürüstlük ve Adalet*" yan yana geçmekte ve dürüstlükle beraber adaletin de sağlanması gereken önemli bir ilke olduğuna işaret edilmektedir.[27]
Japon ahlak yapısını etkisi altına alan dinlerden Konfüçyanizm'de de adalete değer verilmektedir. Konfüçyüscülere göre "*en önemli erdem hoşgörü ve adalet*" olarak kabul edilmektedir. Onlara göre yüce gönüllü bir şahsiyet olabilmek için ilk olarak adalet erdemine riayet etmek gerekmektedir. Adaleti yerine getiren kimse aynı zamanda ahlaka ve edebe de riayet etmiş olmaktadır. Konfüçyanizm'de devlet yönetiminde de adaletin esas alınmasından ve buna uygun kişinin seçilmesi gerektiğinden bahsedilmektedir.[28] Ayrıca Japon Millî Eğitim Bakanlığınca yayımlanan 2015 yılı ilkokul müfredatında ahlak kurallarıyla ilgili 13. maddede, "*Kimseye ayrımcılık yapmayın veya önyargılı olmayın, onlara adil ve tarafsız bir tavırla davranın ve adaleti gerçekleştirmek için çabalayın."*[29] şeklinde bir ibare de yer almaktadır. Böylece bu değerlerin,

[23] Bakara, 2/42.
[24] S. G. F Brandon, *A Dictionary of Comparative Religion*, London,1970, ss. 516-517; Jo Durden Smith, *Budizm: Gizli Öğretisi*, Tolga Bakanay (çevr.), Sınır Ötesi Yayınları, İstanbul 2006, s. 63; Amore R. C., "Eightfold Path", *The Perennial Dictionary of World Religions*, ss. 235-236; DR Hinnells, ss. 114-115; Cemil Kutlutürk, "Hint Dinleri (Budda Dharma/Budizm)", *Dünya Dinleri,* Şinasi Gündüz (ed.), Milel-Nihal Yayınları, İstanbul 2019, s. 208.
[25] Konfüçyüs, Lun Yu; *Konuşmalar,* Çağdaş Matbaacılık Yayıncılık, Muhaddere Nabi Özerdim (çevr.), 2000, s. 4; *Lun Yu;* XVII-22*, Lun Yu*; XII-13. http://ekitap.kolayweb.com/; Selahattin Fettahoğlu, "Konfüçyüs ve Öğretisi", s. 317.
[26] Nisâ, 4/58.
[27] Inazo Nitobe, *Bushido: The Soul of Japan*, 2004. http://www.gutenberg.org.
[28] Konfüçyüs*, Konuşmalar*, Muhaddere Nabi Özerdim (terc.), Ankara 1963, ss. 111-114.
[29] 教育資料，作成　中央大学　池田賢市研究室東京学芸大学　大森直樹研究室2015 年2 月25 日初版発行 2017 年12 月25 日第2 版発行　（有）サンプロセス, s . 8.

Japonlara daha ilkokul sıralarında ciddi bir şekilde öğretilmekte olduğu ve bu yönde eğitilmeye çalışıldıkları görülmektedir.

c.Sözünde Durmak

Hem dürüst bir insan hem de gerçek bir mümin olmanın şartlarından birisi de hiç şüphesiz verilen sözü yerine getirmektir. Bu kavram İslamî literatürde *vaad* kelimesi ile anılmaktadır ve "*gelecekle ilgili bir şey ve durum için ahdetmek*" anlamına gelmektedir.[30]

İslam'da bu erdeme çok önem verilmiş ve insanlar arasında ve dolayısıyla toplumda güvenin sağlanabilmesi için verilen vaadin yerine getirilmesi emredilmiştir. Verilen vaadin yerine getirilmesiyle ilgili çeşitli ayetler vardır. Bunlardan birinde yani Bakara suresinin, 177. ayetinde "İyilik, yüzlerinizi doğu ve batı taraflarına çevirmeniz(den ibaret) değildir. Asıl iyilik, Allah'a, ahiret gününe, meleklere, kitap ve peygamberlere iman edenlerin; mala olan sevgilerine rağmen, onu yakınlara, yetimlere, yoksullara, yolda kalmışa, (ihtiyacından dolayı) isteyene ve (özgürlükleri için) kölelere verenlerin; namazı dosdoğru kılan, zekâtı veren, antlaşma yaptıklarında sözlerini yerine getirenlerin ve zorda, hastalıkta ve savaşın kızıştığı zamanlarda (direnip) sabredenlerin tutum ve davranışlarıdır. İşte bunlar, doğru olanlardır. İşte bunlar, Allah'a karşı gelmekten sakınanların ta kendileridir."[31] şeklinde buyrulmaktadır.

Japon ahlak kaideleri içerisinde de verilen sözü yerine getirmek önemli yer tutmaktadır. Çünkü Japonlar için bir arada hareket edebilmek ve aynı değerlere sahip olabilmek önemli görülmektedir. Bunun sağlanabilmesi için toplum içinde güvenin oluşturulması gerekmektedir. Bu güvenin oluşabilmesinde de çeşitli değerler ön plana çıkmaktadır. Bunların başında da verilen sözün yerine getirilmesi gelmektedir. Nitekim Konfüçyanizm'de önemli kabul edilen erdemlerden biri olan sadakat, yapılan eyleme ve verilen söze ittiba etmeyi ifade etmesi açısından önem arz etmektedir. Konfüçyanizm'deki bu erdem Japon toplum ahlakını da olumlu yönde etkilemiştir. Konfüçyanizm'den de etkiler taşıyan Bushido ahlak felsefesinde de bu durum "*Sadakat Yükümlülüğü*" olarak geçmektedir.[32]

Yine Japon Millî Eğitim sisteminde de sözünde durma erdemi ilkokul müfredatıyla ilgili bölümün 12. maddesinde "*Yasaların ve kuralların anlamını anladıktan sonra, onları korumaya, kendinizin ve başkalarının haklarına değer vermeye ve yükümlülüklerinizi yerine getirmeye istekli olma"*[33] şeklinde geçmekte ve alınan sorumlulukların yerine getirilmesi ve başkalarının mağdur edilmemesi tavsiye edilmektedir.

ç. İyilik Yapmak ve Yardımsever Olmak

İnsanları birbirine bağlayan ve toplumu ayakta tutan bir diğer önemli ahlak kaidesi iyiliktir. İslami literatürde *ihsan* kavramıyla karşılanan bu kavram "*güzel olmak, başkasına iyilik yapmak ve yaptığı işi güzel yapmak*" anlamlarına gelmektedir.[34] Kur'an'da iyiliği tavsiye eden pek çok ayet mevcuttur. Bakara suresinin, 220. ayetinde "Dünya ve ahiret hakkında düşünesiniz diye böyle yapıyor. Bir de sana yetimleri soruyorlar. De ki: "Onların durumlarını düzeltmek hayırlıdır. Eğer onlara karışıp (birlikte yaşar)sanız (sakıncası yok). (Onlar da) sizin kardeşlerinizdir. Allah bozguncuyu yapıcı olandan ayırır. Allah dileseydi sizi zora sokardı. Şüphesiz Allah mutlak güç sahibidir, hüküm ve hikmet sahibidir."[35] şeklinde buyrulmaktadır.

Ayette iyilik olarak yetimlere bakmanın ve onların ihtiyaçlarıyla yakından ilgilenmenin hayırlı bir iş olduğundan bahsedilmektedir. Ayette özel duruma sahip yetimlerden hususi olarak bahsedilmesi

[30] Mustafa Demiray, "Vaad*", TDV İslam Ansiklopedisi*, c. XXXXII, 2012 İstanbul, ss. 403-404.
[31] Bakara, 2/177.
[32] Inazo Nitobe, Bushido: The Soul of Japan, 2004. http://www.gutenberg.org.
[33] 教育資料，作成　中央大学　池田賢市研究室東京学芸大学　大森直樹研究室2015 年2 月25 日初版発行　2017 年12 月25 日第2 版発行　（有）サンプロセス, s .8.
[34] Mustafa Çağrıcı, "İhsan", *TDV İslam Ansiklopedisi*, c. XXI, İstanbul 2000, ss. 544-546.
[35] Bakara, 2/220.

hem insanların onlar hakkında daha hassas olmaları gerektiğini hem de iyilik yapılacak insanların başında gelmekte olduklarını vurgulamak içindir.
İyilik yapma konusu Japonya'da da öne çıkan erdemlerdendir. Toplumu ayakta tutan bu erdem Samuraylar tarafından da benimsenmiş ve Bushido felsefesi içerisinde *"İyilikseverlik ve Acıma Duygusu"* şeklinde yer almıştır.[36] Ayrıca Budizm'deki on faziletin içerisinde de "*iyilik ve cömertlik*" ilk sırada gelmekte ve bu hususun önemine dikkat çekilmektedir.[37]
İnsanlara iyilik etmek ve topluma faydalı olmak Japon Millî Eğitim İlkokul Müfredatı'ndaki 14. maddede "*Çalışmanın ve topluma hizmet etmenin yerine getirilmesinden zevk almak, önemini anlamak ve halk için faydalı bir şeyler yapmak"* şeklinde geçmekte ve iyiliğin önemi insanlara öğretilmektedir.[38]
Bu sayılanların dışında öfkelenmemek, anne ve babaya saygı göstermek, yakın akrabayı ve komşuları gözetmek, kibar olmak, vatanı ve dini korumak gibi daha pek çok benzer ahlakî benzerliklerden söz edilebilmektedir. Ancak bildirimizin belli bir uzunluğu geçmemesi adına bu kadarını açıklamakla kifâyet edilmektedir.

TARTIŞMA VE SONUÇ

Çalışmamızda ele alınan konular ışığında çeşitli sonuçlara ulaşılmıştır. Buna göre genel olarak İslam ve Japon kültürü arasında çeşitli ahlakî benzerliklerin bulunduğu gözlemlenmiştir. Bu durum aktarılan bilimsel kaynaklarla, kişisel tecrübe ve Müslüman olmuş Japonların görüşleriyle kanıtlanmaya çalışılmıştır. Japon inanç ve ahlak sistemini etkisi altına alan Konfüçyanizm, Budizm, Şintoizm ve Taoizm'in çeşitli noktalarda İslam ile benzerlikler yakaladıkları görülmüştür. Bu durumun tarihi süreç içerisinde gönderilmiş ancak daha sonra tahrifata uğramış peygamberlerin ilahi mesajlarından kaynaklanmış olabileceği de aktarılmıştır. Nitekim çeşitler alimler, bu dinlerin kurucularının gönderilmiş peygamberlerden veya tevhit inancına sahip kişilerden olabileceklerini ifade etmişlerdir. Biz de bu görüşten hareketle Japonya'ya göç etmiş toplulukların zamanla dinlerinden uzaklaşmış ve tevhit inancından ayrılmış olabileceklerini ifade edebiliriz.
Japonları etkisi altına alan bu dinler süreç içerisinde kültürel unsurlarla etkileşime girmiş ve Japonlara özgü bir karaktere bürünmüştür. Şintoizm olarak ortaya çıkan bu milli inanış Japon ahlak ve ibadet ilkelerine de etki etmiştir. Ancak Şintoizm'e ait kutsal metinlerde bu ilkelerden açıkça bahsedilmediği görülmüştür. Bu anlamda ahlak ve ibadet ilkelerinin kaynağı olarak Konfüçyanizm, Budizm ve Taoizm dinleri ön plana çıkmıştır. Başta tevhit merkezli bir yapı gösterdiği düşünülen ancak daha sonra tahrifata uğramış olabileceği iddia edilen bu din ve inanışların İslam iman esaslarından farklı pek çok unsuru barındırdığı bilinmekle beraber ahlakla ve ibadetle ilgili farklı konularda İslam ile benzerlik gösterdiği görülmüştür. Nitekim alt başlıklara ayırarak incelediğimiz ahlak ilkeleri iki kültürün benzer kaidelere sahip olduğunu gözler önüne sermiştir. İşte biz de bu benzerliklerin ortaya çıkarılması suretiyle iki kültür arasındaki etkileşimin daha da arttırılması gerektiğini düşünmekteyiz.
Sonuç olarak eserimizde İslam ve Japon ahlak ilkelerinin sanıldığından daha yakın olduğu ortaya konulmaya çalışılmıştır. Bu çalışma da aynı zamanda Müslümanların yapması emredilen ama birçok eğitimsiz Müslümanın terk ettiği erdemler de gün yüzüne çıkarılmıştır. Ayrıca İslam'ın emrettiği bu erdemleri Müslümanlardan daha çok Japonların habersiz bir şekilde uygulaması da gözler önüne serilmiştir. Bu anlamda benzer ahlak ve ibadet ilkelerine sahip olmalarına rağmen pek çok alanda Japon toplumunun gelişme kaydetmesi; Müslüman toplumlarının ise geri kalması üstünde düşünülmesi gereken bir hakikat olarak ortaya konulmuştur.

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[36] Inazo Nitobe, *Bushido: The Soul of Japan,* 2004. http://www.gutenberg.org.
[37] Muhammed b. Abdülkerîm eş-Şehristânî, *el-Milel ve'n-niḥal*, M. Seyyid Kîlânî (nşr.), c. II, Kahire 1961, ss. 252-253.
[38] 教育資料，作成　中央大学　池田賢市研究室東京学芸大学　大森直樹研究室2015 年2 月25 日初版発行 2017 年12 月25 日第2 版発行　（有）サンプロセス, s .8.

Bu hedefin yerine getirilmesi ve çalışmamızın maksadının hasıl olması için iki kültürün birbirini daha iyi tanıması ve bu anlamda ciddi kültürel etkinliklerin oluşturulmasının önem arz ettiğini de belirtmemiz gerekmektedir. Böylece her iki kültüre mensup insanlar eksikliklerini fark ederek ve birbirinden öğrenerek gelişme kaydedebilir ve kültürler arası ilişkilerde örneklik teşkil edebilir. Bu iletişimin daha geniş boyutta devam ettirilebilmesi adına biz de çalışmamızda üstümüze düşen görevi yerine getirmeye gayret ettik. Bu anlamda bildirimizin gelecekteki İslam ve Japon kültürüyle ilgili çalışmalara ışık tutacağını ümit etmekteyiz.

KAYNAKLAR

Akman, Kubilay, (2011). "Buşido: Japon Samuraylarının Felsefesi", *Yalova Sosyal Bilimler Dergisi*, S. 1, s. 132.
Altundağ, Mustafa, (2004). "Kur'an Vahyinin İlk Mesajlarında Ahlaki Boyut", *Baku Devlet Üniversitesi İlahiyat Fakültesi Elmi Mecmuası,* Bakü, s. 131.
Amore R. C., "Eightfold Path", *The Perennial Dictionary of World Religions*, ss. 235-236; DR Hinnells, ss. 114-115.
Aston, W. G., (1907). *Shinto: The Ancient Religion of Japan*, London.
Brandon, S. G. F, (1970). *A Dictionary of Comparative Religion*, London, ss. 516-517.
Brownlee, John S., (1991). *Political Thought in Japanese Historical Writing from Kojiki* (712) to Tokushi Yoron (1712), Wilfrid Laurier University Press, Kanada, Notes: Chapter I, s.142.
Çağrıcı, Mustafa, (1989). "Ahlâk", *TDV İslam Ansiklopedisi*, c. II, İstanbul, ss. 10-14.
Çağrıcı, Mustafa, (2000). "İhsan", *TDV İslam Ansiklopedisi*, c. XXI, İstanbul, ss. 544-546.
Demiray, Mustafa, (2012). "Vaad*", TDV İslam Ansiklopedisi*, c. XXXXII, İstanbul, ss. 403-404.
Güngör, Erol, (1997). *Ahlak Psikolojisi ve Sosyal Ahlak*, Ötüken Neşriyat, İstanbul, s.19.
Güngören, İlhan, (2013). *Zen Budizmi Bir Yaşama Sanatı*, Yol Yayınları, B. 6, s. 24.
İbn Manzûr, (1299-1308). *Lisânü'l-Arab*, "hlk md.", c. I-XV, Dar Sâder, Beyrut, ts., ss. 61-65.
İmam Mâlik, (1991). *el-Muvaṭṭa*, "Huluk", Takıyyüddin en-Nedvî (nşr.), c. I-III, Dımaşk-Beyrut, s. 8.
Taro, Sakamoto, (1980). *Nihon no Shiishi to Shigaku Shibundo*, Tokyo, s. 13.
Oda, Yoshida, (2004). "Japonya'da Din Eğitimi", *Din Eğitimi Araştırmaları Dergisi*, Hamit Er (çevr.), İstanbul, S. 14, s. 98.
Konfüçyüs, (2000). Lun Yu; *Konuşmalar,* Çağdaş Matbaacılık Yayıncılık, Muhaddere Nabi Özerdim (çevr.), s. 4.
Konfüçyüs, (1963). *Konuşmalar*, Muhaddere Nabi Özerdim (terc.), Ankara, ss. 111-114.
Kutlutürk, Cemil, (2019). "Hint Dinleri (Budda Dharma/Budizm)", *Dünya Dinleri,* Şinasi Gündüz (ed.), Milel-Nihal Yayınları, İstanbul, s. 208.
Nitobe, Inazo, (2004). *Bushido: The Soul of Japan,* http://www.gutenberg.org.
Sakamoto Taro & John S. Brownlee, (1991). *The Six National Histories of Japan*, UBC Press, (mitolojik hikayeler).
Smith, Jo Durden, (2006). *Budizm: Gizli Öğretisi*, Tolga Bakanay (çevr.), Sınır Ötesi Yayınları, İstanbul, s. 63.
Şehristânî, Muhammed b. Abdülkerîm, (1961). *el-Milel ve'n-niḥal*, M. Seyyid Kîlânî (nşr.), c. II, Kahire, ss. 252-253.
Ülken, Hilmi Ziya, (1946). *Ahlak*, M. Sadık Kağıtçı Maatbası, İstanbul, s. 9.
Walzer, Richard, (1954-2000). *The Encyclopaedia of Islam (new edition)*, "Akhlak", EI (İng.), c. I, Leiden, s. 336.
教育資料, (2017). 作成　中央大学　池田賢市研究室東京学芸大学　大森直樹研究室2015年2 月25 日初版発行　2017 年12 月25 日第2 版発行　（有）サンプロセス, s .8.

DİSLALİ NEDİR?

WHAT IS DISLALI?

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Özet
Dislali, özel öğrenme güçlüğü içerisinde değerlendirilen ve son yıllarda sıkça gündeme gelmeye başlayan bir konuşma bozukluğudur. Dislali, normal işitmeye ve nörolojik bozukluklara sahip olmamasına rağmen fonemleri doğru şekilde telaffuz edememe ile karakterize bir konuşma bozuklu olarak tanımlanmaktadır. Belirli sesleri veya ses gruplarını doğru bir şekilde üretememe ile kendini gösteren bu gelişimsel bozukluk işitme kaybı veya nörolojik bir bozukluk olmaksızın ortaya çıkar ve genellikle çocuklarda görülür. Öncelikle çocukları etkilyen dislali belirli sesleri veya ses gruplarını telaffuz etmede zorluk olarak ortaya çıkabilir ve anlaşılması zor konuşmaya yol açabilir. Dislali, gelişimsel, işlevsel, işitsel ve organik olmak üzere dört başlık altında toplanmakta ve değerlendirilmektedir. Gelişimsel dislali, doğal konuşma gelişimi sürecinin bir parçası olarak ortaya çıkar ve genellikle kendiliğinden çözülür. İşlevsel dislali, herhangi bir anatomik kusur olmaksızın konuşma organlarının yanlış kullanılmasından kaynaklanır. İşitsel dislali, sesleri doğru bir şekilde algılama ve yeniden üretme yeteneğini etkileyen işitme bozukluklarından kaynaklanır. Organik dislali, dil veya damak gibi konuşma organlarındaki fiziksel anormalliklerden kaynaklanır. Olası duygusal ve akademik zorlukları önlemek için erken teşhis ve müdahale çok önemlidir. Erken teşhis ve tedavi, çocuğun sosyal ve akademik yaşamında karşılaşabileceği potansiyel zorlukları önlemek için önemlidir. Tedavi genellikle egzersizler ve pratik yoluyla artikülasyonu iyileştirmeye odaklanan konuşma terapisini içerir. Bu terapi, doğru artikülasyonu geliştirmek için çeşitli egzersizler ve pratikler içerir.
Anahtar Kelimeler: Dislali, Öğrenme Güçlüğü, Özel Eğitim

Abstract
Dyslalia is a speech disorder that is evaluated within a specific learning disability and has become a frequent topic in recent years. Dyslalia is defined as a speech disorder characterized by the inability to pronounce phonemes correctly despite having normal hearing and no neurological disorders. This developmental disorder, which manifests itself as the inability to produce certain sounds or sound groups correctly, occurs without hearing loss or a neurological disorder and is usually seen in children. Dyslalia, which primarily affects children, can manifest itself as difficulty in pronouncing certain sounds or sound groups and can lead to difficult-to-understand speech. Dyslalia is collected and evaluated under four headings: developmental, functional, auditory and organic. Developmental dyslalia occurs as part of the natural speech development process and usually resolves on its own. Functional dyslalia is caused by the incorrect use of speech organs without any anatomical defect. Auditory dyslalia is caused by hearing disorders that affect the ability to perceive and reproduce sounds correctly. Organic dyslalia is caused by physical abnormalities in speech organs such as the tongue or palate. Early diagnosis and intervention are essential to prevent potential emotional and academic difficulties. Early diagnosis and treatment are important to prevent potential difficulties that a child may encounter in their social and academic life. Treatment usually includes speech therapy, which focuses on improving articulation through exercises and practice. This therapy includes a variety of exercises and practices to develop correct articulation.
Keywords: Dyslalia, Learning Disability, Special Education

DİYABETLİ BİREYİN ÖZ YÖNETİMİNDE SAĞLIK EKİBİNİN ÖNEMİ

THE IMPORTANCE OF THE HEALTHCARE TEAM IN SELF-MANAGEMENT OF THE DIABETIC INDIVIDUAL

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ÖZET

Diyabet; akut ve kronik komplikasyonları nedeniyle sürekli tıbbi bakımı ve öz yönetim gerektiren kronik bir hastalıktır. Diyabette öz yönetim genellikle dört ana bileşeni içerir: beslenme yönetimi, ilaç kullanımı, kan şekeri izleme ve fiziksel aktivite. Diyabette öz yönetimin önemi giderek daha fazla çalışmayla anlaşılmaktadır. Diyabet tanısı konulan bir hastada hastalığı yönetmek ve tedavinin başarısını artırmak için hastaya diyabetin nedenleri, tedavi seçenekleri, beslenme ve egzersizin önemi, öz bakım, kan şekeri seviyelerinin izlenmesi, tedaviye uyum, beklenmeyen durumlarla başa çıkma ve komplikasyonları tanıma ve önleme gibi konularda eğitim verilmesi önemlidir. Bu eğitimlerin verilmesi ve diyabetli hastanın tedavi ve bakım sürecinin yürütülmesi multidisipliner ekip çalışmasını gerektirir. Diyabet için etkili hastalık yönetiminin temel unsurlarından biri, hastanın kendi kendini yönetmesine destek olmaktır. Bu noktada sağlık ekibinin önemi devreye girmektedir. Diyabetli hastalarda sağlık ekibi; doktor, hemşire, diyetisyen, fizyoterapist, eczacı, psikolog, davranış bilimcisi, ana-çocuk sağlığı uzmanı, oftalmolog ve podiatrist'ten oluşur. Ekibin hizmet merkezi hasta ve ailedir. Ekip üyelerinin çeşitliliği nedeniyle roller esnek ve değişken olmaktadır, bu da ekibin dinamik olmasını gerektirir. Ekibin her üyesi kendi özel uzmanlık bilgisini getirdiğinden, her ekip üyesinin yapacağı özel katkılar vardır. Ekip üyeleri arasında saygılı ilişkiler ve karşılıklı güven hastaya verilen bakımın kalitesini artıracaktır. Ayrıca, sağlık ekibinin hasta ile ilgili sorunları tartışmaya açık olması ekip üyeleri arasında olan güveni pekiştirecektir. Yapılan çalışmalarda ekip çalışmasının diyabetli hastalara kaliteli bakım sağlamada kritik öneme sahip olduğu sonucu bulunmuştur. Başka bir çalışmada iyileştirilmiş ekip çalışmasının, hasta tedavi ve bakımında gözle görülür iyileştirmelere yol açtığı ve bu da yüksek kaliteli bakımla sonuçlandığı sonucu bulunmuştur. Bu nedenle, hem profesyonel hem de kişilerarası iletişim yönünden yetkin sağlık ekiplerine sahip olmak etkili bir diyabet öz yönetiminde ön koşuldur.

Anhtar Kelimeler: Diyabet, Öz yönetim, Sağlık Ekibi

ABSTRACT
Diabetes is a chronic disease that requires continuous medical care and self-management due to its acute and chronic complications. Self-management in diabetes usually includes four main components: nutritional management, medication use, blood sugar monitoring, and physical activity. The importance of self-management in diabetes is increasingly understood through studies. In order to manage the disease and increase the success of treatment in a patient diagnosed with diabetes, it is important to provide education to the patient on issues such as the causes of diabetes, treatment options, the importance of nutrition and exercise, self-care, monitoring blood sugar levels, compliance with treatment, coping with unexpected situations, and recognizing and preventing complications. Providing this education and carrying out the treatment and care process of the diabetic patient requires multidisciplinary teamwork. One of the basic elements of effective disease management for diabetes is to support the patient in self-management. At this point, the importance of the health team comes into play. The health team in diabetic patients consists of a doctor, nurse, dietician, physiotherapist, pharmacist, psychologist, behavioral scientist, maternal and child health specialist, ophthalmologist, and podiatrist. The service center of the team is the patient and the family. Because of the diversity of team members, roles are flexible and changeable, which requires the team to be dynamic. Each team member brings their own specialized knowledge, so each team member has a unique contribution to make. Respectful relationships and mutual trust among team members will increase the quality of care provided to the patient. In addition, the openness of the healthcare team to discuss patient-related issues will strengthen the trust between team members. Studies have found that teamwork is critical to providing quality care to patients with diabetes. Another study found that improved teamwork led to significant improvements in patient treatment and care, resulting in high-quality care. Therefore, having competent healthcare teams in terms of both professional and interpersonal communication is a prerequisite for effective diabetes self-management.

Keywords: Diabetes, Self-management, Health Team

GİRİŞ

Diyabet, kan şekerinin yüksek seviyelerde seyrettiği, yaygın olarak görülen, zamanla kalbe, kan damarlarına, gözlere, böbreklere ve sinirlere ciddi hasarlar veren kronik, metabolik bir hastalıktır . Ayrıca dünya çapında coğrafi konum, yaş veya cinsiyetten bağımsız olarak çeşitli demografik özellikteki insanları etkileyen, hem ölüm hem de hastalık açısından önemli bir faktör olarak kabul edilmektedir (Hossain vd., 2024). Hem vaka sayısı hem de diyabetin yaygınlığı son birkaç on yılda istikrarlı bir şekilde artmaktadır. Çoğunluğu düşük ve orta gelirli ülkelerde yaşayan dünya çapında yaklaşık 422 milyon kişi diyabet hastasıdır (WHO, 2024). Yapılan araştırmalar her yıl 1,5 milyon ölüm doğrudan diyabetle ilişkilendirildiğini göstermektedir. Bu bağlamda diyabetin öz yönetimi ciddi önem arz etmektedir.

Diyabetin Öz Yönetimi

Öz yönetim, bireyin kendi sağlık durumunu etkili bir şekilde yönetme becerisini ifade eder. Diyabet; akut ve kronik komplikasyonları nedeniyle sürekli tıbbi bakımı ve öz yönetim gerektiren kronik bir hastalıktır ve bireylerin yaşam kalitesini ciddi şekilde etkilemektedir. Diyabette öz yönetim genellikle dört ana bileşeni içerir: beslenme yönetimi, ilaç kullanımı, kan şekeri izleme ve fiziksel aktivite. Diyabette öz yönetimin önemi giderek daha fazla çalışmayla anlaşılmaktadır. Diyabet tanısı konulan bir hastada hastalığı yönetmek ve tedavinin başarısını artırmak için hastaya diyabetin nedenleri, tedavi seçenekleri, beslenme ve egzersizin önemi, öz bakım, kan şekeri seviyelerinin izlenmesi, tedaviye uyum, beklenmeyen durumlarla başa çıkma ve komplikasyonları tanıma ve önleme gibi konularda eğitim verilmesi önemlidir. Öz yönetim, bireylerin hastalıklarıyla ilgili bilgi edinmelerini ve bu bilgileri günlük yaşamlarına entegre etmelerini gerektirir. Bu süreçte

sağlık ekibi, bireylere rehberlik ederek, onların öz yönetim becerilerini geliştirmelerine yardımcı olur (Haas vd., 2014).

Sağlık Ekibinin Rolü

Diyabetli hastaların günlük öz yönetim hedeflerine ulaşmak için sağlıklı beslenme, egzersiz, kan şekeri düzeylerinin izlenmesi, stres yönetimi ve ilaç hakkında günlük bilgiye ve eğitime ihtiyaçları vardır (Shrivastava vd., 2013). Bu eğitimlerin verilmesi ve diyabetli hastanın tedavi ve bakım sürecinin yürütülmesi multidisipliner ekip çalışmasını gerektirir. Diyabet için etkili hastalık yönetiminin temel unsurlarından biri, hastanın kendi kendini yönetmesine destek olmaktır. Bu noktada sağlık ekibinin önemi devreye girmektedir. Diyabetli hastalarda sağlık ekibi; doktor, hemşire, diyetisyen, fizyoterapist, eczacı, psikolog, davranış bilimcisi, ana-çocuk sağlığı uzmanı, oftalmolog ve podiatrist'ten oluşur. Ekibin hizmet merkezi hasta ve ailedir. Ekip üyelerinin çeşitliliği nedeniyle roller esnek ve değişken olmaktadır, bu da ekibin dinamik olmasını gerektirir. Yapılan çalışmalar sağlık ekibi ile hasta arasındaki etkili bir iş birliğinin yaşam kalitesinede artış sağladığı sonucu bulunmuştur (Powers vd., 2020). Ekibin her üyesi kendi özel uzmanlık bilgisini getirdiğinden, her ekip üyesinin yapacağı özel katkılar vardır. Ekip üyeleri arasında saygılı ilişkiler ve karşılıklı güven hastaya verilen bakımın kalitesini artıracaktır. Ayrıca, sağlık ekibinin hasta ile ilgili sorunları tartışmaya açık olması ekip üyeleri arasında olan güveni pekiştirecektir.

Hemşirelerin Rolü

Diabet, dünya genelinde yaygın bir sağlık sorunu olup, tedavi ve yönetiminde profesyonel sağlık hizmetlerinin büyük önemi vardır. Bu hastaların bakımında hemşirelerin rolü, hastaların yaşam kalitesini artırmak ve komplikasyonları önlemek açısından kritik bir yer tutar (De la Fuente Coria vd., 2020). Hemşireler, diyabetin yönetiminde hasta eğitimi, izleme ve tedavi süreçlerinin yürütülmesinde önemli bir sorumluluğa sahiptir (Polikandrioti, 2010). Yapılan araştırmalar, hemşirelik desteği alan bireylerin öz yönetim becerilerinin arttığını göstermektedir (Davis vd., 2022).

Hemşireler, diyabetli hastaların hastalığı anlama ve yönetme konusundaki bilgilerini artırarak, hastaların tedaviye uyumunu sağlama konusunda rehberlik eder. Yine, kan şekeri düzeylerinin izlenmesi, insülin uygulamaları, ilaç kullanımı ve yaşam tarzı değişikliklerinin gerçekleştirilmesi konusunda hasta ile etkili bir iletişim kurar (Eckel vd., 2021). Ayrıca, diyabetin uzun vadeli komplikasyonlarını önlemek için düzenli kontrol ve eğitimlerin yapılmasını sağlar. Hemşirelerin rolü, hastaların sağlıklı bir yaşam sürmelerini sağlamak için vazgeçilmezdir.

Diyetisyenlerin Rolü

Diyetisyenler, bireylerin beslenme alışkanlıklarını değerlendirerek, dengeli ve sağlıklı bir diyabet diyeti oluşturmalarına yardımcı olurlar. Diyetisyenlerin sağladığı beslenme eğitimi, bireylerin kan şekeri düzeylerini kontrol altında tutmalarında büyük bir etkendir (Siopis vd., 2020). Bu noktada, diyetisyenlerin rolü son derece kritik bir önem taşır.

Diyetisyenler, diyabetli hastaların günlük beslenme ihtiyaçlarını belirler ve kan şekeri kontrolünü sağlamaya yönelik bireyselleştirilmiş diyet planları oluşturur. Karbonhidrat sayımı, porsiyon kontrolü ve doğru gıda seçimi gibi konularda rehberlik ederek hastaların kan şekerinin dengede kalmasına yardımcı olurlar (Awuchi vd., 2020). Yapılan bir çalışmada diyetisyen kontrolünde takip edilen hastaların daha düzenli kan şekeri düzeyine sahip oldukları sonucu bulunmuştur (Brown vd., 2022). Diyetisyenler, beslenme yoluyla hastaların yaşam kalitesini artırır ve diyabetin uzun vadeli etkilerini minimize eder.

Doktorların Rolü

Doktorlar, diyabetli bireylerin genel sağlık durumunu izleyen ve tedavi planlarını oluşturan sağlık profesyonelleridir. İnsülin tedavisi, ilaç yönetimi ve düzenli kontroller gibi konularda bireylere rehberlik ederler (Sorber vd. 2021). Doktorlar, diyabetin tanısını koyma, hastalığın tipini belirleme ve uygun tedavi planını oluşturma noktasında kritik bir rol oynar. Diyabet tedavisi genellikle bireyselleştirilmiş bir yaklaşım gerektirir; bu nedenle doktorlar, hastanın yaşına, sağlık geçmişine ve genel durumuna göre insülin tedavisi, oral antidiyabetik ilaçlar veya diğer tedavi yöntemlerini

belirler (Pilla vd., 2023). Doktorların bireylerle kurduğu güven ilişkisi, bireylerin tedaviye uyumunu artırmakta ve öz yönetim becerilerini geliştirmektedir (Sorber vd. 2021). Diyabetin yönetimi, doktorların uzmanlığı ve hastaların uyumu ile başarılı bir şekilde yürütülebilir.

Fizyoterapistlerin Rolü

Diyabet, uzun vadeli yönetim gerektiren bir hastalıktır. Diyabetli hastalar, metabolik dengeyi sağlama ve komplikasyonları önleme adına fizyoterapistlerin uzmanlığından faydalanabilirler. Fizyoterapistlerin, diyabetli hastaların fiziksel sağlığını desteklemedeki işlevi, hastaların genel yaşam kalitesini artırmaya yönelik kritik bir katkı sağlar (Harris-Hayes vd. 2020).

Diyabetin başlıca komplikasyonlarından biri olan periferal nöropati, hastaların yürüyüş ve denge gibi temel motor becerilerinde zorluklara yol açabilir (Galiero vd., 2023). Fizyoterapistler, bu hastaların hareket yeteneklerini yeniden kazanmaları için denge ve koordinasyon egzersizleri sunarak düşme riskini azaltır. Aynı zamanda, eklem sertliği ve kas zayıflığının önlenmesi için kişiye özel egzersiz programları oluşturarak, diyabetin fiziksel etkilerini minimize eder (Antunes vd., 2022).

Ayrıca, fizyoterapistler diyabetli hastaların kas-iskelet sistemi sağlığını iyileştirmek ve insülin duyarlılığını artırmak amacıyla egzersiz ve aktivite düzeylerini optimize eder. Düzenli fiziksel aktivite, kan şekerinin kontrol altında tutulmasına ve kardiyovasküler sağlık sorunlarının önlenmesine yardımcı olur (Winnige vd., 2021). Fizyoterapistler, bu egzersizlerin güvenli bir şekilde yapılabilmesi için bireylerin sağlık durumlarına uygun bir program geliştirir. Bu nedenle, diyabet tedavisinin önemli bir parçası olarak fizyoterapistlerin katkısı yadsınamaz.

Psikologların Rolü

Diyabet, sadece fiziksel sağlık üzerinde değil, psikolojik sağlık üzerinde de büyük bir etkiye sahip bir hastalıktır. Diyabetli hastaların duygusal ve psikolojik durumu, tedavi sürecini ve yaşam kalitesini doğrudan etkiler (Sørensen vd., 2020).

Diyabetli bireyler, hastalıklarıyla başa çıkarken sıkça stres, anksiyete, depresyon gibi duygusal zorluklarla karşılaşabilirler (Schmitt vd., 2021). Sürekli kan şekeri takibi, ilaç kullanımı ve yaşam tarzı değişiklikleri, hastaların üzerinde ek bir psikolojik baskı oluşturur. Psikologlar, hastaların bu zorluklarla başa çıkabilmesi için bilişsel ve duygusal destek sunar. Anksiyete ve depresyon belirtilerini yönetme, stresle baş etme teknikleri ve hastaların hastalıklarını kabul etme süreçlerine yardımcı olurlar (Mukhtar vd., 2020).

Sağlık Ekibinin Birey Üzerindeki Etkisi

Genetik yatkınlık, diyabetin gelişmesinde önemli bir rol oynasa da yapılan çalışmalar çevresel faktörlerin önemini kesinlikle göstermiştir (Poulsen vd., 1999). Bu çevresel faktörlerin etkisini en aza indirmek etkili bir öz yönetimle mümkün. Bu durum, yalnızca sağlık ekibinin hastalığa karşı diyabetli bireyleri etkili bir öz yönetim konusunda bilgilendirmesiyle başarılı olabilir. Sağlık ekibinin vereceği eğitimler, bireylerin öz yönetim becerilerini geliştirmelerine yardımcı olur ve hastalığın seyrini olumlu yönde etkiler (Hermanns vd., 2020). Doğru bilgiye sahip hastaların hastalığı daha iyi anladıkları, hastalığın ilerlemesini yavaşlattığı ve görülen komplikasyonları azalattığı görülmüştür (Odegard vd. 2007). (Mensing ve arkadaşlarının yaptığı bir çalışmada diyabet öz yönetim eğitiminin standartlarını gözden geçirmiş ve öz bakım uygulamaları konusunda eğitim almamış diyabetli bireylerde görülen diyabet komplikasyonlarında dört kat artış olduğu sonucunu bulmuştur (Mensing vd. 2006). Yapılan bir çalışmada diyabetli bireylerin kendi öz yönetimlerini sağlayarak hastalıklarının ilerlemesini yavaşlattığı sonucu görülmüştür (Shrivastava vd., 2013). Bu noktada sağlık ekibinin vereceği doğru ve etkin eğitimin birey üstünde ne kadar önemli olduğu yadsınamaz bir gerçektir.

SONUÇ

Diyabetli bireylerin öz yönetiminde sağlık ekibinin rolü son derece önemlidir. Öz yönetim becerilerinin geliştirilmesi, bireylerin kendi sağlıklarını yönetmelerine olanak tanır ve diyabetin olumsuz etkilerini azaltır. Hemşireler, diyetisyenler, fizyoterapistler, doktorlar, psikologlar kısacası sağlık ekibi bireylerin öz yönetim becerilerini artırarak, yaşam kalitelerini iyileştirmektedir.

Diyabetli hastaların sağlık ekibi tarafından düzenli olarak takip edilmesinin önemi, uzun vadeli komplikasyonları önlemede büyük öneme sahiptir. Bu nedenle, sağlık ekiplerinin diyabet yönetimindeki rolü, bireylerin sağlık sonuçlarını ve yaşam kalitelerini doğrudan etkilemektedir.

KAYNAKLAR

Antunes, M. D., & Marques, A. P. (2022). The role of physiotherapy in fibromyalgia: Current and future perspectives. *Frontiers in physiology*, *13*, 968292.

Awuchi, C. G., Echeta, C. K., & Igwe, V. S. (2020). Diabetes and the nutrition and diets for its prevention and treatment: a systematic review and dietetic perspective. *Health Sciences Research*, *6*(1), 5-19.

Brown, A., McArdle, P., Taplin, J., Unwin, D., Unwin, J., Deakin, T., ... & Mellor, D. (2022). Dietary strategies for remission of type 2 diabetes: a narrative review. *Journal of Human Nutrition and Dietetics*, *35*(1), 165-178.

Davis, J., Fischl, A. H., Beck, J., Browning, L., Carter, A., Condon, J. E., ... & Villalobos, S. (2022). 2022 National standards for diabetes self-management education and support. *The science of diabetes self-management and care*, *48*(1), 44-59.

De la Fuente Coria, M., Cruz-Cobo, C., & Santi-Cano, M. J. (2020). Effectiveness of a primary care nurse delivered educational intervention for patients with type 2 diabetes mellitus in promoting metabolic control and compliance with long-term therapeutic targets: Randomised controlled trial. International journal of nursing studies, 101, 103417.

Eckel, R. H., Bornfeldt, K. E., & Goldberg, I. J. (2021). Cardiovascular disease in diabetes, beyond glucose. *Cell metabolism*, *33*(8), 1519-1545.

Galiero, R., Caturano, A., Vetrano, E., Beccia, D., Brin, C., Alfano, M., ... & Sasso, F. C. (2023). Peripheral neuropathy in diabetes mellitus: pathogenetic mechanisms and diagnostic options. *International Journal of Molecular Sciences*, *24*(4), 3554.

Haas, L., et al. (2014). Nutrition principles for management of diabetes and related complications. *Diabetes Care*, 37(Supplement 1), S120-S130.

Harris-Hayes, M., Schootman, M., Schootman, J. C., & Hastings, M. K. (2020). The role of physical therapists in fighting the type 2 diabetes epidemic. *Journal of orthopaedic & sports physical therapy*, *50*(1), 5-16.

Hermanns, N., Ehrmann, D., Finke-Groene, K., & Kulzer, B. (2020). Trends in diabetes self-management education: where are we coming from and where are we going? A narrative review. *Diabetic Medicine*, *37*(3), 436-447.

Hossain, M. J., Al-Mamun, M., & Islam, M. R. (2024). Diabetes mellitus, the fastest growing global public health concern: Early detection should be focused. *Health Science Reports*, *7*(3), e2004.

Mensing C, Boucher J, Cypress M, Weinger K, Mulcahy K, Barta P: National standards for diabetes self-management education. Diabetes Care 2006,29(Suppl 1):S78-S85.

Odegard, P. S., & Capoccia, K. (2007). Medication taking and diabetes. *The Diabetes Educator*, *33*(6), 1014-1029.

Peel E, Douglas M, Lawton J: Self monitoring of blood glucose in type-2 diabetes: longitudinal qualitative study of patients' perspectives. BMJ 2007,335(7618):493. 10.1136/bmj.39302.444572.DE

Pilla, S. J., Jalalzai, R., Tang, O., Schoenborn, N. L., Boyd, C. M., Golden, S. H., ... & Maruthur, N. M. (2023). A national physician survey of deintensifying diabetes medications for older adults with type 2 diabetes. *Diabetes Care*, *46*(6), 1164-1168.

Polikandrioti, M. (2010). The role of education in diabetes mellitus type 2 management. Health Science Journal, 4(4), 201.

Poulsen P, Kyvik OK, Vag A, Nielsen-Beck H: Heritability of type II diabetes mellitus and abnormal glucose tolerance – a population-based twin study. Diabetologia 1999,42(2):139–145. 10.1007/s001250051131

Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., ... & Uelmen, S. (2020). Diabetes self-management education and support in adults with type 2 diabetes: a consensus report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association. *Journal of the American Pharmacists Association*, *60*(6), e1-e18.

Schmitt, A., Bendig, E., Baumeister, H., Hermanns, N., & Kulzer, B. (2021). Associations of depression and diabetes distress with self-management behavior and glycemic control. *Health Psychology*, *40*(2), 113.

Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. Journal of diabetes & Metabolic disorders, 12(1), 1-5.

Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. *Journal of diabetes & Metabolic disorders*, *12*(1), 1-5.

Siopis, G., Colagiuri, S., & Allman-Farinelli, M. (2020). Dietitians' experiences and perspectives regarding access to and delivery of dietetic services for people with type 2 diabetes mellitus. *Heliyon*, *6*(2).

Sorber, R., & Abularrage, C. J. (2021, March). Diabetic foot ulcers: epidemiology and the role of multidisciplinary care teams. In *Seminars in vascular surgery* (Vol. 34, No. 1, pp. 47-53). WB Saunders.

Sørensen, M., Groven, K. S., Gjelsvik, B., Almendingen, K., & Garnweidner-Holme, L. (2020). The roles of healthcare professionals in diabetes care: a qualitative study in Norwegian general practice. *Scandinavian journal of primary health care*, *38*(1), 12-23.

Winnige, P., Vysoky, R., Dosbaba, F., & Batalik, L. (2021). Cardiac rehabilitation and its essential role in the secondary prevention of cardiovascular diseases. *World journal of clinical cases*, *9*(8), 1761.

World Health Organization. (2029). Diabetes. Link: https://www.who.int/health topics/diabetes#tab=tab_1

ULUOVA HAVZASI (ELAZIĞ, TÜRKİYE) YERALTI SULARINDA BRÜT ALFA VE BRÜT BETA RADYOAKTİVİTELERİNİN BELİRLENMESİ

DETERMINATION OF GROSS ALPHA AND GROSS BETA RADIOACTIVITIES IN GROUNDWATER OF THE ULUOVA BASIN (ELAZIĞ, TÜRKİYE)

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Özet
Bu çalışmada, Uluova Havzası'ndan (Elazığ, Türkiye) alınan 106 yeraltı suyu örneğinin brüt alfa ve brüt beta aktivite konsantrasyonlarına ilişkin veriler sunulmaktadır. Aynı zamanda, verilerin radyoaktivite açısından uluslararası ve ulusal içme suyu kalite standartlarına ne ölçüde uyduğu da incelenmiştir. Yeraltı suyu örneklerindeki brüt beta ve brüt alfa içerikleri sırasıyla 0,062 (<0,020 – 0,649) Bq L^{-1} ve 0,056 (<0,022 – 0,585) Bq L^{-1} olarak bulunmuştur. Havzanın jeolojisi ve tektonik yapısına bağlı olarak radyoaktivite konsantrasyonlarının mekansal dağılımı oldukça düzensizdir. Üç su örneği hariç, brüt alfa radyasyon konsantrasyonları çoğunlukla Dünya Sağlık Örgütü'nün önerdiği kılavuz aralıkları içerisinde kalmaktadır. Ancak Avrupa Konseyi ve Türkiye Sağlık Bakanlığı içme suyu standart değerlerine göre yeraltı suyu örneklerinin %24'ünün brüt alfa aktivite içeriğinin uygun olmadığı değerlendirilmiştir. Bununla birlikte, her örnekleme lokasyonunda, yeraltı suyundaki brüt beta aktivitesi hem ulusal hem de uluslararası standartları karşılamaktadır. Havzadaki kırsal yerleşimlerin içme suyu ihtiyacı yeraltı sularından karşılandığından radyoaktivite parametrelerinin izleme programına dahil edilmesi büyük önem arz etmektedir.

Anahtar Kelimeler: Brüt alfa, Brüt beta, Uluova Havzası, Radyoaktivite

Abstract
In this study, data on the gross alpha and gross beta activity concentrations of 106 groundwater samples taken from the Uluova Basin (Elazığ, Türkiye) are presented. At the same time, it was also examined to what extent the data complies with international and national drinking water quality standards in terms of radioactivity. The gross beta and gross alpha contents in groundwater samples were found to be 0.062 (<0.020 – 0.649) Bq L^{-1} and 0.056 (<0.022 – 0.585) Bq L^{-1}, respectively. The spatial distribution of radioactivity concentrations is quite irregular depending on the geology and tectonic structure of the basin. With the exception of three water samples, the gross alpha radiation concentrations fall mostly within the World Health Organization's suggested

guideline ranges. However, according to the European Council and Turkish Ministry of Health drinking water standard values, the gross alpha activity content of 24 % of the groundwater samples was deemed to be unsuitable. Nevertheless, the gross beta activity in the groundwater at each sampling location satisfied both national and international stan

dards. Since the drinking water needs of rural settlements in the basin are met by groundwater, radioactivity parameters should be included in the monitoring program.

Keywords: Gross alpha, Gross beta, Uluova Basin, Radioactivity

İVAN SERGEYEVİÇ TURGENYEV'İN İLK AŞK VE İLKBAHAR SELLERİ ESERLERİNDE AŞK TEMASI

THE THEME OF LOVE IN IVAN SERGEYEVICH TURGENEV'S WORKS FIRST LOVE AND SPRING TORRENTS

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ÖZET

Bu makalenin amacı Rus edebiyatının 19. yy'da yaşamış dünyaca ünlü önemli yazarlarından İvan Sergeyeviç Turgenyev'in İlk Aşk ve İlkbahar Selleri romanlarında ana tema olarak "Aşk" kavramını incelemektir. İlk Aşk eserinde ana kahraman Vladimir ilk kez aşk duygusunu tattığı kadın kahraman Zinaida'dan karşılık görmemekte ve aşkını platonik olarak yaşamaktadır. Fakat bu her ne kadar platonik bir aşk olsa da Zinaida bunun farkındadır ve onu bir çocuk gibi görerek yanında tuttuğu halde diğer hayranlarından da uzaklaşmaz ve bir süre sonra Vladimir'in babasıyla ilişkisi ortaya çıkar. Bu durum sonucunda Vladimir büyük bir hüsran yaşar. İlkbahar Selleri eserinde ise nişanlı İtalyan Gemma'ya aşık olan Sanin'in Gemma'yla evlilik sürecinde maddi sıkıntılar nedeniyle arazisini satmak için eski arkadaşıyla birlikte arkadaşının karısı Marya'nın yanına gittikten sonra onun çekiciliğine kapılıp yıktığı ilişkisini konu alır. İki eserde de aşka dair heyecan, mutluluk, kıskançlık, hüzün, öfke, aldatma ve aldatılma gibi unsurlar incelenmiştir. Turgenyev'in karakterlerini üç tip kadın figürü üzerine yazdığı bilinmektedir. Aynı zamanda Turgenyev'in aşk kavramını soylu aşk ve köleleştiren aşk kavramları üzerinden işlediği de açıktır. Turgenyev'in dönemi ve daha sonraki yazar, araştırmacı ve eleştirmenler Turgenyev'in her iki romanındaki kahramanların yaşadığı aşka dair duygu ve düşünceleri değerlendirmişlerdir. Bu çalışmada günümüz normlarıyla her iki eser aşk teması üzerinden aynı perspektifte değerlendirilmiştir.

Anahtar kelimeler: Turgenyev, İlk Aşk, İlkbahar Selleri, Aşk

ABSTRACT

The purpose of this article is to examine the concept of "Love" as the main theme in the novels "First Love" and "Spring Torrents" by Ivan Sergeyevich Turgenev, one of the most famous and important Russian authors of the 19th century. In "First Love," the protagonist, Vladimir, experiences love for the first time with the female character Zinaida, but she does not reciprocate his feelings, leading him to live out his love in a platonic manner. Although this love is platonic, Zinaida is aware of it. She keeps Vladimir close as if he were a child, yet does not distance herself from her other admirers. Eventually, her relationship with Vladimir's father is revealed, leaving Vladimir deeply disappointed. In "Spring Torrents," the story revolves around Sanin, who falls in love with the Italian Gemma, who is engaged to another man. During the process of arranging his marriage to Gemma, Sanin faces financial difficulties and visits his old friend's wife, Marya, to sell his property. However, he becomes captivated by Marya's allure, leading to the downfall of his relationship with Gemma. Both works explore elements of love, including excitement,

happiness, jealousy, sadness, anger, betrayal, and being betrayed. It is known that Turgenev often portrayed his characters based on three types of female figures. Additionally, it is evident that Turgenev addressed the concept of love through notions of noble love and enslaving love. Writers, researchers, and critics from Turgenev's time and beyond have evaluated the emotions and thoughts related to love experienced by the characters in both novels. In this study, both works are analyzed through the theme of love, using contemporary norms and perspectives.

Keywords: Turgenev, First Love, Spring Torrents, Love

ELABORATION AND CHARACTERIZATION OF A NATURAL COMPOSITE MATERIAL BASED ON COLLOIDAL PARTICLES OF MICROCRYSTALLINE CELLULOSE COATED WITH MODIFIED STARCH

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Abstract:
Physicochemical and rheological analyses were realized on microcrystalline cellulose (MCC) of colloidal grade, coated with octenyl succinic anhydride (OSA) starch. The objective was to prepare a biobased material (OSA-Cel), with new characteristics relating to both surface activity and viscosity. The chemical structures of MCC, OSA-starch and OSA-Cel were studied using FT-IR and XRD analyses, and their surface aspects were determined by surface tension measurements. From the results obtained, it was noticed that the FT-IR spectra showed great similarity between the characteristics of the crude MCC and those of OSA-Cel. Analysis by XRD showed a peak that was attributed to the crystalline phase of the cellulose. Furthermore, it was shown that OSA-starch interacts notably with MCC. The rheological properties at different concentrations of OSA-Cel showed the same behavior as that of MCC, a three-region viscosity profile (thinning, shear thickening and an infinite shear plateau).

Keywords: microcrystalline cellulose, OSA-starch, composites, surface tension, rheology

YOĞUN BAKIM HASTALARINDA SUPİNE POZİSYONU SÜRESİNİN ARAYÜZ BASINCINDAKİ DEĞİŞİME ETKİSİ

THE EFFECT OF SUPINE POSITION TIME ON CHANGE IN INTERFACE PRESSURE IN INTENSIVE CARE UNITS PATIENTS

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Özet

Amaç: Çalışma, yoğun bakım hastalarında supine pozisyonunda yatış süresinin sakrumda arayüz basıncındaki değişime etkisini belirlemek amacıyla yapılmıştır.
Yöntem: Araştırma, tekrarlı gözlemsel olarak bir uygulama ve araştırma hastanesi yoğun bakım ünitelerinde, son bir yılda yatan toplam hasta sayısı baz alınarak, ulaşılması gereken örneklem büyüklüğü evreni bilinen örneklem yöntemi ile n=330 hasta ile yapılması planlanmış olası kayıplar dikkate alınarak 350 hasta ile 01 Mart-31 Aralık 2021 tarihleri arasında tamamlanmıştır. Çalışma verileri soru formu, basınç değerlendirme formu, Palm Q-Taşınabilir Arayüz Basınç Sensörü ile hastaya supine pozisyonu verildiği andan itibaren 15 dakikada bir toplam 120 dakika arayüz basıncı ve diğer parametreler ölçülerek toplanmıştır. Araştırma verileri SPSS 22.0 programı kullanılarak; sayı ve yüzde dağılımları ve ortalama±standart sapma ile değerlendirilmiştir.
Bulgular: Hastaların iki saatlik supine pozisyonları başlangıcında arayüz basıncı ortalama değerleri 32,54±2,63 mmHg iken, 15. dakikada 32,45±2,61 mmHg'ye düşmüştür. Sonrasında 15 dakikalık periyotlarla ölçülen değerler sürekli artış göstermiştir. Kadınların ortalama arayüz basıncı değerlerinin erkeklere göre, düşük ve fazla kilolu olanların normal ve hafif kilolu olanlara, 65 yaş ve üzeri olanların 65 altı olanlara göre daha yüksek olduğu bulunmuştur.
Sonuç: Kadınların ortalama arayüz basınç değerleri erkeklerden daha yüksek, düşük kilolu ve obez hastaların arayüz basınç değerleri ise normal kilolu ve hafif kilolu hastalardan daha yüksek bulunmuştur. Aynı pozisyonda kalma süresi arayüz basıncını artırdığından beslenme desteklenmelidir. Sık pozisyon değiştirme arayüz basıncını azaltır ve basınç yaralanmasının gelişimini geciktirir hatta önler.

Anahtar Kelimeler: Arayüz basıncı, Basınç yarası, Pozisyon Süresi, Supine Pozisyonu, Yoğun Bakım

Abstract

Objectives: To determine the effect of time of stay in supine position of intensive care patients on the change in interface pressure in the sacrum.
Methodology: The study is analytical, cross-sectional, repeated observational. The research was conducted in the intensive care units of a practice and research hospital. Based on the total number of patients hospitalized in the last year, the sample size to be reached was calculated with the known universe sampling method. The research was planned to be conducted with 330 patients,

and considering possible losses, it was completed with 350 patients between March 01 and December 31, 2021.
Results: While the mean interface pressure values of the patients were 32.54±2.63 mmHg at the beginning of the two-hour supine position, they decreased to 32.45±2.61 mmHg at the 15th minute. Then, the values measured in 15-minute periods showed a continuous increase. It was found that the mean interface pressure values of female were higher than male, those with low and overweight were higher than those with normal and light weight, and those aged 65 and over were higher than those under 65.
Conclusion: The mean interface pressure values of female are higher than male, the underweight and obese patients were higher than the normal weight and light weight patients. As the time of stay in the same position increases the interface pressure, nutrition should be supported, frequent repositioning reduces the interface pressure and delays or even prevents the development of pressure injury.

Key Words: Interface Pressure, Pressure Injury, Position Time, Supine Position, Intensive Care

SPOR YAPAN VE YAPMAYAN 14-18 YAŞ ARASI ÖĞRENCİLERİN AKADEMİK BAŞARI VE ÖZ GÜVEN DÜZEYLERİNİN İNCELENMESİ

EXAMINATION OF ACADEMIC ACHIEVEMENT AND SELF-CONFIDENCE LEVELS OF 14-18 YEARS OLD STUDENTS WHO DO AND DO NOT DO SPORTS

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ÖZET
Bu araştırmanın amacı; spor yapan ve yapmayan 14-18 yaş arası öğrencilerin akademik başarı ve öz güven düzeylerinin incelenmesidir. Bu amaç doğrultusunda ulaşılabilir olması nedeniyle kolayda örnekleme yöntemi kullanılarak Kocaeli ilinin, İzmit ilçesinde bulunan ve 300 öğrencisi olan bir lise yönetiminden gerekli izinler alındıktan sonra öğrencilere araştırma hakkında bilgi verilmiştir. Literatür bilgileri ışığında hazırlanan 5 soruluk bilgi anketi ile Orçanlı vd. (2021) tarafından Türkçe'ye uyarlaması yapılan Üniversite Öğrencileri İçin Akademik Başarı Envanteri Ölçeği ve Akın (2007) tarafından geliştirilen Öz güven Ölçeği Google form üzerinden düzenlenerek linki öğrencilerle paylaşılmıştır. Google form üzerinden hazırlanan anket uygulamasına toplam 42 öğrenci katılmıştır. Elde edilen veriler SPSS 27.00 paket programında analiz edildiğinde normal dağılım gösterdiğinden bağımsız gruplar için kullanılan parametrik testlerden ikili küme karşılaştırmaları için t testi, ikiden fazla küme karşılaştırmaları için varyans analizi (ANOVA) kullanılmıştır. Yapılan analizler sonucunda; cinsiyet, yaş, sınıf düzeyleri, anne-baba eğitim düzeyi, aile gelir düzeyi ve kardeş sayısı açısından anlamlı bir fark görülmezken; spor yapmayanlar ile sporu 3-4 yıl, 5-6 yıl ve 7-8 yıl yapanlar arasında akademik başarı düzeyi açısından spor yapanlar lehine anlamlı sonuçlar bulunmuş. Yine spor yapmayanlar ile sporu 1-2 yıl, 3-4 yıl, 5-6 yıl ve 7-8 yıl yapanlar arasında öz güven düzeyi açısından spor yapanlar lehine anlamlı farklılıklar olduğu görülmüştür. Sonuç olarak spor yılı arttıkça akademik başarı ve öz güven düzeyinin arttığı söylenebilir. Konuyla ilgili daha kesin sonuçlara ulaşmak açısından daha büyük örneklemde farklı çalışmaların yapılması önerilmektedir.

Anahtar kelimeler: Spor, Öğrenci, Genç, Akademik Başarı, Öz Güven

ABSTRACT
he aim of this study is to examine the academic achievement and self-confidence levels of 14-18 year old students who do and do not do sports. In line with this purpose, the students were informed about the research after obtaining the necessary permissions from the administration of a high school with 300 students in Izmit district of Kocaeli province by using the convenience sampling method due to its accessibility. The 5-question information questionnaire prepared in the light of literature information, the Academic Achievement Inventory Scale for University Students adapted into Turkish by Orçanlı et al. (2021) and the Self-confidence Scale developed by Akın

(2007) were organized on Google form and the link was shared with the students. A total of 42 students participated in the survey application prepared via Google form. When the data obtained were analyzed in the SPSS 27.00 package program, since they showed normal distribution, t test was used for pairwise cluster comparisons and analysis of variance (ANOVA) was used for more than two cluster comparisons among parametric tests used for independent groups. As a result of the analyses, while no significant difference was observed in terms of gender, age, grade level, parental education level, family income level and number of siblings, significant results were found in favor of those who do sports in terms of academic achievement level between those who do not do sports and those who do sports for 3-4 years, 5-6 years and 7-8 years. Again, there were significant differences between those who did not do sports and those who did sports for 1-2 years, 3-4 years, 5-6 years and 7-8 years in favor of those who did sports in terms of self-confidence level. As a result, it can be said that academic achievement and self-confidence level increase as the years of sports increase. In order to reach more precise results on the subject, it is recommended to conduct different studies with a larger sample.

Keywords: Sports, Student, Youth, Academic Success, Self Confidence

GİRİŞ

Spor bir yandan bireyin zihinsel ve fiziksel yönden yaşam kalitesini artırırken diğer yandan da toplumsal davranışlarını düzenleyen bir durum olarak ele alınabilir. Spor bedenen ve ruhsal yönden bütünsel açıdan insanı psikolojik ve fizyolojik yönden desteklemesi ve bireylerin gelişimine katkı sunması sonucunda özgüvenli toplumların oluşmasını sağladığı ve insanları bütünleştirerek toplumlarda dağılmayı önlediğinden söz edilmiştir (Yetim, 2014). Spor duygusal ve davranışlarla birlikte psikolojik bütünlük sağlayarak bireylerin zinde olmasını destekleyen toplumsal bir olgu olarak ele alınmıştır (Şahinler ve Ersoy, 2019).

Spor aktivitesi esnasında bireyin yanındakilerle ile işbirliği yaparak, sorumluluklar alarak bu sorumlulukları gerçekleştirdiği, kurallarla hareket ettiği, kendi yapabildikleri yeteneğini fark ederek, toplum hayatına ve okullara son derece iyi adapte olabildikleri söylenebilir. Bu açıdan aktif olan bireylerin fiziksel etkinlikler sayesinde stres azalması, ruhsal durumu iyileştirmesi ve rahatlatıcı etkiler yaratmasına bağlı olarak akademik anlamda da daha başarılı olabilmeyi desteklediği ileri sürülmüştür (Brown ve Blanton, 2002; Tanır, 2013).

Akademik başarı, ülkenin gelecekteki insan kaynağının geliştirilmesinde; eğitim sistemlerinin verimliliğinin değerlendirilmesinde ve eğitim sisteminin hedeflere ulaşma başarısında önemli role sahip ve aynı zamanda önemli göstergesi olarak kabul edilmektedir. Başka bir deyişle akademik başarı, öğrencilerin, öğretmenlerin ve eğitim kurumlarının hedeflerine ne ölçüde ulaştığını gösterdiği belirtilmiştir (Akgül vd., 2012). Akademik başarı, öğrenenlerin dersin hedeflerine ulaşmada ne ölçüde başarılı olduğu anlamına geldiği, akademik başarı ve onu etkileyen faktörler ilgi çeken bir konu olarak son yıllarda psikologlar ve eğitim uzmanlar tarafından araştırılarak akademik başarıyı artırmaya yardımcı olabilecek değişkenler belirlenmeye çalışılmıştır (Cihan ve Polat, 2016).

Özgüven kavramı, bireyin kendisine karşı olan memnuniyeti, kendini kavraması, kendisinin yeterli olduğunu hissetmesi ve aynı zamanda da kendisiyle barışık, olumlu duygular içerisinde olması durumlarıyla bağlantılı olduğu belirtilmiştir (Kayaalp, 2002). Yüksek özgüvene sahip olan bireylerin hem çevresiyle hem de kendisiyle barışık, cesaretli, pozitif, girişken, yeniliklere karşı açık, mücadeleci bireyler olduğu, düşük özgüvenli bireylerin ise kendinden hoşnut olmama, kendine karşı olumsuz duygular içinde olma, sorunların altından kalkabilme konusunda yetersizlik hissetme, aşırı boyutta rekabetçi olmama, çok hassas olma, çevresindeki insanlara aşırı tabi olan bir yaşam sürme, çekememezlik gibi özellikleri taşıdıkları ileri sürülmüştür (Terlemez, 2019).

Öz güven, başarıyı etkileyen, aynı zamanda akademik başarıdan etkilenen bir özellik olarak düşünülmektedir. Yapılan araştırmaların çoğunda öz güvenin performansla ilişkisi açık bir şekilde

gösterilmese de, becerikli olan spor performansıyla anlamlı düzeyde ilişkili olduğunu gösteren çalışmalar da mevcuttur (Ateş, 2020). Ancak bu ilişkinin yönünün ne olduğu tam belirlenememektedir. Spor başarısı ve özgüven ilişkisini araştıran çalışmalar ve akademik başarı ile benlik saygısının ilişkili olduğunu, benlik saygısının da akademik başarıdan etkilendiğini bildiren çalışmalardan hareketle kişilik gelişiminin tamamlanacağı, kimlik dönemi olarak değerlendirilen aynı zamanda ergenlik dönemi olan lise döneminde olan gençlerin özgüven düzeyleri ile akademik başarıları arasındaki ilişki merak edilerek incelenmek istenmiştir. Bu inceleme sürecinde araştırmanın ana amacı olan spor yapan ve yapmayan 14-18 yaş arası öğrencilerin akademik başarı ve öz güven düzeyleri araştırılmak istenmiştir. Ayrıca akademik başarı ve öz güven düzeylerinin de; yaş, cinsiyet, aile gelir düzeyi spor yapma süresi ve spor yapıp yapmama durumuna göre değişip değişmediği de incelenmiştir.

YÖNTEM

Evren ve Örneklem

Bu çalışma kolayda örnekleme yöntemi ile Kocaeli'de eğitim öğretimlerine devam eden Milli Eğitim bakanlığına bağlı 300 öğrenciye sahip bir liseden araştırmaya gönüllü katılmak isteyen ortalama yaşları 16,35±1,25 yıl olan 46 lise öğrencilerinden oluşmaktadır.

Veri toplama araçları

Araştırmada 5 soruluk bilgi anketi ile Orçanlı vd. (2021)'nin Türkçe'ye uyarladığı yapılan Üniversite Öğrencileri İçin Akademik Başarı Envanteri Ölçeği ile Akın (2007)'ın geliştirdiği Öz Güven Ölçeği kullanılmıştır.

Öz Güven Ölçeği

Ölçek, bireylerin öz güvenlerini belirlemek için geliştirilmiş, en yüksek puanı 165, en düşük puanı ise 33 olan, ve puanlar yükseldikçe bireylerin özgüven düzeylerinin yüksek olduğunu gösteren 33 maddelik bir ölçektir.

Üniversite Öğrencileri İçin Akademik Başarı Envanteri Ölçeği

Üniversite öğrencilerinin akademik başarılarını ölçmek amacıyla Prevatt ve ark. (2011)'nın geliştirdiği, Türkçe'ye uyarlaması Orçanlı ve arkadaşlarının (2021) yaptığı, 50 maddeden oluşan 7'li Likert tipte bir ölçektir. Ölçeğin Cronbach alfa katsayısını 0.937 olduğu belirtilmiştir (Orçanli vd., 2021). Bu araştırmada Cronbach alfa katsayısı 0.87 olarak bulunmuştur.

İstatistiksel Analiz

Öncelikle araştırmaya katılan bireylerin demografik özelliklerine ait frekans (n) ve yüzdelikleri hesaplanmıştır. Yapılan normallik sınamasında verilerin normal dağılıma uyduğu belirlendiğinden t-testi ile Tek Yönlü Varyans Analizi (ANOVA) kullanılmıştır. Farkın kaynağını bulmak için post-hoc testinden yararlanılmıştır.

BULGULAR

Tablo1: Katılımcıların frekans ve yüzde dağılımları

		N	%
Yaş	14	3	7,1
	15	7	16,7
	16	12	28,6
	17	11	26,2
	18	9	21,4
Cinsiyet	Erkek	21	50,0
	Kadın	21	50,0
Aile Gelir Durumu	Orta	30	71,4
	Yüksek	12	28,6
Spor Yapma Durumu	Evet	26	61,9
	Hayır	16	38,1
Spor Yılı	Yapmıyor	16	38,1
	1-2	7	16,7
	3-4	10	23,8
	4-6	5	11,9
	7-8	2	4,8
	9+	2	4,8

Tablo 1 verilerine göre; katılımcıların 3'ü 14, 7'si 15, 12'si 16, 11'i 17, 9'u 18 yaşındadır. 21'i erkek, 21'i kız öğrencidir. 30'unun ailesi orta, 12'sinin ailesi yüksek gelire sahiptir. 26'sı spor yaparken, 16'sı spor yapmamaktadır. 16'sı spor yapmazken, 7'si 1-2 yıldır, 10'u 3-4 yıldır, 5'i 4-6 yıldır, 2'si 7-8 ve 2'si 9 ve üzeri yıldır spor yapmaktadır.

Tablo 2: Katılımcıların yaşlarına göre akademik başarıları ve özgüven düzeylerinin karşılaştırılması (Varyans Analizi)

Yaş		**N**	**X**	**SS**	**F**	**p**
Akademik Başarı	14	3	3,00	2,0	,408	,802
	15	7	3,00	1,63		
	16	12	3,58	1,16		
	17	11	3,09	1,13		
	18	9	2,89	1,53		
Öz Güven	14	3	135,6	8,62	,449	,772
	15	7	134,5	11,32		
	16	12	134,4	15,94		
	17	11	139,5	15,39		
	18	9	141,5	14,56		

Tablo 2: Verilerine bakıldığında; katılımcıların yaşlarına göre akademik başarı ve özgüven puanları arasında istatistiksel olarak anlamlı farklılıklar görülmemiştir ($p>0.05$).

Tablo 3: Katılımcıların cinsiyetlerine göre akademik başarıları ve özgüven düzeylerinin karşılaştırılması (T Testi)

Cinsiyet		N	X	SS	t	p
Akademik Başarı	Erkek	21	3,29	1,27	,570	,572
	Kadın	21	3,05	1,43		
Öz güven	Erkek	21	141,5	14,21	1,981	,054
	Kadın	21	133,2	13,02		

Tablo 3'de katılımcıların cinsiyetlerine göre akademik başarıları ve özgüven düzeyleri verilerine bakıldığında; katılımcıların cinsiyetlerine göre akademik başarı ve özgüven puanları açısından anlamlı görülmemiştir (p>0.05).

Tablo 4: Katılımcıların aile gelir durumlarına göre akademik başarıları ve özgüven düzeylerinin karşılaştırılması (T Testi)

Aile Gelir Durumu		N	X	SS	t	p
Akademik Başarı	Orta	30	2,93	1,31	-1,832	,074
	Yüksek	12	3,75	1,28		
Öz güven	Orta	30	136,90	14,67	-,363	,719
	Yüksek	12	138,66	13,10		

Tablo 4'de ailelerin gelir düzeylerine göre akademik başarı ve özgüven puanlarında anlamlı farklılık görülmemiştir (p>0.05).

Tablo 5: Katılımcıların spor yapma durumlarına göre akademik başarıları ve özgüven düzeylerinin karşılaştırılması (T Testi)

Spor Yapma Durumu		N	X	SS	t	p
Akademik başarı	Evet	26	3,81	,93	-1,832	,074
	Hayır	16	2,13	1,25		
Öz güven	Evet	26	142,4	10,58	-,363	,719
	Hayır	16	129,2	15,57		

Tablo 5'de katılımcıların spor yapma durumlarına göre akademik başarıları ve özgüven düzeylerinin incelenmesi analizi görülmektedir. Verilere bakıldığında katılımcıların spor yapma durumlarına göre akademik başarı ve özgüven puanları arasında istatistiksel olarak anlamlı farklılıklar görülmemiştir (p>0.05).

Tablo 6: Katılımcıların spor yıllarına göre akademik başarıları ve özgüven düzeylerinin karşılaştırılması (Varyans Analizi)

	Spor Yılı	N	X	Ss	F	p	Fark
Akademik Başarı	Hiç[a]	16	2,31	1,44	3,515	**,016***	a<c,d,e
	1-2[b]	7	3,07	,976			
	3-4[c]	10	3,80	1,03			
	5-6[d]	5	4,00	,707			
	7-8[e]	4	3,25	1,25			
Öz güven	Hiç[a]	16	126,6	14,64	6,483	**,000***	a<b,c,d,e
	1-2[b]	7	141,1	10,25			
	3-4[c]	10	142,9	8,76			
	5-6[d]	5	143,6	6,76			
	7-8[e]	4	152,5	5,06			

Tablo 6'da katılımcıların spor yıllarına göre akademik başarıları ve özgüven düzeylerine ilişkin verilere bakıldığında; katılımcıların spor yıllarına göre akademik başarı ve özgüven özelliklerinde anlamlı farklılık görülmüştür ($p<0.05$). Analiz sonrası gruplar arası farklılıkları anlamak adına yapılan post-hoc testinde; spor yapmayanlar ile sporu 3-4, 5-6 ve 7-8 yıl yapanlar arasında akademik olarak, spor yapmayanlar ile sporu 1-2, 3-4, 5-6 ve 7-8 yıl yapanlar arasında özgüven düzeyi olarak anlamlı farklılıklar olduğu görülmektedir.

Tablo 7: Akademik başarı ve özgüven düzeylerinin korelasyon analizi

		Akademik Başarı	Öz güven
Akademik Başarı	r	1	,117
	p		,459
	N	42	42
Öz güven	r	,117	1
	p	,459	
	N	42	42

Tablo 7'de akademik başarı ve özgüven ölçekleri arasında korelasyon analizi görülmektedir. Akademik başarı ve özgüven ölçeği arasında korelasyon görülmemiştir($p>0.05$).

TARTIŞMA VE SONUÇ

Spor yapan ve yapmayan 14-18 yaş arası öğrencilerin akademik başarı ve öz güven düzeylerinin incelenmesi amacıyla yapılmıştır.

Bulgularda akademik başarı ölçeği ve öz güven ölçeği puan ortalamaları cinsiyete göre incelendiğinde; kadın ve erkekler arasında anlamlı bir fark yoktur. Literatürde cinsiyet açısından akademik başarı ile ilgili olarak benzer sonuç alınan araştırmalarda (Köse vd., 2023) anlamlı fark bulunmazken; kimi araştırmalarda kadınlar lehine (Ullah ve Mardell, 2007) kimi araştırmalarda ise erkekler lehine anlamlı sonuçlar görülmüştür (Balanlı, 2017; Damar ve Uçan, 2021).

Yapılmış diğer araştırmalarda cinsiyet değişkeni açısından öz güvende anlamlı bir fark bulmayan çalışmaların (Bozdoğan ve Güler, 2017; Karademir, 2015; Yıldız vd., 2016) aksine kadınların erkeklere göre öz güven düzeyini daha yüksek bulan çalışmalara da rastlanmıştır (Bal vd., 2017; Başoğlu, 2007). Erkeklerin kadınlara göre özgüven düzeylerinin daha yüksek olduğunu bulan araştırmaların olduğu da görülmüştür (Kanadıkırık Kılıç ve Kılıç, 2013)

Araştırmaya katılan bireylerin yaşlarına göre akademik başarı ve özgüven puan ortalamalarına bakıldığında anlamlı olmadığı görülmüştür. Literatürde Köse vd. (2023) hemşirelik öğrencilerine yönelik olarak yaptıkları çalışma sonucunda yaşa göre üniversite öğrencileri için akademik başarı envanteri ölçeği ortalamalarının istatistiksel olarak anlamlı farklılıklar göstermediğini tespit etmişlerdir. Yine benzer sonuçlar olarak, Gökkaya ve Biçer (2017), Yağan (2019) ve Yerebatan (2019) tarafından yapılan çalışmalarda, öz güven düzeyi ile yaş arasında anlamlı bir farklılık bulunmamıştır. Bununla birlikte, bu çalışmanın aksine, yaş değişkeni açısından özgüven düzeyleri arasında anlamlı ilişki olduğunu gösteren bulgular da mevcuttur (Aksoy 2019; Dirik, 2016).

Aile gelir düzeyine göre öz güven ve akademik başarı incelendiğinde anlamlı bir fark olmadığı bulunmuştur. Her ne kadar anlamlı sonuçlar alınmasa da puan ortalamalarına bakıldığında; her iki ölçekte de gelir durumu yüksek olanların orta gelire sahip olanlara göre ortalama puanlarının daha yüksek olduğu görülmüştür. Literatürde benzer şekilde aile gelir durumuna göre akademik başarı açısından bir fark olmadığı (Köse vd., 2023), aksine aile gelir durumu orta düzeyde olanların düşük düzey gelire sahip olanlara göre daha yüksek akademik başarıya sahip olduklarını bulan çalışmalar olduğu görülmüştür (Polat, 2009; Şevik, 2014; Tapkan, 2024).

Spor yapma durumu değişkenine göre akademik başarıları incelendiğinde anlamlı bir fark olmadığı bulunmuştur. Literatüre bakıldığında aksine spor yapma durumuna göre spor yapanlar lehine anlamlı sonuçlar bulunurken (Er, 2010; Saygılı vd., 2015; Tosun vd., 2015) spor yapmayanların akademik başarılarının spor yapanlara göre anlamlı derecede daha yüksek olduğunu gösteren çalışmaların olduğu da görülmüştür (Şenses, 2009; Tatlı, 2004).

Katılımcıların spor yapma durumuna göre öz güven ölçeği sonuçlarına bakıldığında anlamlı bir ilişki bulunmamıştır. Literatüre bakıldığında; öz güven ile spor yapma durumu arasında anlamlı bir ilişki olmadığını bildiren çalışmaların yanında (Ekinci vd., 2014; Karagün, 2014); düzenli olarak spor yapmanın öz güven düzeyini arttırdığını gösteren çalışmaların olduğu da görülmüştür (Arslan vd., 2015; Özbek vd., 2017; Yarımkaya vd., 2014).

Spor yapma yılına göre akademik başarı anlamlı bulunmuştur. Bu anlamlılığın kaynağını bulmak için Tukey testi ile analiz edildiğinde de; 3-4 yıl, 5-6 yıl ve 7-8 yıl spor yapanların hiç spor yapmayanlara göre akademik başarı ortalamalarının anlamlı derecede yüksek olduğu belirlenmiştir. Konuyla ilgili yapılan literatür incelemesinde bu araştırmanın aksine düzenli olarak spor yapmanın akademik başarıya etkisinin olmadığını gösteren çalışmaların (Duman vd., 2020) aksine spora uzun süre devam eden bireylerin daha az süre spor yapanlara göre daha yüksek akademik başarıya sahip olduğunu gösteren araştırmalar olduğu da görülmüştür (Aytaç vd., 2022, Oktaş, 2019)

Spor yapma yılına göre öz güven ölçek sonuçları incelendiğinde; spor yılı arttıkça öz güven puanlarında anlamlı bir artış olduğu görülmüştür. Bu anlamlı farkın hangi gruplardan kaynaklandığını belirlemek için yapılan Tukey testinde; 1-2 yıl, 3-4 yıl, 5-6 yıl ve 7-8 yıl spor yapanların hiç spor yapmayanlara göre öz güven puan ortalamalarının anlamlı derecede yüksek olduğu belirlenmiştir. Konuyla ilgili literatür incelendiğinde; uzun süre aktif spora katılımın öz güven üzerinde pozitif etki yarattığı (Sun, 2015), uzun süre spor yapanların spor yapmayanlara göre daha yüksek öz güvene sahip olduğu belirtilmiştir (Soykan ve Mirzeoğlu 2020; Bozkurt vd., 2023).

Akademik başarı ile özgüven arasında korelasyon analiz edildiğinde; akademik başarı ile öz güven arasında ilişki olmadığı görülmüştür. Benzer çalışmalara bakıldığında; ‘aile uyumu, öğrenci özgüveni ve akademik başarı arasındaki ilişkilerin araştırıldığı araştırma sonucunda akademik başarı ve özgüven arasında ilişki olmadığını belirten çalışmanın (Soner, 2013) aksine ‘Öğrencilerin özgüven ve sorumluluk duygusunun akademik başarı üzerindeki rolünü araştıran bir başka çalışmada özgüven duygusunun akademik başarıyla ilişkili olduğu görülmüştür (Ateş, 2020).

Bu sonuçlara göre; spor yapanların özgüven ve akademik başarı ortalamaları, spor yapmayanlara oranla daha yüksek olduğu belirlenmiştir. Cinsiyet değişkeni açısından; erkeklerin özgüven ve

akademik başarı puan ortalamaları kadınlardan; aile gelir düzeyi açısından yüksek gelire sahip olanların özgüven ve akademik başarı puan ortalamaları orta gelire sahip bireylerden daha yüksektir. Yaş değişkeni bakımından değerlendirildiğinde; 18 yaşında olan bireylerin en yüksek, yaşı 16 olan bireylerin ise en düşük özgüven puan ortalamasına sahip olduğu, yaşı 16 olan bireylerin en yüksek, yaşı 18 olan bireylerin ise en düşük akademik başarı puan ortalamalarına sahip olduğu bulunmuştur. Spor süresi yıl olarak incelendiğinde; akademik başarı ve özgüven düzeyleri hiç spor yapmayanların en düşük; 7-8 yıl spor yapanların ise en yüksek puana sahip olanlar olduğu görülmüştür.

Sonuç olarak araştırma verileri değerlendirildiğinde; yaş, spor yapma durumu, aile gelir düzeyi ve cinsiyet açısından hem akademik başarı hem de öz güven ölçeği açısından anlamlı fark görülmemiştir. Spor yapma yılı açısından ise öz güven ve akademik başarı ölçeklerinde spor yapanlar lehine anlamlı farklılık elde edilmiştir. Spor yılı arttıkça akademik başarı ve öz güven düzeyinin arttığı söylenebilir. Konu ile ilgili daha büyük örneklemde farklı çalışmaların yapılması önerilmektedir.

KAYNAKLAR

Akgül, S., Güral, M., Demirel, M., ve Üstün, Ü. D. (2012). İlköğretim öğrencilerinin okul içi ve okullar arası sportif etkinliklere katılma nedenlerinin çeşitli değişkenler açısından araştırılması. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 1(32), 13-22.

Akın, A. (2007). Öz-Güven ölçeğinin geliştirilmesi ve psikometrik özellikleri, *Abü Eğitim Fakültesi Dergisi,* 7(2), 165-175.

Aksoy, U. (2019). Farklı klasmanlarda görev yapan futbol hakemlerinin iletişim becerileri ve öz güven düzeylerinin çeşitli değişkenlere göre incelenmesi (Aydın İli Örneği). Yüksek Lisans Tezi, Aydın Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü, Aydın.

Arslan, A., Doğanay, H., Kırık, A., ve Çetinkaya, A. (2015). Lise öğrencilerinde spor yapma ve özgüven ilişkisi. *Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Bilimleri Dergisi*, 17, 130-149.

Ateş, A. (2020). Öğrencilerin özgüven ve sorumluluk duygusunun akademik başarı üzerindeki rolü. (Yüksek Lisans Tezi). İstanbul Sabahattin Zaim Üniversitesi Sosyal Bilimler Enstitüsü.

Aytaç, K. Y., Yetiş, Ü., & Öz, K.A. (2022). Spor Lisesi Öğrencilerinin Bazı 45 Değişkenlere Göre Öz Yeterlilik Düzeylerinin İncelenmesi. *Akdeniz Spor Bilimleri Dergisi*, 5(Özel Sayı 2), 953-965.

Bal, S. İ., Pehlivan, Z., ve Ada, E. N. (2017). Beden eğitimi dersine yönelik öz güvenin ortaokul düzeyinde incelenmesi. *Spormetre*, 15 (4), 117-126.

Balanlı, O. F. (2017). Spora Katılımın Ortaöğretim Öğrencilerinin Akademik Başarılarına Ve Öz-Yeterliklerine Etkisi (Yüksek Lisans Tezi), Aksaray Üniversitesi Sosyal Bilimler Enstitüsü.

Başoğlu, S. T. (2007). Sınav kaygısı ile özgüven arasındaki ilişkinin erinlik döneminde incelenmesi. Yüksek Lisans Tezi, Maltepe Üniversitesi, Sosyal Bilimler Enstitüsü. İstanbul.

Bozdoğan, T. A. ve Güler, L. (2017). Investigation of self confidence levels of secondary school students engaged in individual and team sports. *European Journal of Education Studies*, 3 (10), 558-571.

Bozkurt, H. Korkmaz, C. Gençay, Ö.A. (2023). Spor yapan ve yapmayan ampute bireylerin öz güven düzeylerinin karşılaştırılması. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 17(1), 10-25.

Brown, D. R. ve Blanton, C. J. (2002). Physical activity, sports participation, and suicidal behavior among college students. *Medicine and Science in Sports and Exercise*, 34(7), 1087-1096. https://doi.org/10.1097/00005768-200207000-00006

Cihan, B., ve Polat, B. (2016). Fiziksel aktivitenin akademik başarı üzerine etkilerinin araştırılması (derleme). 4.Uluslararası Spor Bilimleri Turizm ve Rekreasyon Öğrenci Kongre Kitabı,(1):232-236

Damar, İ., & Uçan, Y. (2021). The Investigation of Self-Confidence Levels of Adult Individuals Who Do and Do Not Do Sports. *International Journal of Physical Education Sport and Technologies* 2(2), 1-10

Dirik K. (2016). Ergenlerde akıllı telefon bağımlılığı ile öz-güven arasındaki ilişkilerin çeşitli değişkenler açısından incelenmesi. Yüksek Lisans Tezi, Gelişim Üniversitesi Sağlık Bilimleri Enstitüsü, İstanbul.

Duman, T.,Güllü, A., Yılmaz, C., &AbiÇ, S. (2020). Beden Eğitimi ve Spor Öğretmen Adaylarının Mesleki Tutumlarının Akademik Öz Yeterlilik Düzeylerine Etkisi. *Journal of International Social Research,* 13(74).

Ekinci, N.E. Özdilek, Ç. Deryahanoğlu, G. Üstün, Ü.D. (2014). Spor yapan lise öğrencilerinin öz güven düzeylerinin incelenmesi. *Sportif Bakış: Spor ve Eğitim Bilimleri Dergisi,* 1(1), 36-42.

Er, F. (2010). Düzenli Spor Yapan Ve Yapmayan Üniversite Öğrencilerinin Fiziksel Uygunluk Düzeyleriyle Akademik Başarıları Arasındaki İlişkinin Karşılaştırılması, (Yayımlanmamış Yüksek Lisans Tezi), Ankara: Gazi Üniversitesi Eğitim Bilimleri Enstitüsü Beden Eğitimi ve Spor Öğretmenliği Anabilim Dalı.

Gökkaya, D. ve Biçer, T. (2017). Psikolojik beceri kıstası olarak özgüvenin elit sporcuların performansına katkısı; boks milli takımı örneği. *Marmara Üniversitesi Spor Bilimleri Dergisi,* 2 (1), 25.

Kanadıkırık-Kılıç, A., ve Kılıç, A. (2013). MEB ortaöğretim kurumlarındaki öğrencilerin akran zorbalığına maruz kalma düzeyleri ve özgüven arasındaki ilişki. Sakarya Üniversitesi, Eğitim Bilimleri Enstitüsü, VI. Ulusal Lisansüstü Eğitim Sempozyumu Bildirileri, 23-29.

Karademir, N. (2015). Fen Edebiyat Fakültesi Coğrafya Bölümü Öğrencilerinin Özgüven Algıları. *Kahramanmaraş Sütçü İmam Üniversitesi Sosyal Bilimler Dergisi*, 12(1): 53-77.

Karagün, E. (2014). Self confidence level in professional athletes; an examination of exposure to violence. Branch and socio- demographic aspects. *International Journal of Human Sciences*, 11(2), 744-753.

Kayaalp, İ. (2002). *Eğitimde iletişim dili*. Bilge Kültür - Sanat Yayınları: İstanbul.

Köse, S., Binay, Ş. K. ve Karakurt, P. (2023). Uzaktan eğitim döneminde hemşirelik öğrencilerinin akademik başarı düzeyleri ve etkileyen faktörler. *Etkili Hemşirelik Dergisi*, 16(3), 317-331.

Oktaş, A. (2019). Lise Öğrencilerinde Beden Eğitimi ve Spor Dersine Yönelik Tutum ile Akademik Öz Yeterlik İncelenmesi (Yüksek Lisans Tezi), Sakarya Uygulamalı Bilimler Üniversitesi.

Orçanli, K., Bekmezci, M., & Boztoprak, H. (2021). Adaptation of Academic Success Inventory Scale for College Students to Turkish: Validity and Reliability Study. *OPUS Uluslararası Toplum Araştırmaları Dergisi*, 17(37), 399-4026

Özbek, S., Yoncalık, M. T., & Alıncak, F. (2017). Sporcu ve sedanter lise öğrencilerinin özgüven düzeylerinin karşılaştırılması (Kırşehir ili örneği). *Gaziantep Üniversitesi, Spor Bilimleri Dergisi*, 2(3): 46-56.

Polat, S. (2009). Akademik başarısızlığın toplumsal eşitsizlik temelinde çözümlenmesi. *Eğitim Bilim Toplum Dergisi*, 7 (25), 46-61.

Prevatt, F., Li, H., Welles, T., Festa-Dreher, D., Yelland, S. ve Lee, Jiyoon (2011). The academic success ınventory for college students: Scale development and practical ımplications for use with students. *Journal of College Admission*, 26-31.

Saygılı, G., Atay, E., Eraslan, M.& Hekim, M.(2015). Düzenli Olarak Spor Yapan Ve Yapmayan Öğrencilerin Kişilik Özellikleri İle Akademik Başarıları Arasındaki İlişkinin İncelenmesi. *Kastamonu Eğitim Dergisi*, 23(1), 161-170.

Soner, O. (2013). Aile uyumu, öğrenci özgüveni ve akademik başarı arasındaki ilişkiler. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 12(12), 249-260.

Soykan, Ö. Mirzeoğlu, A.D. (2020). Halk oyunlarının üniversite öğrencilerinin sosyal beceri ve öz güven düzeylerine etkisi. *Spormetre*, 18(2), 136-156.

Sun, E. (2015). Sporun lise öğrencilerinin özgüven düzeylerine etkisi. Kahramanmaraş Sütçü İmam Üniversitesi Sağlık Bilimleri Enstitüsü, Beden Eğitimi ve Spor Ana Bilim Dalı Yüksek Lisans Tezi, Kahramanmaraş

Şahinler, Y. ve Ersoy, A. (2019). Sporcuların zihinsel dayanıklılıklarının farklı değişkenlere göre incelenmesi. *International Journal of Social Sciences and Education Research*, 5(2), 168-177. https://doi.org/10.24289/ijsser.558658

Şenses, M. (2009). Trabzon Merkezde Bulunan Bazı İlköğretim Okullarında 7. Ve 8. Sınıfta Okuyan Lisanslı Sporcu Öğrenciler İle Lisanssız Öğrencilerin Okul Ders Başarılarının Karşılaştırılması, (Yayımlanmamış Yüksek lisans tezi), Trabzon: Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü.

Şevik, Y. (2014). İlköğretim müdür ve müdür yardımcılarının öğrencilerin akademik başarısını etkileyen faktörlere ilişkin görüşleri ile akademik başarısına katkıları. Yayınlanmamış yüksek lisans tezi, Mehmet Akif Üniversitesi, Burdur.

Tanır, H. (2013). İlköğretim 8. Sınıf öğrencilerinde fiziksel aktivite düzeyi ve bazı antropometrik özelliklerin akademik başarı ile ilişkisi. Yayımlanmamış doktora tezi. Kırıkkale: Kırıkkale Üniversitesi.

Tapkan, B. (2024) Üniversite Öğrencilerinde Gelecek Kaygısı İle Akademik Başarı Arasındaki İlişkinin İncelenmesi, (Yayımlanmamış Yüksek Lisans Tezi), İstanbul Arel Üniversitesi, Lisansüstü Eğitim Enstitüsü

Tatlı, İ. (2004). Niğde İlinde Ortaöğretimde Okuyan Lisanslı Sporcular İle Spor Yapmayanların Atılganlık, Yalnızlık, Depresyon Ve Akademik Başarıları, (Yayımlanmamış Yüksek Lisans Tezi), Niğde: Niğde Üniversitesi Sosyal Bilimler Enstitüsü.

Terlemez, M. (2019). Spor Aktivitesinin Özgüven, Serotonin ve Dopamine etkisi *Uluslar Arası Sosyal Bilimler Dergisi*, 2 (2), 1-6.

Tosun, A., Demir, B., Uçkun, G. ve Konak, O. (2015). Spor Aktivitelerinin Üniversite Öğrencilerinin Başarı Ve Motivasyonu İle İlişkisi. 4.Uluslararası Meslek Yüksek Okulları Sempozyumu, Cilt 2.

Ullah, H. ve Mardell, A.W. (2007). Students' academic success and its association to student involvement with learning and relationships with faculty and peers. *College Students Journal*, 14(4), 1192-1202.

Yağan, K. (2019). Fitness merkezine giden bireylerin sosyal görünüş kaygısı ve öz güven düzeylerinin incelenmesi. Yüksek Lisans Tezi, Karamanoğlu Mehmet Bey Üniversitesi, Sosyal Bilimler Enstitüsü, Karaman.

Yarımkaya, E., Akandere, M., ve Baştuğ, G. (2014). Effect of self-confidence levels of 12- 14 years old students on their serving agility in volleyball. *Niğde University Journal of Physical Education And Sport Sciences,* 8, 242-50.

Yerebatan, Z. (2019). Basketbol klasman hakemlerinin karar verme stilleri ve öz güven düzeylerinin incelenmesi. Yüksek Lisans Tezi, Marmara Üniversitesi, Sağlık Bilimleri Enstitüsü, İstanbul.

Yetim, A. (2014). *Sosyoloji ve spor* (6. bs.). Ankara: Berikan Yayınevi

Yıldız, N., Özen, G., ve Bostancı, T. G. (2016). The effects of one-day outdoor education on self-efficacy. *Journal of Human Sciences*,13 (3), 6098-6103.

ROMANTİK İLİŞKİLERDE BAĞLANMA STİLLERİ, DUYGUSAL ZEKÂ VE ROMANTİK KISKANÇLIK DÜZEYİNİN İNCELENMESİ

INVESTIGATION OF ATTACHMENT STYLES, EMOTIONAL INTELLIGENCE, AND ROMANTIC JEALOUSY LEVELS IN ROMANTIC RELATIONSHIPS

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Özet
Bu çalışmada romantik ilişkisi olan bireylerin bağlanma stilleri, duygusal zekâ ve romantik kıskançlık düzeyinin incelenmesi amaçlanmıştır. Bu araştırmada nicel araştırma desenlerinden biri olan tarama modeli kullanılmıştır. Araştırmanın evreni Kuzey Kıbrıs Türk Cumhuriyeti ve Türkiye'de yaşayan 18 yaş üstü romantik ilişkisi bulunan bireylerden oluşmaktadır. Bu araştırmada seçkisiz olmayan araştırma yöntemlerinden biri olan amaçsal örnekleme yöntemi kullanılmıştır. Araştırmanın örneklemi ise 18 yaş ve üzeri romantik ilişkisi devam eden bireyler olarak belirlenmiştir. Araştırmanın örneklemi romantik ilişkisi bulunan ve 18 yaşını doldurmuş 430 katılımcıdan oluşmaktadır. Araştırmada katılımcıların sosyo-demografik bilgilerini öğrenmek amacıyla "Sosyo-Demografik Bilgi Formu", bağlan stillerini tespit etmek için "Üç Boyutlu Bağlanma Stilleri Ölçeği", duygusal zekâ düzeylerini belirlemek için "Rotterdam Duygusal Zekâ Ölçeği" ve romantik kıskançlık düzeylerini belirlemek için ise "Romantik İlişkilerde Kıskançlık Ölçeği" kullanılmıştır. Bu araştırma sonucunda kadınların kaygılı-kararsız bağlanma ve duygusal zekâda erkeklere göre daha yüksek puan aldığını, ilişki süresinin ve şeklinin bağlanma stilleri ile ilişkili olduğunu ve bağlanma stilleri ile duygusal zekâ ile romantik kıskançlık arasında ilişkilerin olduğu sonuçlarına ulaşılmıştır. Romantik ilişkisi bulunan bireylerin bağlanma stilleri, duygusal zekâ ve romantik kıskançlık düzeylerinin incelenmesi ile ilgili daha detaylı ve kapsamlı çalışmaların gerçekleştirilmesi önerilmektedir.

Anahtar kelimeler*:* romantik ilişki, bağlanma stilleri, duygusal zekâ, romantik kıskançlık

This study aimed to investigate the attachment styles, emotional intelligence, and levels of romantic jealousy among individuals in romantic relationships. A screening model, which is one of the quantitative research designs, was employed for this research. The population of the study consists of individuals aged 18 and over who are in romantic relationships residing in the Turkish Republic of Northern Cyprus and Turkey. Purposive sampling, a non-random research method, was utilized in this study. The sample of the research was determined as individuals aged 18 and over who are currently in romantic relationships. The sample of the research consists of 430 participants who are in romantic relationships and have reached the age of 18. To collect data, "Socio-Demographic Information Form" was used to gather participants' socio-demographic information, "Three-Dimensional Attachment Style Scale" was used to determine attachment styles, "Rotterdam Emotional Intelligence Scale" was used to assess emotional intelligence levels, and "Romantic Jealousy Scale" was employed to measure levels of romantic jealousy. The results

of this study revealed that women scored higher than men in anxious-ambivalent attachment and emotional intelligence, and that the duration and nature of the relationship were associated with attachment styles. Furthermore, relationships were found between attachment styles, emotional intelligence, and romantic jealousy. It is recommended that further comprehensive studies be conducted on the examination of attachment styles, emotional intelligence, and levels of romantic jealousy among individuals in romantic relationships.

Keywords: romantic relationship, attachment styles, emotional intelligence, romantic jealousy

APPLICATION OF THE DOE METHOD TO OPTIMIZE A RADIAL IMPULSE TURBINE FOR WAVE ENERGY CONVERSION

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ABSTRACT
This research focuses on enhancing the performance of a self-rectifying radial impulse turbine, a critical component in wave energy conversion. The turbine's unique design incorporates circular-profile blades, and optimization of its efficiency is pursued through the Design of Experiments (DOE) methodology. The primary objective is to maximize efficiency during the inhalation and exhalation phases of its operational cycle. Employing a meticulous data-driven approach, a 3D viscous flow modeling technique utilizing the ANSYS Fluent code is employed to comprehensively analyze the turbine's performance, considering alterations in its geometry. Within the optimization process, ten distinct geometric parameters are scrutinized, with a focus on achieving precision through a 95% confidence level to identify parameters genuinely influencing efficiency. Only four of these parameters significantly impact the turbine's efficiency, with the rotor's geometry, particularly the blade angle, emerging as a key determinant of overall performance. Additionally, the study explores the influence of the rotor blade stagger angle, revealing that maintaining a stagger angle of 4 degrees is optimal for sustaining high efficiency in both operational modes, exceeding 50% efficiency. In comparison with a turbine featuring elliptical profiles, the study demonstrates a substantial 20% improvement in efficiency for the current turbine. These findings underscore the significance of the design modifications explored, offering promising prospects for enhancing the efficiency of wave energy conversion systems.

Keywords: DOE method; Wave Energy Conversion; Turbine Efficiency; Geometric Parameters; Optimization.

PROF.DR. EROL GÜNGÖR'ÜN FELSEFE ANLAYIŞI

PROF.DR. EROL GÜNGÖR'S UNDERSTANDING OF PHILOSOPHY

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ÖZET
Prof. Dr. Erol Güngör, modern Türk düşüncesi önemli ilim adamlarından biridir. Kısa bir ömrüne devası eserler bırakan aydın, farklı alana hitap eden çalışmaları kaleme almıştır. Onun araştırma alanlarına bakıldığında Felsefe, Dil, Edebiyat, Tarih, Din, Eğitim, Sosyal Psikoloji, Siyaset ve Antropoloji hakkındadır. Erol Güngör, batılılaşma hareketinin bireysel, toplumsal ve kültürel boyutlarına dikkat çekmiştir. O, dindar–Türk aydınlarını bu noktada sorumluluklarını hatırlatmış milli değerlere sahip çıkılması adına kendi felsefi düşüncesini inşa etmiştir. Bu bağlamda Erol Güngör, ahlaki değerler ve tarihsel bir bilinçle ile hareketle felsefi fikirlerini ortaya koymuştur. Güngör çalışmalarında milli geleneğin üzerine inşa edilen tarihsel bir perspektif ile felsefi kavramları tekrardan ele almıştır. Böylelikle yeni bir felsefi bakış açısıyla toplumsal sorunların çözüm noktasında önemli tespitleri olmuştur. Bu bağlamda çalışmada nadir olarak bilinen felsefi kimliği ön plana çıkararak Erol Güngör'e göre felsefenin işlevinden söz edilmiştir. Ayrıca Erol Güngör çağdaş dönem Türk dönemi faaliyetlerini gerçekleştirirken felsefe ve bilim birlikteliğinin öneminden bahsetmiştir. Çalışmamızda Erol Güngör'ün felsefi ve bilimsel çerçevede toplumsal meselelere sunmuş olduğu metodolojik yönüne de dikkat çekilmiştir.

Anahtar Kelimeler: Erol Güngör, Felsefe, Türk İslam Düşüncesi, Toplum, Bilim, Tarih

ABSTRACT
Prof. Dr. Erol Güngör is one of the important scholars of modern Turkish thought. The intellectual, who left huge works in a short life, has written works addressing different fields. When we look at his research areas, it is about Philosophy, Language, Literature, History, Religion, Education, Social Psychology, Politics and Anthropology. Erol Güngör drew attention to the individual, social and cultural dimensions of the westernization movement. He reminded the religious-Turkish intellectuals of their responsibilities at this point and built his own philosophical thought in order to protect national values. In this context, Erol Güngör put forward his philosophical ideas based on moral values and historical consciousness. In his works, Güngör revisited philosophical concepts with a historical perspective built on the national tradition. Thus, he has made important determinations at the point of solving social problems with a new philosophical perspective. In this context, in this study, the function of philosophy according to Erol Güngör was mentioned by bringing the rarely known philosophical identity to the forefront. In addition, Erol Güngör mentioned the importance of the unity of philosophy and science while realizing the activities of the contemporary Turkish period. In our study, attention was also drawn to the methodological aspect that Erol Güngör presented to social issues within the philosophical and scientific framework.
Keywords: Erol Güngör, Philosophy, Turkish Islamic Thought, Society, Science, History

GİRİŞ

Erol Güngör 1938 yılında Kırşehir'de dünyaya gelmiştir. İlkokul ve ortaöğrenimini Kırşehir'de gören Güngör başarılı bir öğrenciydi. Arapçayı öğrenmek adına özel dersler almıştır. Kırşehir'in manevi değerlerine ilgisi vardı. Bu anlamda Anadolu'nun tarihi ve kültürünü merakla araştıran birisiydi. Daha küçük yaşlarda Türk-İslam Düşüncesi Tarihi bağlamında yazılan metinleri okumaya başlamıştı. Onun bu merakı sonraki ilim yaşamını önemli bir yönünü teşkil edecek milli ve İslami kültür değerlerine ilgisinin temelini oluşturmuştur. Diğer yandan Ziya Gökalp ve Hilmi Ziya Ülken gibi fikir adamların eserlerini okumaya çalıştı. 1956 yılında Kırşehir Lisesinden mezun olmuştur. Daha sona İstanbul Üniversitesi Hukuk Fakültesine kayıt olmuştur. Bu sıralar da dönemin ilim, düşünce ve sanat adamlarının bir araya geldiği ortamlarda bulunmuştur. Bu toplantılarda kendisine danışman olacak Mümtaz Turhan'ı tanıma fırsatı yakalamıştır. Hocasının kendisine rehber olmasıyla Hukuk Fakültesi'ni bırakmış kaydını Felsefe Bölümüne almıştır. Güngör, Mümtaz Turhan'ın önderliğinde çalışmalarını yürütmüştür. [39]

Erol Güngör 20. Yüzyılın ikinci yarısında İslam'ı ve milliyetçili yeniden çalışmalarına konu edinmiş ve önemli değerlendirmeler de bulunmuştur. Erol Güngör'de Ziya Gökalp, Mümtaz Turhan ve Mehmet İzzet gibi Türk Sosyolojisi okulunun bir halkasını teşkil eden isim olmuştur. O, sağlam bilgisi ve objektif davranışa sahip bir aydın olması sebebiyle her sınıfa hitap eden bir yönü vardı. Diğer aydınların din, medeniyet, milliyet gibi kavramları parça parça irdelerken Erol Güngör, sistematik ya da dizgesel bir biçimde ele almıştır. Bu anlamda onun eleştirileri ve yorumları öğretici nitelikte olmuştur.[40]

Erol Güngör Sosyal Bilimler'e konu olabilecek hemen hemen bütün alanlara hitap edilecek çalışmalar yürütmüştür. Onun düşünce dünyasının merkezinde insan olduğu için insan yaşamına konu olmuş meseleleri çalışmalarına taşımıştır. Ahlak, din, sosyal psikoloji, hukuk, tarih ve bilim üzerine çalışmalarını yürütmüştür. Onun özellikle Türk İslam düşüncesi açısından ele almış olduğu eserleri önceliğini, kendi toplumuna ve kültürüne verdiğini anlaşılmıştır. Dönemin sorunlarının çözüm noktasında ise önemli tespitleri olan Güngör felsefesini inşa ederken yine bağlı olduğu kültürünü ve değerlerini göz önünde tutmuştur. Çalışmamızda Güngör'ün felsefe 'ye ilişkin görüşlerine yer verilmiştir. Bu bağlamda onun bilgi ve ahlak felsefesine konu olmuş temel kavramları hakkında da bilgiler verilmiştir.

ARAŞTIRMA VE BULGULAR

Erol Güngör'ün Sosyal psikolog kimliğinin dışında diğer bir kimliği olan felsefeci yönüne dikkat çekilmiştir. Bu anlamda onun epistemolojisine yer verilmiş ve akabinde felsefesinde kullanmış olduğu temel kavramlara yer verilmiştir. Psikoloji, bilim ve felsefe üçgeninde Güngör'ün çalışmalarındaki göstermiş olduğu başarı gösterilmeye çalışılmıştır. Türk İslam düşüncesi bağlamında yazılar yazan düşünürlere kıyasla Güngör'ün çalışmalarının daha dizgesel olduğu saptanmıştır. Özellikle onun sosyal bilimler konusunda yapmış olduğu çevirilerine baktığımızda Avrupalılar tarafından da takdir kazanmıştır. Çalışma Güngör'ün felsefesine kazandırmış olduğu kavramlar çerçevesinde bir bütün oluşturacak şekilde düşünürün fikirleri izah edilmeye çalışmıştır.

1.EROL GÜNGÖR'ÜN DÜŞÜNCE DÜNYASINDA FELSEFE'NİN YERİ

Erol Güngör'ün bir rasyonalite anlayışından bahsedilebilir mi? Yahut bu anlayışına uymuş mudur? Fikirlerinin felsefi temelinden söz edilebilir mi? Evet, bir rasyonaliteye sahiptir. Güngör, söz konusu anlayışa riayet etmiştir. Ortaya koymuş olduğu düşüncelerindeki tutarlılık, intizam ve sıralı düzen bu rasyonaliteyi göstermeye yetecek durumdadır. Onun düşüncelerinin bilimsel ve felsefi temeli vardır. Güngör lisans eğitimini Felsefe alanından yapmıştır. Batı felsefesinin önemli filozoflarının temel fikirlerinden istifade etmiştir (Bolay, 2007).

Erol Güngör *İslam'ın Bugünkü Meseleleri* adlı çalışmasında realitenin kavranışını gerçeklik hususundaki bilgimizin kaynağını tartışmıştır. Burada Güngör bilgi felsefesi hakkındaki görüşlerini de açığa çıkarmış olur. Güngör, Batılı filozoflar olan Kant, Hegel, A. Comte, Bergson,

[39] İnternet Erişim https://islamansiklopedisi.org.tr/gungor-erol.
[40] Türkiye Diyanet Vakfı İslam Ansiklopedisi. Erol Güngör, 14.cilt, s.305,

Schopenhauer, Nietzsche, Marx, Kierkegaard gibi isimleri tenkit eder. Realitenin tek yanlı olmadığını bilgimizin teorik yanının sezgici veya estetik yanıyla birlikte bir anlam ifade edeceğini dile getirmesi onun felsefi temele sahip olduğunu göstermektedir (Güngör, 1981). Bu anlamda Erol Güngör'ün tasavvufi bilgisine dair açıklamaları da önem taşır.

O, mistisizmin "görünen" ve "görünmeyen" iki realitenin varlığını ifade ettiğine işaret eder. Söz konusu ayrım ruh-beden ayırımı kadar eski ve hatta onunla iç içe bir meseledir. Bu anlamda Erol Güngör akıl ve sezgi arasındaki ayrıma dikkat çeker. Güngör'e göre bize eşyanın yalnızca görüntüsünü veren şey akıldır. Ancak eşyanın hakikatini yani görüntünün arkasındaki asıl gerçeği bilemez. Eşyanın özüne nüfuz edilebilmenin akıldan başka bir yolu olmalıdır. Bu da "Sezgi" dir (Yamak, 2018). Yine bu anlamda Güngör, eşyanın hakikatinin kavrayışında İslam felsefesinde teorik bilgi (mantık), duyu organları (gözlem) ve sezgi (görü) şeklinde üç bilgi türü ortaya koyar (Güngör, 2006).

Erol Güngör'ün felsefesine ve çalışmalarına baktığımızda dil, tarih, milli kültür, örf, ahlak, batılılaşma ve din hakkında yazılar kaleme almıştır. Bu bağlamda onun çalışmalarını okuyan her insanda bir ilmi zihniyet bilinci uyandırmaya vesile olmuştur. Yani insanların zihin dünyasında bilincin oluşmasına katkı sunmuştur. Zihinleri sarsmış, düşüncelerin mecrasını değiştirmiştir. Bu konuda zihinlerde kalıplaşmış ideolojileri yıkmıştır. Düşüncenin akışını başka kanallara yönlendirmiş ve insanın bakış açısına zenginlik kazandırmıştır. Aydınımız, insanların; kültüre, milli kültüre, milliyetçiliğe, İslam düşüncesine, medeniyete ve ilme bakış açılarını yenilemiştir. Toplumsal sorunların yaşanmasına neden olan korkuların kaldırılmasında öncü isim olmuştur. Bu minvalde sömürgeci kültür karşıtı, çağdaş, medeni ve demokratik bir milliyetçiliğin ve İslam felsefesinin yeni yorumlarının fikir babası olmuştur (Bolay, 2007).

Erol Güngör'ün sosyal sorunlara dair fikirlerine bakıldığında temel eserlerinden önce ampirik olarak ele aldığı araştırmalarında toplum kültür varlığını dikkate aldığını görürüz. Erol Güngör'ün ampirik çalışmaları ve düşünceleri ayrı olarak ele alınarak ampirik çalışmaları için sadece akademik çalışmalar olduğunun düşünülmesi ve düşünce dünyasında kendisinin farklılaştırılması söz konusudur. Güngör'ün felsefi eserleri ile sosyal psikoloji araştırmalarını ayrı yorumlanması problem teşkil etmektedir. Söz konusu problem, felsefe-bilim kuramının toplum-kültür varlığı bakımından değerlendirilmelidir (Eker, 2023).

"Güngör'ün ait olduğu bir araştırma geleneği olmakla beraber getirdiği eleştirilerin neticesinde kendisinin tercih ettiği bir bilimsel kuramı bulunmaktadır. Felsefe bilim temelli bir bilim kuramının içerisine giren bilimsel çalışmalarında gerçekleştirdiği ampirik çalışmaların içeriği, problemleri ve hipotezleri bakımından bu durum incelenebilmektedir. Herhangi bir toplum yerine kendi toplumun kuşatan bir metodoloji toplum kültür varlığını gerçeklik olarak sunmaktadır. Güngör'e göre İslam düşüncesinin özellikle felsefe alanında geliştirdiği bilgi ile toplumsal meselelere dair sunduğu metodoloji bilimsel olarak değerlendirilebilir. Felsefe bilim temelli bilim kuramı içinde sosyal psikoloji bir bilimsellik etrafında kendi toplumsal meselelerini hipotezleştirmek ve çözüme kavuşturmak bakımından çalışmaktadır. O halde sosyal Psikoloji konusuna göre problem çözme faaliyetini kendi toplumunda gerçekleştirebilir" (Eker, 2023).

2. EROL GÜNGÖR'ÜN FİKİRLERİNİN OLGULAŞMASINDA ÖNEMLİ DÜŞÜNÜRLER

Erol Güngör'ün fikirlerinin olgunlaşmasında Ziya Gökalp, Hilmi Ziya Ülken, Mümtaz Turhan, Fethi Gemuhluoğlu, Dündar Taşer ve Kenneth Hammond etkili olmuştur. Bu bilim insanları Erol Güngör'ün düşünce dünyasını zenginleştiren ve felsefesinin temellenmesinde öncü isimlerdir.

Türkiye'nin kuruluşunda fikirleriyle en etkili ideologların başında Ziya Gökalp gelmektedir. Çağın modern ve pozitif bilgilerini irdeleyip Türk toplumuna uyarlayan sosyolojinin de öncülerindendir (Gökalp, 2013). "Güngör, ilmî sahası gereği birçok sosyoloğun fikirlerini incelemiştir fakat en sert eleştirisini Gökalp'e yapsa da onun Türk fikir hayatındaki en etkili isimlerden biri olduğunu belirtir" (Kılıç, 2023). Bu anlamda Güngör, Ziya Gökalp'in "Türkleşmek, İslamlaşmak, Muasırlaşmak" merkezli fikrini dönemin en gerçekçi en birleştirici kurtuluş çaresi olduğunu savunur (Güngör, 1984). Gökalp'in millet, kültür, medeniyet vb. kavramlar hususundaki görüşleri

Güngör'ü derinden etkilemiştir. Bu da Güngör'ün felsefi düşüncesine konu olan kavramların tarif ve izah edilmesine sebep olmuştur. Güngör Türk sosyolojisi öncüsü olan Gökalp'i tenkit etmesi bir tapunun yıkılmasını göstermiştir. Bu kırılma ise Milliyetçi camiada Gökalp'in eleştirilemez olduğu fikri ile alakalıdır. Güngör'ün böylesine bir girişimde bulunması sonraki kuşaklar için "lider şahsiyetlerin eleştirilemez" tabusunu da yıktığı söylenebilir (Kılıç, 2023).

Hilmi Ziya Ülken, Türk düşünce hayatında ve Türkiye'de bir felsefe geleneğinin oluşmasında önemli bir etkisi olmuştur. Ülken'in İstanbul Edebiyat Fakültesi Sosyoloji bölümünden öğrencisi Erol Güngör'dür. Erol Güngör'de hocası gibi farklı disiplinlere yönelmiş ve çalışmalar üretmiştir. Talebesinin farklı olarak felsefe ve roman alanlarında eserler kaleme almıştır. Ülken, Anadolucu düşünce akımının bir temsilci olarak addedilirken, Güngör milliyetçi muhafazakâr düşünce yapısına daha yakın görülmüştür. Bu iki düşünce akımında büyük farklılıklar olmasa da iki fikir akımının temelinde kültür milliyetçiliği vardır. İki düşünce akımı için de İslâm dini ve Türk kültürü esas ögelerdir. Ülken, Türk düşüncesi alanındaki yazıları Türkiye'de ilk olmasından dolayı önemi büyüktür. Bu yazı çalışmalarında kaynak sıkıntısı yaşadığı için İslâmî dönem Türk düşüncesi alanında sınırlı sayıda şahıslardan yararlanmıştır. İslâm felsefesi ve Türk düşüncesi ile ilgili çalışmalarında ise Batılı bir duruş sergilediği görülmektedir (Vural, 2019). Bu bağlamda Erol Güngör üniversite yıllarında hocası Hilmi Ziya Ülken'in derslerine katılır ve derslerinde almış olduğu notları Osmanlıca yazardı. Söz konusu Osmanlıca yazılan ders notları Ülken tarafından genişletilmiş ve Türkiye'de Çağdaş Düşünce adlı eser meydana gelmiştir. Bu minvalde Ülken'in ilmi gayreti, çalışma disiplini ve çok yönlü bir bilim adamı olması Güngör'ü etkilemiştir. Güngör'ün akademik hayatında önemli bir ahlâkî lider olmuştur (Kılıç, 2023).

Türkiye'de Sosyal Psikoloji ve Deneysel Psikoloji alanında önemli olan Mümtaz Turhan'da Güngör'ün düşünce dünyasını etkileyen önemli bir şahsiyettir. Mümtaz Turhan Türkiye'de yaşanılan sorunlara çözüm noktasında önemli tespitleri olan birisidir. Memleketin dertlerini kendi derdi gibi bilen Mümtaz Turhan bu anlamda Türk gençliği içinde önemli bir rehberdi. Küçük, Hocası Turhan Hoca'nın ölümüyle Türk gençliği "milliyetçi mürşidini kaybetmişti. Fikir cephesinde ise "İslâm'ın mana ve ruhuna uygun bir Müslüman'dır (Küçük, 1977). Turhan, İstanbul Üniversitesi Hukuk Fakültesi'ne kaydını yaptıran Güngör'ün kaydını aldırarak Edebiyat Fakültesi Felsefe Bölümü'ne başlamasına vesile olmuş ve sonra da onu Sosyal Psikoloji Bölümü'ne asistan olarak kabul etmiştir. Ziya Gökalp ile Turhan, Turhan ile Güngör arasında devam eden milliyet/çilik-kültür anlayışı küçük farklılıklarla da olsa birbirlerinden etkilenmeleri devam etmiştir. Turhan, Gökalp'ı görmemiştir ama Güngör, Turhan'ın öğrencisi olmuştur hatta bu hoca-talebe ilişkisinden öteye baba-oğul ilişkisine benzer hâle gelmiştir (Kılıç 2023). Güngör hocası hakkında şunu dile getirir. "Kendisini tanıyan herkese derin ilhamlar verecek kadar kuvvetli olan ahlâkî şahsiyeti bile onun ilmî şahsiyetinden ayrılamazdı. Ben hayatımda onun kadar şahsiyetinin bütün boyutlarını bu derece ahenkli hâle getirmiş ve hepsini ilimci düşünce esası etrafında birleştirmiş ve bütünleştirmiş başka insan görmedim." (Güngör, 1994) Ayrıca "Güngör de Hocası Turhan gibi aydın konusu üzerinde durmuş, bu kavramı eğitimli insanların ve halkın bakış açılarına göre incelemiştir. Turhan, Güngör'ün sadece ilmî hayatında etkili olmayıp sosyal hayatında da etkili olmuştur" (Kılıç 2023).

Güngör, Türk Kültürü ve Milliyetçilik adlı eserini hocası Mümtaz Turhan'a şu sözlerle ithafta bulunmuştur: "Bu küçük kitap, merhum Profesör Mümtaz Turhan'ın hatırasına ithaf edilmiştir. Önce talebesi, sonra mesai arkadaşı olarak birlikte bulunduğum yıllarda ondan öğrendiklerim benim bütün akademik hayatımın çekirdeğini teşkil etmiştir. Onun kıymet verdiği ve itina ile yetiştirmeye çalıştığı bir talebe olmam bana hayatım boyunca gurur verecektir. Bu kitapta birtakım yanlışlar varsa, bunlar Profesör Turhan'ın hayatta olmayışı yüzünden düzeltilememiştir" (Güngör, 1975).

"Yirminci yüzyıl Türkiye'sinde yetişmiş birçok akademisyenin üzerinde maddî-manevî emeği olan Fetih Gemuhluoğlu'nun keşfettiği cevherlerden biri de Erol Güngör'dür. Gemuhluoğlu'nun Türk milletine en büyük hediyesi Güngör'ü ilim camiasına kazandırmasıdır. Çünkü Güngör'ün

akıl hocası, manevî babası, unutulmaz hocası Mümtaz Turhan'la tanışmasına vesile olan Gemuhluoğlu'dur." (Kılıç, 2023). Bu anlamda Gemuhluoğlu'nun Erol Güngör ile olan anısını Özdemir şöyle aktarır:

"Yüksek tahsil için İstanbul'a gelen Erol Güngör'ün, Marmara Kıraathanesi'nde dedesine eski harflerle yazdığı mektubunu, masasına oturan Fethi Gemuhluoğlu görür. İnci gibi yazdığı mektubunu hayran hayran seyreden Gemuhluoğlu, Erol Güngör ile tahsil durumunu ele alıp biraz sohbet eder; onu gözüne kestirir. (…) Erol Güngör'e, 'Kalk seninle bir yere gidelim.' der. Tabii Erol Güngör büyüğüne saygısından dolayı hemen ayağa kalkar. Marmara Kıraathanesi'nden çıkarak az aşağıdaki Edebiyat Fakültesi'ne Mümtaz Turhan'ın odasına girerler. 'İşte aradığın ilim adamını getirdim.' müjdesini verir. Fethi Gemuhluoğlu'nun söylediği laf ciddiye alınır; Erol Güngör'ün derslerindeki başarısı Mümtaz Turhan'ın takdirini kazanır. 1961 yılında 'Tecrübî Psikoloji' konusunda onu asistan olarak alır" (Özdemir, 2017).

"Nurettin Topçu için Abdülaziz Bekkine, Necip Fazıl için Abdülhakim Arvasi ne ise Güngör için de Dündar Taşer odur yani bir nevî şeyh, önder" (Doğan, 2018). "Güngör'e göre Taşer kendi varlığını millet içinde eritmiş, Türkiye'nin ruhunu arayan ve insanları etkileyen bir büyüye sahip lider şahsiyettir" (Güngör, 1984). Güngör'e göre Taşer, kendini politik bir adam olarak görmemiştir. O kendini Türk milliyetçisi olarak görüyordu. Dündar genç neslin siyasi alanların peşinde giden değil idealler uğruna yaşayan kimseler olmasını arzulamıştır. Güngör'ün Taşer'in arkasındaki başarı şuydu: "Taşer her şeyden önce kendini bir derviş mahiyeti içinde tutmayı bildi. Onun gençlik hareketinde kendini bir lider olarak ortaya attığını veya öyle düşündüğünü hiç kimse söylemez. Taşer gençlerle bir arada oturup dernekçilik de yapmadı. O sadece bütün çalışmaların önünde bir ışık gibi duruyor, çıkan her ihtilafta hakem oluyordu. Gençlere iki şey öğretti: Birincisi Türk tarihinin yeni bir yorumu, ikinci bu tarih içinde çağdaş Türk gençliğinin yeri ve vazifesi. Başarısının fikrî bakımdan sırrı işte bu noktada yatar. Onun getirdiği yorum şimdiye kadar milliyetçilikte ihtilaf konusu olan bütün noktaları bertaraf etmiş, herkesi birleştirmiştir. Fikirlerinin yanında şahsiyetine ait vasıfları hesaba katmazsak onun başarısını yine açıklayamayız. Kendisini görme imkânını bulamayan gençler işte bu yüzden onun yaptığı işi kolaylıkla anlayamayacaklardır. Taşer bizim tarihimizdeki 'Veli' ve 'Alp' tiplerinin her ikisinin özelliklerini de üstünde taşıyordu" (Güngör, 1984).

Son olaraktan Erol Güngör'ün fikirlerinin olgunlaşmasında etkisi altında kalmış olduğu düşünür Kenneth Hammond'tur. Güngör, 1966 senesinde ABD Colorado Üniversitesi'nde meşhur sosyal-psikolog Kenneth Hammond'un isteği üzerine Amerika'ya çağrılmıştır. Colorado Üniversitesi'ni Davranış Bilimleri Enstitüsü'nde farklı alanlarda çalışmalar yürütmüş ve sosyal-psikoloji ders ve seminerlerini vermiştir. Yine onun çevrileri etrafındakilerinin dikkatini çekmiş özellikle Fransızca'dan İngilizce 'ye yapmış oldukları başarılı görülmüştür. Yaklaşık olarak iki sene Avrupa'da eğitim gören Güngör, felsefesine ve düşünce dünyasına zenginlikler katmıştır. Ona göre batı kültürünü bilmek kişinin kendi kültürünü anlaması açısından önemliydi. Bu sebeple birçok kitap çevirisi yapmış, birçok dil öğrenme ihtiyacı hissetmiştir. Hocası Hammond'un akademideki saygın yeri Güngör için iyi bir fırsat olmuştur (Kılıç, 2023).

3. EROL GÜNGÖR'ÜN FELSEFESİNDE BAZI TEMEL KAVRAMLAR

Erol Güngör'ün çalışmalarına baktığımız zaman genel anlamda batılılaşma hareketleri sonucunda Anadolu'nun sorunlarını tespit ederken üzerinde durmuş olduğu temel kavramlar olmuştur. Bizde çalışmamızın bu kısmında düşünürün sıklıkla üzerinde durduğu birkaç kavramına yer vereceğiz. Bunlardan ilki "milliyetçilik" kavramıdır.

Güngör'e göre milliyetçilik bir sosyolojik veya felsefi doktrini kalıpları içinde izah edilemeyecek kadar karmaşık bir kavramdır. Her memlekette milliyetçilik o memleketin kendine mahsus şartları içinde gelişmiş ve bir memlekette aldığı şekil çok defa bir başka yerdekiyle ihtilaf veya tezat halinde görünmüştür (Güngör, 1980). Güngör'e göre sosyal kimliğini kaybetmekte olan toplumların kültürel benliklerini muhafaza etmeleri milliyetçilik duygularına bağlıdır. Çünkü milliyetçilik, yeni devletlerde milli birlik ve tecanüsü kazanılması yanı sıra, Batı kapitalizmine bir

reaksiyon hareketi olarak da görülmektedir (Güngör, 1981). Güngör'ün çalışmalarında üzerinde durduğu diğer bir kavram ise "kültür"dür.

Erol Güngör'e göre kültür bir cemiyetin kendi problemlerini çözmenin bir tarzı olarak benimsenmiş olup kullandığı her türlü davranış sistemleri ve maddi vasıtaların bir terkibidir. Onun dikkat çektiği şey tek bir kültür de bahsedilemeyeceğidir. Bugünkü Avrupa'nın tek bir kültür olduğunu söylemenin doğru olmadığını belirtir. Güngör'e göre farklı milli kültürlerin oluşturmuş olduğu bir Avrupa kültüründen söz edilmektedir (Güngör, 1995). Bu minvalde Güngör, her milletin kendine ait bir medeniyetinin olduğunu hatırlatır. Bunun da milli kültür bağlamında değerlendirir. Ona göre "kültür ve medeniyet birbirinden ayrı olgular değillerdir. Milli kültürler bir medeniyetin çeşitli manzaralarından ibarettir. Milletler arasında alış veriş konusu olan ortak medeniyet unsurları her milletin kendi şartları içinde kendisine mahsus bir hüviyete kavuşur ve böylece her bir millet medeniyeti kendi tarzında benimser. Bizim kültür dediğimiz şey milletin cemiyetlere intikal ediliş tarzı ve onlarca benimsenmiş şeklidir" (Güngör, 1995).

Erol Güngör çalışmalarında "Aydın" kavramı üzerinde yoğunlaştığını da görüyoruz. Güngör aydın tarifinde bulunmadan önce ilk olarak Anadolu'da mevcut var olan aydın/entelektüel durumunu ele almaktadır. Akabinde bir aydında bulunması gereken niteliklerden söz eder. O, ülkesinin gelişmemiş durumunu gözler önüne sererek aydınlarımızın da gelişmediğini dile getirmiştir (Güngör, 217). Güngör, bu sorunun iyileşmesi adına toplumumuzda olması gereken aydın tipini şöyle betimler: "Memleketimizde ihtiyaç duyulan aydın (burada aydın kelimesiyle memleketin entelektüel elitini teşkil eden insanları kastediyoruz) kadrosunu dolduramadığı için, elindeki zayıf kadroyu her türlü ihtisas mevkiinde çalıştırma yoluna gitmektedir. Bu da yetmediği takdirde acele kurulmuş bir takım eğitim müesseselerinden yarım bir tedrisatla mezun ettiği insanlarla memleketin aydın kadrolarını doldurmaya çalışmaktadır" (Güngör, 2011).

Güngör'ün metinlerine bakıldığında "Tarih" kavramı üzerinde de birçok fikir beyan etmiştir. Ona göre "tarih bir milletin geçmişi olduğuna göre, onun millî hüviyeti ve şahsiyeti tarihin bir eseri demektir. (…) Bir insanın gelecek hakkındaki başarı tahminleri nasıl onun geçmişine ait kanaatlerinin bir uzantısı oluyorsa bir milletin şimdiki ve gelecekteki imkân ve kabiliyetleri hakkında fikir sahibi olması büyük ölçüde onun tarih anlayışına göre belirlenecektir" (Güngör, 2007). Bu minvalde Güngör'e göre Türk medeniyetinin en gelişmiş dönemi ve örneğini Osmanlı medeniyetini görür. Osmanlı medeniyeti İslam dünyasında Türk egemenliğini tesis eden bir medeniyettir (Güngör, 1995). Bu konuda Erol Güngör şu tespiti yapmaktadır: Türk milleti bu uzun tarihi boyunca kazandığı bütün gücünü ve tecrübesini birleştirerek Osmanlı İmparatorluğunu kurdu. Bizim tarihimizin bütün evvelki safhaları bu büyük eserin meydana getirilmesi için yapılmış birer prova gibidir (Güngör, 1995).

Son olarak Güngör'ün eserlerinde sıklıkla bahsetmiş olduğu "Ahlak" kavramına bakalım. En genel anlamda Erol Güngör'e göre "ahlak, insanı erdemli kılan bir değerdir" (Güngör, 1985) İnsanlar birlikte yaşarken en çok ahlaka gereksinim duyarlar. Güngör, sosyal yaşam içinde ahlakın insani ilişkilerin düzenlenmesinde önemli rol oynadığını dile getirir. Ahlaki ilkelere bağlı kalınarak toplumsal kuralların oluşması söz konusudur. Bu anlamda Erol Güngör'e göre ahlak, "toplum hayatının gerektirdiği davranışlarla ilgili bir kavramdır" (Güngör, 1998). Güngör, ahlakın insan yaşamı için zaruri bir mesele olduğunu şöyle açıklar: "kendileri için zararlı ve yararlı olan yiyecek, içecek vs. gibi şeyleri ayırt etmek zorunda olan insanlar, iyi davranışlar ile kötü davranışları ayırt eden manevi bir sisteme de sahip olmak durumundadır. Aslında ahlakın varlığı, bir çeşit tabiat kanunudur: Suyun bulunduğu yerde nasıl hayat varsa insanların bulunduğu yerde de ahlak vardır. İnsanlara düşen görev, ahlakı en iyi şekle getirmektir" (Güngör, 1998).

"Gerek yaşadığı dönemde gerekse de sonrasında fikirleri ve yazıları ele aldığı konular itibariyle derin etkiler yaratan Erol Güngör, yaşadığı dönemde ön planda olan sosyal meseleler hakkında fikirlerini açıkça beyan etmekten geri durmamıştır. Kültür, modernleşme, milliyetçilik, İslam ve din, aydınlar ve tarih gibi o dönemde hem dünyada hem de Türkiye'de üzerine yoğun tartışmalar yapılan kavramlar hakkında oldukça fazla sayılabilecek eserler üretmiştir. Böylece hem sonraki

nesillerin bu konular üzerine düşünmesini sağlamış, hem de bu konular hakkında çalışma yapmak isteyen araştırmacılara kaynak zemini oluşturmuştur" (Değirmenci, 2023).

SONUÇ

Erol Güngör Türk İslam düşüncesi açısından önemli bir aydınımızdır. Aydınımız genellikle sosyal psikolog ve akademisyen kimliğiyle bilinmektedir. Onun filozof kimliği ise yaşadığı toplum tarafından az bilinmektedir. İstanbul Üniversitesi Felsefe Bölümünden mezun olan Güngör, dönemin önemli felsefeci akademisyenlerinden eğitim görmüştür. Felsefe, bilim ve psikoloji bağlamında çalışmalarını yürütmüş ve araştırmalarında bir bütünselliğin içeriğine dikkat etmiştir. O, felsefesini inşa ederken üzerinde durduğu temel kavramlar dönemin toplumsal sorunlarını dile getiren kavramlar olmuştur. Bu anlamda milliyetçilik, tarih bilinci, aydın, ahlak gibi kavramları tanımlamaya çalışmıştır. O, milliyetçilik kavramını kültür ile tarih bilinci ise medeniyet kavramı ile ilişkilendirerek izah etmiştir. Yine aydın kavramını açıklarken önce kendi toplumunun durumunu göz önünde bulundurmuş ardından aydın tiplemesini tasvir etmiştir. Ahlak kavramını ise birey ve toplum yaşamı için gerekli bir değer olduğunu dile getirmiştir. Ahlakın sosyal boyutuna dikkat çeken Güngör, aynı zamanda ahlakın toplum düzeninin devamının sağlanmasında önemli bir işlevi olduğunu da hatırlatmıştır.

KAYNAKÇA

Bolay, Süleyman Hayri. (2007). Erol Güngör. Tabula Rasa Felsefe & Teoloji, yıl:7, sayı:19.

Değirmenci, Mehmet. (2023). Prof. Dr. Erol Güngör'ün Kavramsal Çerçevesi. Ekev Akademi Dergisi, Sayı 95.

Doğan, Mehmet D. (2018). "Erol Güngör: Yeniden". Cumhuriyet dönemi millî düşünce sistematiğinde Erol Güngör içinde , (17-22),Türkiye Yazarlar Birliği, Ankara.

Eker, Hasan Remzi. (2023). Erol Güngör'ün Düşüncesinde Felsefe Bilim Faaliyeti Olarak Sosyal Psikoloji. Muhafazakâr Düşünce Dergisi, yıl: 19, sayı: 64.

Güngör, Erol. (1981). İslam'ın Bugünkü Meseleleri. Ötüken Yayınları, İstanbul.

Güngör, Erol. (1980). Türk Kültürü ve Milliyetçilik. Ötüken Yayınları, İstanbul.

Güngör, Erol. (1995). Türk Kültürü ve Milliyetçilik. Ötüken Yayınları, (11. Basım), İstanbul.

Güngör, E. (2011). Sosyal meseleler ve aydınlar. (7. baskı). Ötüken Yayınları, İstanbul.

Güngör, E. (2007). Sosyal meseleler ve aydınlar. (6. basım), Ötüken Yayıncılık, İstanbul.

Güngör, E. (1998). Ahlak Psikolojisi ve Sosyal Ahlak. (3.baskı), Ötüken Yayınları, İstanbul.
Güngör, E. (2011). Sosyal meseleler ve aydınlar. (7. baskı). Ötüken Yayınları, İstanbul.
Güngör, Erol. (2006). İslam'ın Bugünkü Meseleleri. (14.baskı), Ötüken Yayınları, Ankara.
Güngör, Erol. (1984). Dünden Bugünden Tarih-Kültür-Milliyetçilik. Mayaş Yayınları, Ankara.

Güngör, Erol. (1975). Türk Kültürü ve Milliyetçilik. İrfan Matbaası, İstanbul.

Gökalp, Ziya. (2014). Türk Töresi. Ötüken Neşriyat, İstanbul.

Kılıç, Ahmet. (2023). Erol Güngör'ün Hayatında Etkili Olan Şahsiyetler. Gelenekten Geleceğe Bir Aydın Erol Güngör Kitabı, Kaim Yayınları.

Küçük, Hasan. (1977). Türk Milliyetçiliğin Büyük Önderlerinden Prof. Dr. Mümtaz Turhan Bütün Yönleriyle. Türdav Basın, İstanbul.
Özdemir, Mehmet Niyazi. (2017). Erol Güngör'den bir hatıra. Selçuk Bakış Prof. Dr. Erol Güngör Hatırasına, Sayı: 42.

Türkiye Diyanet Vakfı İslam Ansiklopedisi, Erol Güngör. 14.cilt.
Vural, Mehmet. (2019). Hilmi Ziya Ülken. Diyanet İşleri Başkanlığı Yayınları, Ankara.

Yamak, Mehmet Bilal. (2018). Klasiği Modern Okumaya Tâbi Kılmanın İmkânı: Erol Güngör Düşüncesinde "Tasavvufî Bilgi". Cumhuriyet Dönemi Milli Düşünce Sistematiğinde Erol Güngör Sempozyumu, Kırşehir.

İNTERNET KAYNAK

İnternet Erişim https://islamansiklopedisi.org.tr/gungor-erol.

NEW VENTURES IN DIGITAL CREATIVITY PERSPECTIVE

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ABSTRACT
Both the rapid development and rapid spread of communication technologies have made it necessary for those who market their products and services to develop new tactics and to use this new field effectively. This emerging necessity has led to the emergence of creative digital ideas and has brought the concept of digital entrepreneurship to the literature, unlike traditional entrepreneurship. Digital entrepreneurship is an investment that started with the spread of the internet and made on internet-based ideas. In today's world, the rapidly developing internet technology, the internet passion of the Z generation, external factors (pandemic, etc.) are the motor dynamics of digital entrepreneurship and provide very important opportunities for economic development and employment opportunities. Netflix, Yemek Sepeti, Getir, Amazon, Trendyol etc. Applications such as successful digital creativity examples have offered guiding alternatives to new digital entrepreneurs. Also Youtuber, Blogging, Vlogging, Podcast production etc. It shows us that there is a wide variety of business ideas that can be put forward in the field of creative entrepreneurship. Especially by making Big Data analysis over the applications installed on smart phones, the producer and the consumer can carry out their economic activities very quickly and without intermediaries by coming together in electronic market places besides the classical market environment. In this study, the concept of "Digital entrepreneurship and digital creativity" is discussed as a new transformation platform in terms of economic history, and its conceptual framework, types, features and social benefits etc. are discussed. aspects will be evaluated.

Keywords: Digital Entrepreneurship, Digital Creativity, Digital Marketplace, Technology, Big Data.

INTRODUCTION
The concept of “digital entrepreneurship” which emerged with the integration of digital technologies into entrepreneurship, affects commercial activities in every field and makes human life easier. Unlike traditional entrepreneurship, the innovative and creative effect of information and communication technology has diversified business ideas by offering different applications to the digital world. Especially the increase in internet usage due to the effect of globalization plays a positive role in reaching this diversity (product and service) to the consumer through digital platforms. Evaluating human resources in accordance with technology, ensuring sustainability and modernizing organizational structures and gaining new shopping habits are all possible thanks to this digital transformation.
This transformation that we feel in every field of life has recently affected the behavior and perceptions of many generation representatives, especially Generation Z youth. The technical equipment adequacy, promotion anxiety, and flexible working policy desire of Generation Z representatives, independent of space and time limitations, increase the motivation of this generation for digital entrepreneurship life. The increase in efficiency, productivity and innovation in business and service models included with this motivation; It also provides a positive effect on economic growth and development with the transportation speed, market interaction and flexible

service network it provides. In this context, firstly, the concept of entrepreneurship will be discussed, then the emergence, definition and types of digital entrepreneurship will be presented and digital entrepreneurship will be evaluated in terms of the opportunities it offers.

CONCEPTUAL FRAMEWORK

The Concept of Entrepreneurship

The process of creating goods and services of different value by spending a certain amount of time and effort in return for a monetary and personal reward and considering various risks (financial, psychological and social, etc.) is called entrepreneurship (Hisrich and Peters, 1995: 16).

The concept of entrepreneurship, which has an impact on economic growth and development through the establishment of new business lines, is defined as "the activities of turning opportunities that others look at but cannot see into a business idea by bringing together production factors such as labor, capital and natural resources". The four main components of entrepreneurship are being innovative and creative, taking risks, acting as a pioneer and thinking competitively. (Başar 2017: 10). The person who brings these production activities together in line with these components is the entrepreneur.

Within the framework of the concept of entrepreneurship, which has a very old history but whose theory began to be accepted in the 20th century, the concepts of capitalist and entrepreneur were reconciled in the work titled “Wealth of Nations” written by Adam Smith in 1776. While Richard Cantillon defined the concept of entrepreneur in 1755, he emphasized the risk-taking aspect of the entrepreneur, while Jean Baptiste Say added the necessity of managerial qualification to this definition in 1803. Later, Joseph Schumpeter emphasized the innovative and developing aspects of entrepreneurship. In the 20th century, entrepreneurs were defined as people with an innovative structure and who take risks and were included in all scientific studies (Rüzgar 2019: 20-21).

The Concept and Types of Digital Entrepreneurship

Digital entrepreneurship is a field related to both the introduction of a new digital product and service to the market as an enterprise and the digital transformation of an existing commercial activity (Welsum 2016:1). Although many different definitions have been made regarding the conceptual framework of this field, some of them are; (Hull, Hung and Perotti, 2007) Digital entrepreneurship, which is a sub-category of entrepreneurship, is the digitalization of a part or all of the products that can be considered physical in the traditional organizational environment, (Risch, 2012) the application of traditional entrepreneurship principles to strengthen intellectual property in a digital perspective, (OECD, 2015) new entrepreneurial activities that emerge with the discovery and use of new digital technologies and transformations regarding existing businesses, (Sahut et al., 2021) the value creation process that emerges through the implementation of digital techniques in the process of obtaining, processing, distributing and consuming digital information (Özay, Kök 2022: 213-214). According to their functions, digital entrepreneurship types are examined under three headings as light, medium and extreme entrepreneurship and their characteristics are as follows (Hull et al. 2007: 296):

1-Light Digital Entrepreneurship: Digital entrepreneurship is complementary to traditional entrepreneurship and websites are additional supports. Goods and services are not digital, sales are digital and distribution is physical. It is a type of entrepreneurship where traditional methods are used in physical spaces.

2- Medium Digital Entrepreneurship: Resources are allocated to all components of the business through digital components. Digital or non-digital goods and services are sold both digitally and through personalization, and the distribution method is physical.

3-Extreme Digital Entrepreneurship: The entire process from production to customer relations management is digital. Goods and services are digital and sales are also digital. Distribution is done in a digital environment.

Differences Between Traditional Entrepreneurship and Digital Entrepreneurship

(Kişi 2018: 392-393) expresses the different aspects between traditional and digital entrepreneurship as follows:

• **Ease of entry into the market:** Digital entrepreneurship is a type of entrepreneurship where entry into the market is easy and does not incur time costs. Thanks to this advantage, individuals complete their business activities in a short time.

• **Ease of Production-Storage:** Since there is no need for a production facility and warehouse in digital entrepreneurship, it provides an advantage to the entrepreneur. This advantage is not the case for traditional entrepreneurs.

• **Ease of Distribution:** In digital entrepreneurship, distribution is fast and costs less, unlike traditional entrepreneurship.

• **Digital Workplace:** While being together physically, in other words team spirit, is important in traditional entrepreneurship, the digitalization of goods and services in digital entrepreneurship significantly reduces the need for a team.

• **Digital commitment:** While organizational commitment is easy in traditional entrepreneurship, it is more difficult in the virtual world of digital entrepreneurship.

• **Communication with digital technologies:** It is seen that computer technology is the main tool in digital enterprises.

• **Flexible organizational structure:** The flexible perspective developed by integrating technology with the digital world necessitates the establishment of a new organizational model.

Opportunities for Digital Entrepreneurship and the Importance of Digital Entrepreneurship

Digital entrepreneurship has an effect that contributes to all digital businesses, platforms, markets and technology in today's fast-paced competitive environment and creates opportunities, and these opportunities (Kumar et al. 2018: 28-29) have been examined under six different headings:

1- New Market Opportunity: It is the emergence of new market opportunities by reaching customer-focused audiences thanks to the rapid adaptation and active use of internet technology to human life.

2- Technological Innovation Advantage: It refers to the dynamism of businesses in the competitive environment thanks to their adaptation to technological innovations.

3-Digital Offer Opportunity: Digital businesses create demand in the market by both presenting new business opportunities and optimizing the available opportunities and ideas.

4-Objective Measurement and Evaluation Opportunity: Thanks to the measurement methods and analysis techniques offered by objective digital marketing tools, entrepreneurs will achieve healthier results.

5-Removal of Customer Communication Barriers: New social media tools and new digital platforms have made it easier to provide strong interaction with customers and establish an emotional bond.

6-Flexibility: It is the ability of digital businesses to serve their customers with an easily accessible network without time and space limitations.

Today, with the increase in technological developments, smartphones, tablets and computers are rapidly entering human life and creating a market environment for buyers and sellers. The digital environment in question prevents people from spending time in shopping malls with the online shopping comfort it offers. In this way, needs are both more easily met. In addition, the virtual environment in question provides individuals with a home working environment thanks to the communication environment it offers (Özay, Kök 2022: 215).

CONCLUSION

In recent years, the innovation process that has emerged with the rapid change in information and communication technologies both in Turkey and in the world has significantly affected individual and social life. Computers, printers, cloud technologies, data analytics, smartphones, etc. that have entered our lives through digital technologies, and popular interaction methods and new generation mobile applications thanks to some online platforms (Youtubers, Vlogging, Blogging, etc.) have caused a digital transformation.

In addition, natural disasters experienced in the world (earthquakes, wars, epidemics, etc.) affect the field of entrepreneurship. For example, with the Covid-19 pandemic process that we have recently experienced, it has been confirmed that entrepreneurs need to focus on seeing new opportunities with a faster, more flexible and adaptable attitude and an innovative perspective (Ayaz 2024: 190).

This digital transformation has revealed new opportunities, new business models, new employment opportunities, new marketing strategies and new organizational structures in the economy. From traditional entrepreneurship to production, marketing, logistics organizational structure, workplace, storage, etc. Digital entrepreneurship, which is divided into aspects, has paved the way for the use of different applications in many areas in micro and macro terms. Thanks to the adaptation of applications such as Trendyol, Amazon, Yemek Sepeti, Getir etc. to daily life, the concept of flexible working hours has entered the literature and a perspective has developed that emphasizes that it does not matter where you work as long as you do your job and criticizes the concept of fixed space. Now, individuals can access more alternatives in terms of supplying goods and services without experiencing any time cost and access problems. When we look at these applications, it is seen that they are quite valuable in terms of growth rate and dynamism potential.

This digital structure that entrepreneurship has taken on strengthens the positive correlation between entrepreneurs and economic growth. The digital platforms created add a certain dynamism to the economic structure. Especially, creating employment outside of known fields positively affects the process of using and transferring digital resources more productively and more efficiently. In that case, the duty of businesses is to develop a business model suitable for their own organizational structure and to realize an organization that can easily respond to customer expectations.

In this context, it is seen that digital entrepreneurship is spreading very quickly and finding an area of application with the effect of globalization. Most countries evaluate this rapid spread as an opportunity and evolve into digital transformation. Thus, the creation of new business opportunities with an innovative perspective also contributes to economic growth and development.

Therefore, the recommendation for supporting digital entrepreneurship in the light of the opportunities presented;

It should be aimed to enlighten digital entrepreneurs on the points where they are lacking in terms of integration with digital transformation and sustainability, and to inform them to choose digital technologies that are suitable for their business models.

RESOURCES

Ayaz, E., (2024). Bibliometric Analysis of Studies on the Concept of Digital Entrepreneurship with Vosviewer, Turkish-Islamic World Social Research Journal, 11(40), 185-196.

Başar, E., (2017). Entrepreneurship, 3rd Edition, Nobel Publishing, Ankara.

Hısrıch, R. D., Peters, M. P., (1995). Entrepreneurship Starting, Developing and Managing a New Enterprise, Irwin Publishing, USA.

Hull, C. E., Hung, Y. T. C., Hair, N., Perotti, V., and Demartino, R. (2007). Taking advantage of digital opportunities: a typology of digital entrepreneurship. International Journal of and Virtual Organizations, 4(3), 290–303.

Kisi, N., (2018). A New Entrepreneurship Approach in the Digital Age: Digital Entrepreneurship, C. University Journal of Economics and Administrative Sciences, Volume:19, Issue:2, pp:389-399.

Kumar, B.G., et al., (2018). Manoeuvre of Electronic Entrepreneurial Ecosystem to Contemporary Indicator of Techno Business Leadership in Industry 4.0: Digital Entrepreneurship, Volume-10, Issue-3, pp:25-33.

Ozay, K., Kok, S, (2022). Digital Entrepreneurship as an Example of New Generation Entrepreneurship and Digital Characteristics of Entrepreneurs, Pamukkale University Journal of Business Research, Volume: 9, Issue: 1, pp: 211-246.

Rüzgar, N., (2019), The Protagonist of Innovative Entrepreneurship: Disruptive Technologies, 1st Edition, Dora Publishing House, Bursa.

Welsum, D.v. (2016). Digital dividends: enabling digital entrepreneurs, world development report 2016. www. documents.worldbank.org/curated/en/2016/02/25851780/world-development-report-2016-digital-dividends-enabling-digital-entrepreneurs (Access date: 5.10.2024)

FARKLI BESİN ORTAMLARI KULLANILARAK BALIK LARVALARI İÇİN İNFUSORİA ÜRETİLMESİ

PRODUCTION OF INFUSORIA FOR FISH LARVAE USING DIFFERENT NUTRIENT MEDIA

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ÖZET

İnfusoria genel olarak suda yaşayan küçük canlıların beslenmesinde kullanılan organizma olarak tanımlanmaktadır. İnfusoria kültürü içinde bulanan birçok farklı organizma mevcut olup bunlar arasında yaygın olarak bilinen amip, öglena, paramesyum, rotifer sayılabilmektedir. İnfusoria balık yetiştiriciliğinde özellikle yeni doğan ve ağız açıklığı küçük olan larvaların beslenmesinde kullanılan önemli bir besin görevi gören organizmadır. Böylelikle yaşamlarının ilk dönemlerinde balık yavrularının büyütülmesinde önemli bir halka olarak karşımıza çıkmaktadır. İnfusoria her türlü su ortamında bulunmakla birlikte balıkların beslenmesi için yeterli miktarda mevcut değildir. Bu yüzden kültürün istenen miktara ulaştırılabilmesi için çoğaltılması gerekmektedir. Kullanılacak olan canlı yemin yeni doğan balık yavrularının ağız açıklığına uygun olması istenmektedir. Bu bağlamda canlı yem olarak kullanılan infusorianın balık emriyolarında kullanılmasındaki en önemli avantajı küçük olmaları (40-100 µm) sayılabilmektedir. Bu çalışmada kültüre alınan infusoriaların farklı besin ortamlarında yetiştirme koşullarının değerlendirilmesi amaçlanmış ve deneme iki tekerrür olacak şekilde planlanmıştır. Farklı besin ortamları olarak; kedi maması (11 gr), köpek maması (11 gr), balık yemi (5-11 gr), organik yem (11 gr), tavşan yemi (11 gr) ve maya (11 gr) kullanılmıştır. Kültür ortamları havalandırma olmadan ortam sıcaklığı 25 °C, ortam nemi % 62 ve kültür sıcaklığı 26-27 °C olarak ayarlanmıştır. Ölçümler her 24 saatte yapılarak kültür ortamındaki infusaria miktarları belirlenmiştir. Kültürdeki toplam infusoria miktarları belirlenirken ışık mikroskobu altında alınan 5 mikrolitre örnek -18 ^{0}C de 15 sn tutularak yüzme hızı yavaşlatılmış ve sayı hesaplanmıştır. Buna göre; kültürde kullanılan farklı besin ortamlarındaki büyüme karşılaştırıldığında 96 saat sonunda kullanılan balık yeminde (11 gr) büyümenin fazla olduğu tespit edilmiştir. Ancak kullanılan 11 gramlık oranın tüm ortam koşullarında 120. saat sonunda ortamda oluşan amonyak neticesinde azaldığı görülmüştür. Kullanılan balık yemin 5 gram olarak ilave edilen oranında ise büyümenin diğer balık yemi oranına göre (11 gr) daha yavaş olduğu ama kültürün kullanım açısından gün sayısında daha verimli olduğu tespit edilmiştir.

Anahtar Kelimeler: Ağız açıklığı, canlı yem, infusoria, larva

Abstract
Infusoria are generally defined as organisms used to feed small aquatic organisms. There are many different organisms found in infusoria cultures, including the widely known amoebae, euglena, paramecium and rotifers. Infusoria is an important nutrient organism used in fish farming, especially in the feeding of newborn larvae with small mouth openings. It is therefore an important link in the rearing of fry in the early stages of their life. Infusoria are found in all types of waters, but they are not available in sufficient quantities for feeding fish. It is therefore necessary to increase the culture to achieve the desired quantity. It is desirable that the live food to be used is suitable for the mouth-opening of the newborn fry. In this context, the most important advantage of infusoria used as live food for fish embryos can be seen in their small size (40-100 µm). The aim of this study was to evaluate the growth conditions of infusoria cultured in different culture media and the experiment was designed for two replicates. Cat food (11 g), dog food (11 g), fish food (5-11 g), organic food (11 g), rabbit food (11 g) and yeast (11 g) were used as different culture media. The culture media were set to 25 °C without aeration, the ambient temperature to 62% and the culture temperature to 26-27 °C. Measurements were taken every 24 hours to determine the amount of infusoria in the culture medium. When determining the total amount of infusoria in the culture, 5 microliter samples were taken under a light microscope and kept at -18 ^{0}C for 15 seconds to slow down the swimming speed and calculate the number. Accordingly, when comparing the growth in different culture media used in the culture, it was found that the growth in the fish food used (11 g) was higher at the end of the 96 hours. However, it was found that the 11-gram ratio decreased at the end of the 120th hour under all environmental conditions due to the ammonia formed in the medium. It was found that growth was slower with the addition of 5 grams of fish feed than with the other amount of fish feed (11 grams), but the culture was more efficient in terms of the number of days of use.
Keywords: Mouth-opening, live food, infusoria, larvae

GİRİŞ

İnfusoria siliyat, öglenoid, protozoa ve tatlı su mikroorganizmalarını tanımlamak için kullanılmaktadır. İnfusorianın vücudu şeffaf yapıdadır. Vücutlarının yüzeyinde küçük siller bulunur, esnek bir yapıya sahiplerdir, beslenmelerini sağlamak için açıklıkları vardır, iki tip çekirdekleri bulunmaktadır, dış etkenlere karşı kendilerini korumak için vücutlarına gömülü halde trikositleri bulunmaktadır (Widjaja vd. 1981). İnfusoria, atık bitkisel maddelerin suda birkaç gün beklenmesi sonucunda, bitkilerin çürümesiyle birlikte ortaya çıkmaktadır. Aşırı doz kullanılması ve uzun süre bekletilmesi halinde kötü koku ve renkte bulanıklık meydana gelmektedir. İnfusori, balıkların emriyo düzeyinde besin maddesi olarak kullanılmaktadır. Yumurtadan yeni çıkan balık emriyoları ilk iki üç gün beslenme gereksinimi duymazlar. Bu süreçte vücutlarında bulunan keseyi kullanarak besin ihtiyaçlarını karşılamaktadırlar. Bu kese kaybolduktan sonra emriyolar besin ihtiyacı duymaktadır (Stokes vd., 1885). Bu aşamada embriyolar canlı yem ile besin ihtiyaçlarını karşılamaktadırlar. İnfusorianın balık emriyolarında kullanılmasındaki önemli özellikleri ağızdan geçecek kadar küçük olmaları (40-100 mikrometre), kolay sindirilmeleri, silleri sayesinde haretli ve yüzer durumda olmaları, kısa zamanda kolay ve büyük miktarda üretilmeleri, fiyatı düşük olması ve atık kaynaklardan elde edilmesi gibi özellikleri bulunmaktadır (Stokes vd., 1886).

YÖNTEM

İnfusoria hazırlanması

Çalışmamız Tekirdağ Namık Kemal Üniversitesi Fen Edebiyat Fakültesi Biyoloji Bölümü Sucul Omurgalı Deney Ünitesinde gerçekleştirilmiştir. Çalışma iki tekerrür olarak hazırlanarak kültürün hazırlanması için plastik oval şeffaf bidonlar kullanılmıştır. Her bir bidon içine ünitemizde bulunan akvaryum suyu ile 1800 ml su doldurulmuş ve farklı akvaryumlarda bulunan biyolojik filtrasyonu sağlayan pipo filtrelerin sıkılmasıyla elde edilen sudan 200 ml ilave edilmiştir (Şekil

1). İlave edilen 200 ml fitre suyu elde edilecek kültür için başlangıç infusoria kültürünü oluşturmuştur (Şekil 2).



Şekil 1. Kültürün hazırlanması



Şekil 2. İnfusoria kültürü

Toplam 2000 ml olan her bir bidona farklı yem malzemelerinden hazırlanan yem eklenmiştir (Tablo 1).

Tablo 1. İnfusoria kültüründe kullanılan farklı yemler

Yemler	Oran
Köpek maması	11 gram
Hayvansal Balık yemi	11 gram
Bitkisel Balık yemi	11 gram
Tavşan yemi	11 gram
Maya	11 gram

Yem kültür bidonlarına eklenmeden önce bidonlara ilave edilen 1800 ml lik sudan plastik kutulara 200 ml alınarak bu kutulara 11 gram yem ilave edilmiş ve yemin yumuşaması için 30 dakika beklenmiştir. Bu süre sonunda süzgeç yardımıyla elde edilen yem kaynağının posası süzülerek su tekrar bidona ilve edilmiştir (Şekil 3). Kültürün tutulduğu ortam sıcaklığı ortalama 25 ^{0}C ve kültürün sıcaklığı 26 ^{0}C dir (Şekil 4).



Şekil 3. Yemlerin hazırlanması



Şekil 3. Deney ortamı

İnfusoria ölçüm

İlk 24 saat: İlk 24 saatte üreme tüm bidonlar da yeterli sayıda olmadığı için sadece fotoğraflama işlemi gerçekleştirildi.

İlk 48 saat: Bidon yüzeyinin 3 farklı noktasından örnekler alındı. Alınan örnekler deney tüpünün içine ilave edildi. Deney tüpünden 5 mikrolitre olacak şekilde mikropipet yardımıyla örnekler alınarak lam üzerine 7 tekerrür olacak şekilde sayımı gerçekleştirildi.

Sayım yapılırken lam -18 ^{0}C' de 20 sn bekletildikten sonra infosoriaların hareketlerinde yavaşlama olduktan sonra sayımları mikroskop altında 4x de sayma işlemi gerçekleştirildi.

İlk 72 saat: Yine aynı yöntem ile 5 mikrolitre de ölçüm işlemleri yapıldı.

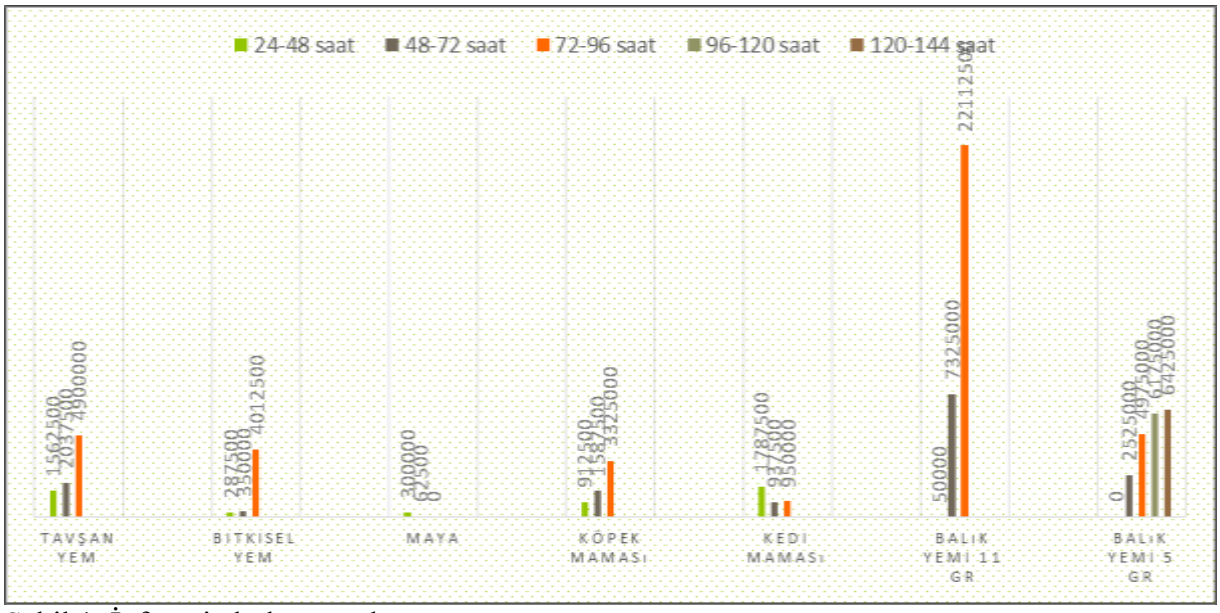
72 saatte ki ölçümler sonucunda balık yeminde çok hızlı bir üreme olduğu gözlemlendi.

İlk 96 saat : Yine aynı yöntem ile 5 mikrolitre de ölçüm işlemleri yapıldı.

96.saatte balık yeminde çok sayıda üreme gözlendi.

İlk 120 saat: balık yeminde üreme sayısı azaldı. Diğer kültürlerde de üremenin olmadığı ve canlılık sayısının azaldığı gözlendi.

Bu yüzden tüm kültürlere amonyum testi uygulandı. Amonyum testi ortalama değeri 5ppm bulundu. Bu yüzden 120. Saatte sayım yapılmadı. Bidonlardaki amonyak canlılık sayısını azalttı.



Şekil 1. İnfusoria kültür sayıları

TARTIŞMA VE SONUÇ

İnfusoria, tatlı su ekosistemlerinde ve balık yetiştiriciliğinde önemli bir rol oynamaktadır. Özellikle balık embriyolarının erken gelişim evrelerinde besin kaynağı olarak sağladıkları katkılar, bu mikroorganizmaların biyolojik ve ekonomik değerini artırmaktadır.

KAYNAKLAR

Stokes, A. C. (1885). Some new infusoria. *The American Naturalist, 19*(5), 433-443.

Widjaja, F. T., & Suwignyo, S. (1981). Infusoria as an indicator of autoeutrophication, its culture for fish larvae: With 4 figures in the text. Internationale Vereinigung für theoretische und angewandte Limnologie: *Verhandlungen, 21*(3), 1503-1506.

Stokes, A. C. (1886). Notices of new fresh-water infusoria. *Proceedings of the American Philosophical Society, 23*(124), 562-568.

THE ROLE OF BIOPHILIC DESIGN IN ENHANCING WELL-BEING IN INTERIOR SPACES

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ABSTRACT

Biophilic design is a prominent trend in the field of architecture and interior design today, with the goal of connecting people with nature through natural elements in living spaces. This approach not only creates aesthetic beauty but also brings numerous health benefits, both physical and mental. This paper delves into the core principles of biophilic design and how they can be applied in interior spaces to improve daily life.

Natural light, greenery, natural materials such as wood and stone, and nature-inspired forms are essential elements in biophilic design. Natural light helps regulate circadian rhythms, reduces fatigue and stress, while indoor plants not only improve air quality but also create a relaxing atmosphere, enhance focus, and uplift mood. The use of natural materials helps people feel closer to nature, providing a sense of security and comfort.

The paper also analyzes several practical studies, showing that interior spaces applying biophilic design have significantly improved the quality of life for users. These spaces help reduce stress, create more effective work environments, and increase satisfaction with living spaces. The paper presents strategic proposals for applying biophilic design in various contexts. This not only contributes to creating sustainable interior spaces but also improves human health and well-being in the era of modern urbanization.

Keywords: Biophilic design, architecture and interior design, sustainable interior spaces, healthy material, green design

1. Introduction

Biophilic design is an innovative approach that intricately weaves the essence of nature into the built environment, creating a harmonious interplay between people and their surroundings. This design philosophy has gained significant traction in recent years, spurred by a growing body of research that underscores its profound benefits for human health and overall well-being. At its core, biophilic design acknowledges the intrinsic bond between humans and nature, advocating for environments that not only enhance aesthetic appreciation but also actively promote psychological and physical wellness.

Historically, urbanization and industrialization have distanced individuals from nature, leading to a myriad of health issues, including increased stress, anxiety, and diminished cognitive function. In response, biophilic design seeks to counteract these negative effects by fostering environments that reconnect people with the natural world. This approach is rooted in the understanding that exposure to natural elements—such as light, greenery, and water—can significantly improve emotional states and cognitive performance. Biophilic design encompasses various principles, including the integration of natural light, the use of organic materials, and the incorporation of water features. These elements not only contribute to the aesthetic appeal of a space but also evoke feelings of calmness and tranquility. For example, maximizing natural light can enhance mood and energy levels, while the presence of plants can improve indoor air quality and reduce stress. Furthermore, water features, whether in the

form of fountains or aquariums, provide auditory and visual stimuli that can enhance relaxation.

The applications of biophilic design are diverse, spanning residential, commercial, and institutional settings. In workplaces, biophilic design can lead to increased productivity, creativity, and job satisfaction. By creating environments that are rich in natural elements, employers can cultivate a healthier and more engaging atmosphere for their employees. Similarly, in educational institutions, biophilic design has shown promise in enhancing student engagement and learning outcomes by creating stimulating environments that encourage exploration and interaction with nature. Moreover, the impact of biophilic design extends to healthcare settings, where it has been shown to facilitate healing and improve patient experiences. Environments that incorporate natural elements can reduce anxiety, enhance comfort, and accelerate recovery times, ultimately leading to better health outcomes.

In summary, biophilic design represents a paradigm shift in how we think about and construct our environments. By prioritizing the integration of nature into our living and working spaces, we can create holistic environments that nurture not only our physical well-being but also our mental and emotional health. This paper will delve deeper into the principles of biophilic design, explore its various applications within interior spaces, and analyze the resultant positive impacts on the well-being of occupants. Through this exploration, we aim to highlight the significance of biophilic design as a crucial strategy in fostering healthier, more sustainable living environments.

2. Understanding Biophilic Design

Biophilic design is fundamentally rooted in the concept of biophilia, which posits an innate human affinity for nature (Kellert et al., 2011). This design philosophy seeks to counteract the disconnection many individuals experience in modern urban environments by incorporating natural elements—such as plants, natural light, water features, and organic materials—into interior spaces. By mimicking the patterns, colors, and textures found in nature, biophilic design helps to create environments that significantly enhance occupants' emotional and physical health.

The significance of biophilic design extends beyond mere aesthetics; it is about cultivating an atmosphere that resonates with our inherent desires for connection and well-being. As people increasingly spend substantial amounts of time indoors, integrating natural elements into these spaces has become essential for promoting a healthy lifestyle. The design encourages a symbiotic relationship between humans and nature, fostering environments where individuals feel more at ease, focused, and rejuvenated.

Key Principles of Biophilic Design

2.1. Natural Elements: Incorporating plants and greenery into indoor spaces not only improves air quality but also provides significant psychological benefits. Studies show that exposure to plants can reduce stress and enhance mood (Ryan et al., 2014). The presence of greenery creates a calming atmosphere, making spaces feel more inviting and less sterile.

2.2. Natural Light: Maximizing natural light through windows and skylights is crucial in reducing reliance on artificial lighting. Natural light positively affects circadian rhythms, which are essential for regulating sleep patterns and overall well-being (Zhong et al., 2022). Access to daylight has been shown to boost productivity and elevate mood, making it a vital element in biophilic design.

2.3. Water Features: The sound and sight of water can evoke a sense of tranquility and promote relaxation. Integrating water elements into interior design—whether through fountains, ponds, or aquariums—has been shown to enhance feelings of calmness and reduce anxiety (Dalay, 2020). The soothing properties of water create a serene environment that can aid in stress relief and foster a peaceful atmosphere.

2.4. Natural Materials: Utilizing materials such as wood, stone, and clay not only evokes a connection to nature but also provides tactile experiences that enhance sensory engagement within a space (Kellert, 2008). These materials resonate with our primal instincts, offering warmth and familiarity that artificial materials often lack.

2.5. Views of Nature: Designing spaces with views of outdoor landscapes can significantly boost mood and cognitive function. Access to nature, even through windows, fosters a sense of tranquility and connection to the environment (Elmashharawi, 2019). Studies indicate that the mere sight of natural landscapes can enhance concentration and reduce mental fatigue.

3. The Impact of Biophilic Design on Well-Being

Numerous studies have demonstrated the positive effects of biophilic design on human well-being in various settings, including workplaces, educational institutions, and healthcare environments.

3.1. Workplace Well-Being

Research indicates that biophilic design in office environments can lead to increased productivity, creativity, and job satisfaction. For instance, Sanchez et al. (2018) found that workplaces designed with biophilic elements reported higher employee engagement and lower stress levels. The introduction of plants, natural light, and open spaces can create an environment that motivates employees and enhances their overall work experience. Similarly, Aristizabal et al. (2021) explored a multisensory approach to biophilic office design, highlighting its effectiveness in enhancing employee well-being by engaging multiple senses and creating a more dynamic work environment.

3.2. Educational Spaces

In educational settings, biophilic design has been shown to improve learning outcomes and student well-being. Elmashharawi (2019) emphasizes the role of biophilic elements in stimulating creativity and focus among students. Environments that incorporate natural features—such as classrooms with ample sunlight, greenery, and water elements—foster a more conducive learning atmosphere. This immersive approach not only aids concentration but also encourages collaboration and active engagement, essential components of effective learning.

3.3. Healthcare Environments

Biophilic design has profound implications for healthcare settings, where patient recovery and mental health are paramount. El Messeidy (2019) discusses the application of biophilic patterns in hospitals, demonstrating that environments rich in natural elements can expedite healing processes and improve patient satisfaction. These design principles are not only beneficial for patients; they also enhance the working conditions for healthcare professionals. Moreover, Untaru et al. (2024) examined biophilic design's role in healthcare, highlighting its effectiveness in creating emotional well-being and enhancing workplace attachment among healthcare professionals. By cultivating environments that prioritize nature, healthcare facilities can promote healing and foster a supportive atmosphere for both patients and staff.

4. Case Studies and Applications

4.1. *Office Spaces*

A significant case study highlighting the efficacy of biophilic design principles is the redesign of a corporate office space that sought to enhance employee well-being and productivity through the incorporation of biophilic elements. This project included the implementation of indoor gardens, water features, and the strategic use of natural light. Following the redesign, employees reported a 15% increase in productivity and a remarkable 25% reduction in stress levels (Topgül, 2019). The aesthetic transformation of the office not

only improved its visual appeal but also created a more inviting and healthier work environment.

The biophilic elements introduced in this case—such as living walls and natural materials—facilitated a greater connection between employees and the natural world. This connection proved to be essential, as research suggests that environments rich in nature lead to enhanced cognitive functioning and emotional resilience. Moreover, the introduction of natural soundscapes, such as water features, contributed to reducing background noise, thereby fostering a more focused and serene atmosphere conducive to productive work.

4.2. *Educational Institutions*

In the realm of education, the application of biophilic design principles has shown transformative results. A primary school designed with these principles integrated natural lighting, an abundance of plants, and outdoor learning spaces into its curriculum. The outcomes of this initiative were compelling, with significant improvements observed in student engagement and academic performance (Yağcıoğlu, 2022). Teachers noted that students exhibited greater attentiveness and enthusiasm for learning when immersed in nature-inspired environments.

The positive impact of biophilic design in educational settings can be attributed to the enhanced sensory experiences these environments provide. Natural light, for instance, not only improves mood and focus but also aligns with the natural circadian rhythms of students, promoting better sleep and concentration. Furthermore, outdoor learning spaces enable experiential learning opportunities, allowing students to engage with nature directly, thus fostering a sense of curiosity and exploration.

4.3. *Healthcare Facilities*

The integration of biophilic design in healthcare settings has profound implications for patient recovery and well-being. One exemplary case involved a hospital that implemented biophilic design elements such as expansive views of gardens, the use of natural materials, and the incorporation of soothing water features. The results were significant; the facility reported decreased patient anxiety levels and shorter recovery times (Nevzati et al., 2021).

These findings underscore the critical role that the healing environment plays in patient outcomes. Biophilic design not only enhances the psychological well-being of patients by providing comforting visuals and sounds but also supports physical recovery processes. Natural views have been shown to reduce stress and promote a sense of calm, which is vital for healing. Moreover, the use of natural materials contributes to a less clinical and more homelike atmosphere, further aiding in the recovery experience.

5. Challenges and Considerations

Despite the compelling benefits of biophilic design, several challenges impede its widespread implementation. Budget constraints often pose a significant barrier, as integrating natural elements can require substantial investment in design, construction, and maintenance. Additionally, there may be a lack of awareness or understanding of biophilic principles among stakeholders, which can hinder buy-in from decision-makers. Educating these stakeholders on the tangible benefits of biophilic design is essential for fostering its adoption.

Furthermore, the integration of biophilic elements into existing structures can be particularly challenging. Many urban environments are characterized by limited space and pre-existing architectural constraints, making it difficult to retrofit biophilic features without significant alterations. Therefore, architects and designers must innovate ways to incorporate natural elements creatively within these limitations. It is also crucial to consider regional contexts and cultural differences when designing biophilic spaces. What resonates with occupants in one geographical area may not hold the same significance in another. For instance, the types of plants used or the design of water features may need to be tailored to reflect local ecosystems and cultural preferences (Mahmoud Ibrahim, 2021). This adaptability

ensures that biophilic design principles are not only aesthetically pleasing but also culturally relevant and meaningful to the occupants.

Biophilic design emerges as a transformative approach to enhancing well-being in interior spaces, fundamentally redefining how we interact with our built environments. This design philosophy emphasizes the integration of natural elements—such as greenery, natural light, water features, and organic materials—into various spaces, creating environments that resonate with our innate human instincts. The profound connection between nature and human well-being has been extensively documented, highlighting how biophilic design can significantly impact occupants' mental and physical health.

6. Conclusion

Research consistently demonstrates that environments designed with biophilic principles can lead to reductions in stress, improvements in mood, and even enhanced cognitive performance. For instance, studies have shown that individuals working in biophilic office spaces experience increased productivity and job satisfaction, while students in nature-infused educational settings demonstrate greater engagement and improved academic outcomes. In healthcare facilities, biophilic design has been linked to shorter recovery times and lower anxiety levels among patients. These findings underline the potential of biophilic design to create spaces that not only serve aesthetic purposes but also foster emotional resilience and holistic well-being. As our understanding of the benefits of biophilic design deepens, it becomes increasingly imperative for architects and designers to prioritize these principles in their projects. This means not only considering the visual aspects of design but also the psychological and physiological responses that environments evoke in their occupants. By actively incorporating elements that connect people to nature, designers can create spaces that nurture well-being, enhance productivity, and promote healing. Moreover, the urgency of addressing mental health challenges in contemporary society further underscores the need for biophilic design. In an age where urbanization and digitalization often lead to disconnection from nature, fostering environments that encourage a relationship with the natural world is essential. This approach is not merely a design choice; it represents a crucial step towards promoting holistic well-being across diverse contexts, from workplaces and schools to hospitals and residential spaces.

In conclusion, biophilic design offers a pathway to reconnect individuals with nature, reminding us of the profound impact our surroundings have on our well-being. By prioritizing natural elements in interior spaces, we can cultivate environments that support our physical health and enhance our mental and emotional states. As we move forward, it is vital for all stakeholders in the design and construction industries to embrace biophilic principles, recognizing that such integration is not only beneficial but essential for creating healthier, more sustainable living and working environments. In doing so, we can foster a future where the built environment harmoniously coexists with the natural world, ultimately enriching the human experience.

Reference:

1 Yassein, G., & Ebrahiem, S. (2018). Biophilic design in the built environment to improve well-being: a systematic review of practices. *Journal of Urban Research*, *30*(1), 128-146.

2 Elmashharawi, A. (2019). Biophilic design for bringing educational spaces to life. *Journal of Design Studio*, *1*(1), 16-21.
3 Kellert, S. R., Heerwagen, J., & Mador, M. (2011). *Biophilic design: the theory, science and practice of bringing buildings to life*. John Wiley & Sons.
4 Ryan, C. O., & Browning, W. D. (2020). Biophilic design. *Sustainable built environments*, 43-85.
5 Kellert, S. R. (2008). Dimensions, elements, and attributes of biophilic design. *Biophilic design: the theory, science, and practice of bringing buildings to life*, *2008*, 3-19.
6 Sanchez, J. A., Ikaga, T., & Sanchez, S. V. (2018). Quantitative improvement in workplace performance through biophilic design: A pilot experiment case study. *Energy and Buildings*, *177*, 316-328.
7 Lutrin, A., Gupta, V., Kahlon, P., Naik, T., Spencer, K., & Jokar, B. (2022). The Effects of Biophilic Art on Affective Well-Being.
8 Yağcıoğlu, B. (2022). *Effects of biophilic design in interior space and evaluation in educational buildings* (Master's thesis).
9 Nevzati, F., Demirbaş, O. O., & Hasırcı, D. (2021). Biophilic interior design: A case study on the relation between water elements and well-being of the users in an educational building. *Sanat ve Tasarım Dergisi*, *11*(2), 450-467.
10 Hung, S. H., & Chang, C. Y. (2021). Health benefits of evidence-based biophilic-designed environments: A review. *Journal of People, Plants, and Environment*, *24*(1), 1-16.
11 Abouelela, A. (2023). BIOPHILIC DESIGN AS AN APPROACH TOWARDS NTEGRATING NATURE INTO THE DESIGN OF RESIDENTIAL UNITS TO IMPROVE HUMAN MENTAL HEALTH AND WELL-BEING.
12 Bayatmaku, S. (2022). *Biophilic Design Efficiency on Humans' Well-being in Daily Life with an Atmospheric Approach* (Doctoral dissertation, Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, Lisansüstü Eğitim Enstitüsü, Mimarlık Ana Bilim Dalı, Mimari Tasarım Bilim Dalı, İstanbul, 705110).
13 Khanzadeh, M. ENHANCING USER EXPERIENCE IN INTERIOR ARCHITECTURE THROUGH BIOPHILIC DESIGN: A CASE STUDY OF URBAN RESIDENTIAL SPACES.
14 El Messeidy, R. (2019). Application of biophilic patterns in health care environments to enhance healing. *Engineering Research Journal*, *163*, 130-143.
15 Untaru, E. N., Han, H., David, A., & Chi, X. (2024). Biophilic Design and Its Effectiveness in Creating Emotional Well-Being, Green Satisfaction, and Workplace Attachment Among Healthcare Professionals: The Hospice Context. *HERD: Health Environments Research & Design Journal*, *17*(1), 190-208.
16 McGee, B., & Park, N. K. (2022). Colour, light, and materiality: biophilic interior design presence in research and practice. *Interiority*, *5*(1), 27-52.
17 Mahmoud Ibrahim, M. (2021). Beyond Sustainability–Towards Restorative Interior Spaces through Biophilic Design. *International Journal of Advanced Research on Planning and Sustainable Development*, *4*(2), 8-44.
18 Ismail Ismail Attia, D. (2021). Using Biophilia in Interior Design and its impact factor on performance's and Wellbeing of the occupiers.
19 Kellert, S. R. (2018). *Nature by design: The practice of biophilic design*. yale university press.
20 McGee, B., Park, N. K., Portillo, M., Bosch, S., & Swisher, M. (2019). DIY Biophilia: development of the Biophilic Interior Design Matrix as a design tool. *Journal of Interior Design*, *44*(4), 201-221.

21 Mollazadeh, M., & Zhu, Y. (2021). Application of virtual environments for biophilic design: a critical review. *Buildings*, *11*(4), 148.
22 Huntsman, D. D., & Bulaj, G. (2022). Healthy dwelling: design of biophilic interior environments fostering self-care practices for people living with migraines, chronic pain, and depression. *International journal of environmental research and public health*, *19*(4), 2248.
23 Bettaieb, D. M., & Alsabban, R. F. (2023). Users' role in applying biophilic attributes to the interiors of residential spaces. *Open House International*, *48*(1), 163-184.
24 Bettaieb, D. M., & Alsabban, R. F. (2023). Users' role in applying biophilic attributes to the interiors of residential spaces. *Open House International*, *48*(1), 163-184.
25 Pandita, D., & Choudhary, H. (2024). Biophilic designs: a solution for the psychological well-being and quality of life of older people. *Working with Older People*.
26 Fadda, R., Congiu, S., Roeyers, H., & Skoler, T. (2023). Elements of biophilic design increase visual attention in preschoolers. *Buildings*, *13*(5), 1160.
27 Sjövall, I. A., & Spiers, H. J. (2024). The Potential of Biophilic Design and Nature to Improve Health, Creativity and Well-Being. In *Environmental Neuroscience* (pp. 255-281). Cham: Springer Nature Switzerland.
28 Cacique, M., & Ou, S. J. (2022). Biophilic design as a strategy for accomplishing the idea of healthy, sustainable, and resilient environments. *Sustainability*, *14*(9), 5605.
29 Kabinesh, V., Vennila, S., Baranidharan, K., Ravi, R., Krishnamoorthi, S., & Thirunavukkarasu, M. (2024). Sustainable Spaces-The Evolution of Biophilic Design in Modern Architecture: A Review. *Asian Journal of Environment & Ecology*, *23*(5), 64-77.
30 Kabinesh, V., Vennila, S., Baranidharan, K., Ravi, R., Krishnamoorthi, S., & Thirunavukkarasu, M. (2024). Sustainable Spaces-The Evolution of Biophilic Design in Modern Architecture: A Review. *Asian Journal of Environment & Ecology*, *23*(5), 64-77.
31 Topgül, S. (2019). The impact of biophilic designs on worker efficiency. *Sosyal Araştırmalar ve Davranış Bilimleri*, *5*(9), 11-26.
32 Afacan, Y. (2023). Impacts of biophilic design on the development of gerotranscendence and the Profile of Mood States during the COVID-19 pandemic. *Ageing & Society*, *43*(11), 2580-2604.
33 Radha, C. H. (2022). Biophilic Design Approach for Improving Human Health in the Built Environment. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, *13*(9), 1-12

34 Aristizabal, S., Byun, K., Porter, P., Clements, N., Campanella, C., Li, L., ... & Bauer, B. (2021). Biophilic office design: Exploring the impact of a multisensory approach on human well-being. *Journal of Environmental Psychology*, *77*, 101682.
35 Dalay, L. (2020). The impact of biophilic design elements on the atmospheric perception of the interior space. *Uluslararası Peyzaj Mimarlığı Araştırmaları Dergisi (IJLAR) E-ISSN: 2602-4322*, *4*(2), 4-20.
36 Dalay, L. (2020). The impact of biophilic design elements on the atmospheric perception of the interior space. *Uluslararası Peyzaj Mimarlığı Araştırmaları Dergisi (IJLAR) E-ISSN: 2602-4322*, *4*(2), 4-20.
37 Elmashharawi, A. (2019). Biophilic design for bringing educational spaces to life. *Journal of Design Studio*, *1*(1), 16-21.
38 Green, J. (2012). Back to nature for good: Using biophilic design and attention restoration theory to improve well-being and focus in the workplace.
39 Ryan, C. O., Browning, W. D., Clancy, J. O., Andrews, S. L., & Kallianpurkar, N. B. (2014). Biophilic design patterns: emerging nature-based parameters for health and well-being

in the built environment. *ArchNet-IJAR: International Journal of Architectural Research*, *8*(2), 62.

40 Zhong, W., Schröder, T., & Bekkering, J. (2022). Biophilic design in architecture and its contributions to health, well-being, and sustainability: A critical review. *Frontiers of Architectural Research*, *11*(1), 114-141.

CULTURAL INFLUENCE ON GREEN INTERIOR DESIGN: A CASE STUDY OF VIETNAM-JAPAN EXCHANGE

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ABSTRACT
This paper is conducted in the context of research on the cultural influence on green interior design, with a focus on the cultural exchange between Vietnam and Japan. Green interior design, primarily based on the use of sustainable materials and the creation of eco-friendly living spaces, is analyzed from a cultural perspective to understand how the traditional values and lifestyles of these two countries impact the application of sustainable design principles.
The research method involves analyzing the similarities and differences in the green architectural design styles of Vietnam and Japan, specifically the use of natural light, natural materials such as wood and bamboo, and open, nature-connected spaces. The study, based on exemplary cases, shows that both cultures have unique approaches to connecting with nature, leading to green interior design solutions that are both effective and celebrate cultural values.
The paper suggests that the cultural exchange between Vietnam and Japan in green interior design can generate new models and ideas for sustainable architecture. At the same time, it recommends that this cultural collaboration will raise awareness of environmental protection and promote sustainable development in the region. Future research may expand to explore other cultural factors influencing sustainable design in other Asian countries.

Keywords: Cultural Influence, architecture and interior design, sustainable interior spaces, healthy material, green interior design, cultural exchange between Vietnam and Japan

1. Introduction
Green interior design has become a prominent global trend as societies increasingly emphasize sustainability, environmental responsibility, and eco-friendly practices in architecture and interior design. The fusion of cultural influences with green design principles adds another layer of complexity and depth to this field. This article explores the cultural impact on green interior design by focusing on the exchange between Vietnam and Japan—two countries that have cultivated a dynamic relationship in various spheres, including art, architecture, and environmental sustainability.
Vietnam and Japan share centuries of interaction through trade, political alliances, and cultural exchanges, particularly from the 12th to the 18th centuries (Kikuchi, 2021). Over time, these interactions have evolved into strategic partnerships that influence contemporary design approaches, including sustainable practices (Do, 2014). As environmental concerns become a global priority, both Vietnam and Japan have engaged in green design efforts that integrate cultural values with sustainability. This article will focus on the cultural influences shaping green interior design in both countries, with an emphasis on how Vietnamese and Japanese traditions, aesthetics, and environmental practices converge.
The primary objective of this article is to examine how the cultural exchange between Vietnam and Japan influences green interior design practices, specifically by looking at shared values, local materials, and traditional design approaches. By doing so, we aim to provide a comprehensive understanding of the role culture plays in promoting sustainable design solutions that reflect both environmental and aesthetic concerns.

2. Cultural Influence on Interior Design: A Historical Perspective

The long-standing cultural interaction between Vietnam and Japan has laid the foundation for a cross-cultural influence that extends into the realm of interior design. This relationship dates back to the era of maritime trade, where both countries exchanged goods and ideas that impacted their architectural practices (Kikuchi, 2021). Japan's influence on Vietnam, in particular, grew significantly during the 20th century, when Japanese official development assistance (ODA) contributed to Vietnam's socio-economic development, including urban and architectural projects (Tsuno, 2021).

Vietnam's architecture, particularly in cities such as Hoi An, bears traces of Japanese influence, especially in traditional wooden structures and the use of open spaces (Shiraishi, 2010). These design elements align with green interior design principles, as they prioritize natural materials and environmentally responsive construction. The cultural exchange has also been reciprocal, with Vietnamese aesthetics and principles contributing to Japan's design ethos, particularly in regions with Vietnamese communities or influences from collaborative projects (Nguyen, 2019).

One of the critical aspects of this cultural influence is the integration of local and natural materials, a hallmark of green design. The use of bamboo, a material found abundantly in both Vietnam and Japan, exemplifies the emphasis on sustainability and cultural resonance. Bamboo's versatility and low environmental impact make it a popular choice for eco-friendly construction and interior design in both countries (Fujimoto et al., 2021). This material choice reflects the cultural value placed on living harmoniously with nature, a concept deeply embedded in both Vietnamese and Japanese philosophies.

3. Green Design and Cultural Sustainability

The concept of green design is often associated with sustainability and environmental responsibility, but it also intersects with cultural sustainability. As Maranov (2018) argues, cultural sustainability in interior design ensures that design practices not only protect the environment but also preserve and reflect cultural heritage. This is particularly relevant in the context of the Vietnam-Japan exchange, where green design often incorporates traditional design elements and techniques.

In Vietnam, the concept of "cultural heritage" plays a significant role in green interior design, as seen in efforts to restore and preserve historical buildings using sustainable materials (Fujimoto et al., 2021). Similarly, Japan's long-standing architectural traditions, such as the use of tatami mats, sliding doors, and natural ventilation, provide valuable lessons in sustainable design that are still relevant in modern green interior projects (Ireland, 2018).

The use of natural lighting and ventilation systems in traditional Japanese homes, for example, is an excellent illustration of how cultural practices align with green design principles. These homes are designed to optimize airflow and daylight, reducing the need for artificial lighting and air conditioning—an approach that is both environmentally friendly and culturally significant (Park & Farr, 2007). In Vietnam, traditional homes also emphasize natural ventilation and the use of local materials such as bamboo and wood, both of which are renewable and have a low carbon footprint (Fujimoto et al., 2021).

4. Contemporary Green Interior Design in Vietnam and Japan

In contemporary green interior design, the influence of both Vietnamese and Japanese cultural elements continues to thrive. One area where this is evident is in the design of public spaces, such as cafés and restaurants, which often incorporate traditional design motifs alongside sustainable materials. The café culture, a growing trend in both Vietnam and Japan, highlights the importance of cultural exchange in shaping interior spaces that are both functional and environmentally responsible (Luu & Westh, 2023).

In Vietnam, the rise of green cafés, which utilize eco-friendly materials and energy-efficient designs, reflects the growing awareness of sustainability. These spaces often incorporate traditional Vietnamese design elements, such as bamboo furniture and natural lighting, alongside modern green technologies like solar panels and water recycling systems (Luu & Westh, 2023). Similarly, in Japan, cafés are designed with minimalist aesthetics that emphasize simplicity, sustainability, and the use of natural materials—a reflection of Japan's cultural appreciation for nature and Zen philosophy (He, 2022).

The commercial and residential sectors in both countries are increasingly adopting green interior design practices, driven by a combination of cultural values and environmental regulations. In Japan, for instance, the government's push for sustainable construction has led to the integration of green materials in residential projects, where designers are encouraged to use eco-friendly products such as recycled wood and low-VOC (volatile organic compound) paints (Dennis & Porter, 2021). In Vietnam, green design initiatives are supported by local architects and designers who are committed to preserving traditional Vietnamese aesthetics while promoting sustainability (Ni, 2017).

5. Challenges and Opportunities

Despite the growing popularity of green interior design, several challenges remain in fully integrating cultural elements with sustainable practices. One of the primary obstacles is the availability and cost of sustainable materials. While materials such as bamboo are abundant in both Vietnam and Japan, the cost of implementing advanced green technologies, such as solar energy systems and green roofs, can be prohibitive for smaller projects (Jones, 2008).

Moreover, the demand for modern, high-tech interiors sometimes conflicts with the desire to maintain cultural authenticity. In both Vietnam and Japan, there is a growing trend toward ultra-modern design, which often overlooks traditional aesthetics in favor of sleek, minimalist spaces (Obeidat et al., 2022). However, this trend also presents an opportunity for designers to innovate by blending modern technology with traditional design principles to create spaces that are both culturally significant and environmentally sustainable.

Educational initiatives in both countries are also playing a vital role in promoting green interior design. In Japan, interior design programs emphasize the importance of sustainability and cultural heritage, encouraging students to incorporate these values into their work (Beyaz & Asilsoy, 2019). Similarly, in Vietnam, educational efforts are focused on raising awareness about the environmental impact of design choices and promoting the use of green materials (Afacan, 2017).

6. Conclusion

The cultural exchange between Vietnam and Japan has significantly influenced green interior design in both countries. By integrating traditional design elements with sustainable practices, designers in Vietnam and Japan are creating interior spaces that are environmentally responsible and culturally significant. The use of local materials, such as bamboo, and traditional techniques, such as natural ventilation and lighting, demonstrates the potential for green design to preserve cultural heritage while promoting sustainability.

As the world increasingly moves toward eco-friendly practices, the lessons learned from the Vietnam-Japan exchange provide valuable insights into how cultural values can inform and enhance green interior design. While challenges remain in fully integrating these principles, the continued emphasis on education, innovation, and cultural sustainability offers a promising path forward for green interior design in both countries.

Reference:

1. Luu, T. Q., & Westh, W. (2023). The influence of Café culture in Tourism:-A global study on Vietnam, Japan, Sweden and the Netherlands.
2. Afacan, Y. (2017). Sustainable library buildings: green design needs and interior architecture students' ideas for special collection rooms. *The Journal of Academic Librarianship*, *43*(5), 375-383.
3. Aktas, G. G. (2013). Design parameters and initiatives for ecological and green design in interior architecture. *WSEAS Transactions on Environment and Development*, *9*(2), 57-67.
4. Aktas, G. G. (2013). Design parameters and initiatives for ecological and green design in interior architecture. *WSEAS Transactions on Environment and Development*, *9*(2), 57-67.
5. Beyaz, C., & Asilsoy, B. (2019). Knowledge of green buildings and environmental worldview among interior design students. International journal of advanced and applied sciences, 6(1), 29-36.

6. Celadyn, M. (2018). Environmental activation of inner space components in sustainable interior design. *Sustainability*, *10*(6), 1945.
7. Dennis, L. (2010). *Green interior design*. Simon and Schuster.
8. Dennis, L., & Porter, C. (2021). *Green Interior Design: The Guide to Sustainable High Style*. Simon and Schuster.
9. Do, T. T. (2014). Locating Vietnam-Japan's strategic partnership in the changing East Asian political landscape. JIIA Paper.
10. El-Ghobashy, S., & Mosaad, G. (2016). Nature influences on architecture interior designs. *Procedia Environmental Sciences*, *34*, 573-581.
11. Enwin, A. D., Ikiriko, T. D., & Jonathan-Ihua, G. O. (2023). The role of colours in interior design of liveable spaces. *European Journal of Theoretical and Applied Sciences*, *1*(4), 242-262.
12. Fujimoto, T., Chiem, N. H., Van Cong, N., Loc, N. X., Nam, T. S., Thuan, N. C., ... & Shiratori, Y. Restoration Channel and Waterfront Community by Effective Utilization of Local Biomass and Bio-waste Resources under the Concept of "the Most Beautiful Village in Japan": A Case Study of Tan Phu Thanh Village, Hau Giang Province in Mekong Delta, Vietnam.
13. Hartini, L., Wibawa, B., Situmorang, R., & Raissa, F. (2020, December). Interior design of national library with environmentally sustainability materials. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1007, No. 1, p. 012004). IOP Publishing.
14. Hassanein, H. (2021). Trends of contemporary art in innovative interior architecture design of cultural spaces. *Cities' Identity Through Architecture and Arts*, 25-57.
15. He, J. (2022). Applied Research on cultural elements in Interior Design.
16. Ireland, J. (2018). *History of interior design*. Bloomsbury Publishing USA.
17. Jones, L. (2008). *Environmentally responsible design: Green and sustainable design for interior designers*. John Wiley & Sons.
18. Jones, L. (2008). *Environmentally responsible design: Green and sustainable design for interior designers*. John Wiley & Sons.
19. Kang, M., & Guerin, D. A. (2009). The characteristics of interior designers who practice environmentally sustainable interior design. *Environment and Behavior*, *41*(2), 170-184.
20. Kikuchi, Y. (2021). History of Maritime Trade in Northern Vietnam, 12th to 18th Centuries. Springer Singapore.
21. Lee, E., Allen, A., & Kim, B. (2013). Interior design practitioner motivations for specifying sustainable materials: Applying the theory of planned behavior to residential design. *Journal of interior design*, *38*(4), 1-16.
22. Lee, Y. S. (2012). Using building information modeling for green interior simulations and analyses. *Journal of Interior Design*, *37*(1), 35-50.
23. Mangaroska, V. (2024). Advanced Sustainable Interior Design Concept as Methodological Approach in the Process of Architectural Design. *Sciences (IJTNS)*, *4*(1), 55-72.
24. MARANOV, R. (2018). Design for cultural sustainability in interior design project.
25. Mate, K. I. R. S. T. Y. (2009, September). Attitudes versus actions: are interior designers genuinely embracing sustainable design through material selection. In *5th International Conference of the Association of Architecture Schools in Australasia* (pp. 1-9).
26. McCoy, J. (2012). Sustainability: Environmentally responsible interior design. Journal of Interior Design, 37(1), 5-6.
27. Nguyen, H. P. L. (2019). IMMIGRANT WORKING EXPERIENCE IN JAPAN A case study of Vietnamese students in Japanese school.
28. Ni, M. (2017, June). Research on application of green concepts in interior design. In *2017 2nd International Conference on Education, Sports, Arts and Management Engineering (ICESAME 2017)* (pp. 1328-1331). Atlantis Press.
29. Obeidat, I., Obeidat, S., Rumman, S. A., & Al-Jubouri, F. (2022, May). The role of sustainable interior design and its impact on customer's behavior in commercial environments.

In *IOP Conference Series: Earth and Environmental Science* (Vol. 1026, No. 1, p. 012054). IOP Publishing.
30. Park, N. K., & Farr, C. A. (2007). The effects of lighting on consumers' emotions and behavioral intentions in a retail environment: a cross–cultural comparison. *Journal of Interior Design*, *33*(1), 17-32.
31. Pham, D. L. (2004). International Politico-Cultural Influences on Vietnam in the 20Th Century. Xlibris Corporation.
32. Rashdan, W., & Ashour, A. F. (2017). Criteria for sustainable interior design solutions. *WIT Transactions on Ecology and the Environment*, *223*, 311-322.
33. Rashdan, W., & Ashour, A. F. (2017). Criteria for sustainable interior design solutions. *WIT Transactions on Ecology and the Environment*, *223*, 311-322.
34. Rashdan, W., & Mhatre, V. (2019). Impact of heritage on contemporary sustainable interior design solutions. *WIT Trans. Ecol. Environ*, *238*, 47-58.
35. Shiraishi, M. (2010). Japan and the Reconstruction of Indochina. New Dynamics between China and Japan in Asia. World Scientific, Singapore, 125-161.
36. Tsuno, M. The Role of Japanese Official Development Assistance in Viet Nam's Socio-economic Development. Viet Nam 2045: Development Issues and Challenges, 53.
37. Tsuno, M. The Role of Japanese Official Development Assistance in Viet Nam's Socio-economic Development. Viet Nam 2045: Development Issues and Challenges, 53.
38. Wu, F. (2023). Analysis of green art concept and interior design space utilization based on perception and behavioral association. *Applied Mathematics and Nonlinear Sciences*, *9*(1).
39. Yan, L. (2022, July). An Analysis on Sustainable Development of Interior Design. In *2022 3rd International Conference on Language, Art and Cultural Exchange (ICLACE 2022)* (pp. 342-346). Atlantis Press.
40. Yang, H., Xiao, Z., & Deng, H. (2022). A Framework for Green Interior Design and Simulation Using Immersive VR Technology. *Mobile Information Systems*, *2022*(1), 2722522.

AN ANALYSIS OF A HAIKU POEM BY ROMANIAN POET SERBAN CODRIN

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ABSTRACT
The haiku poem, originally a Japanese type of poem, has been taken over with enthusasim by and adapted to Western culture members. While its beginnings lie in the seventeenth century, the haiku poem is still practised today, and still relevant today. It is adapted to today's lifestyle and it manages successfully to capture our present day concerns, regardless of the culture we belong to. For Western culture members it can be both a means of understanding Asian cultures' mindset, based on the Zen Buddhist philosophy in Japan,which emphasizes the importance of the present moment and the ephemerality of life, and a means of self-expression, facilitated due to its concise form.
We all react emotionally to changes in seasons, and this is visible in the haiku poem analysed in this paper, and written by Romanian poet Serban Codrin: "Autumnal rainfall./ And my shadow nearby/ with no hope at all." The sadness, or melancholy, specific to the autumn season, which is present in many Western culture poems, makes up a common, universal element, which can serve as a bridge between Asian and Western cultures. The haiku poem can be regarded as a symbol of soft power, or of attractive cultural products of Japanese culture for Western cultures. At the same time, it can be regarded as a minimalist, concise and all the more powerful means of expressing feelings and becoming aware of what we are feeling, for therapeutic purposes.
In the poem analysed in this paper, the feeling of sadness and ephemerality is attributed to the shadow, not to the poetic persona, showing how haiku is an example of indirect communication, which is specific to Asian cultures.

Keywords: Soft Power, Therapy, Cultural Heritage, Zen Buddhism

INTRODUCTION
There are cultural products which are still around today, and are practiced to the same arge extent as in the past. While they go through some transformations, they are still reminiscent of the past, and still very adaptable to the lifestyle and mindset we have today. Such a cultural products is the haiku poem. The haiku poem is so adaptable, that it is not restricted to Japanese culture members only. Nowadays, it is practiced all over the world, and this is a proof of both its universality and its impact.
The haiku poem appeared in the seventeenth century in Japan, and its writing was a practice related to Zen Buddhism (Kern, 2021; Lien, 2019). It is, traditionally, a very short poem, made up of three lines, 5-7-5 syllables. The English language haiku poems can even have shorter syllables. Since the haku poem is about the present moment, and the ephemerality of the moment, as well as of our entire lives, we need to remain grounded in the present. This can be achieved with the help of a very strong awareness of the seasons. The current season in haiku poems is present through a reference suggesting it, based on specific elements that can be found during the time of the respective season. The seasonal element can include, for instance, dry leaves, of yellow leaves, for

autumn, or cherry blossoms for spring. In addition, references to the time of day, such as sunshine, or moonlinght, can also be used. Modern haiku, or free form haiku poems can do away with the traditional, fixed pattern number of syllables, as well as with the seasonal reference, or kigo, in haiku poems. Such haiku form was practiced by Ogiwara Seisensui (1884-1976) (Kimura, 2022; Thomas, 1994; Trumbull, 2003) and, among his well-known disciples, Santoka Taneda (Oyama, 2021; Watson, 2003). Challenging the 5-7 syllables pattern and the presence of the kigo started even earlier, with Masaoka Shiki (Beach, 2019; Caldwell, 2019; Kimura, 2022).

The experimentation with haiku poems continued by having this type of poem taken over and written by Western culture members. They brought in elements of their own mindset, and adapted the haiku poem to their understanding. In turn, they also adapted their mindset to the haiku poem, and managed to fit in their means of expressing themselves within the concise form of the haiku poem. In addition, they learned to do away with figurative and lyrical language, as well as with emotional expression specific to Western culture poetry, and to use, instead, the juxtaposition (Gilli, 2021; Hiraga, 1999; Trumbull, 2012), or the way meaning and a figurative sense could be created based on the combination and interpretation of the two parts of the haiku poem. They also learned how to express emotions and abstract ideas through indirect language, using visual imagery instead of abstract notions.

The present paper will show an example of haiku poem written by a Romanian author, and offer a model of understanding and interpreting this poem.

MATERIALS AND METHODS

The haiku poem analysed in the present paper is the following:

Autumnal rainfall.
And my shadow nearby
with no hope at all (Codrin, 1994)

This poem was written by Serban Codrin, considered one of the Romanian haiku poetry masters.

Readers identify the season right away: it is autumn, and it is also raining. An entire landscape can be pictured right before us. The atmosphere could be of any type. We could feel nostalgic, sad, we could simply contemplate the scenery, or we may be hurrying towards our home, job, or throughout the city trying to continue our activities. We could also recreat in our cosy homes and start reading a good book, as we often see images of the kind circulating on social media. Here we resort to the associations with autumn we have been finding throughout our readings and thoughout our school years' contact with literary works and paintings. Romanian culture members may recall the hopeless moods of Symbolist poet George Bacovia (Gurguta et al, 2020; Murgu et al, 2020; Taylor et al, 2015) in his poems about the autumn season. His depictions of autumn include the Symbolist features of decay and death, together with the associations of autumn as a season when nature is dying and when sadness is overwhelming due to the dark sky.

The absence of sunlight triggers depressive moods, while autumn, as a season of transition from summer to winter and towards the death of the cycle of the seasons can cause seasonal affective disorder (Magnusson & Boivin, 2003). States of high-end sadness, even depresive moods, are among the emotions common to SAD and to the emotional associations of piets and visual artists with autumn.

Romanian poet Bacovia has portrayed in his poems a sense of despair at the neverending autumn rain, when everything feels flooded, including the houses. He depicts houses on the lake, where water surrounds everything, and, above all, it also keeps raining without stopping. Another poem shows readers a very dark, overwhelming atmosphere, where the sky is dark and heavy as lead, where there is imagery with death associations, such as coffins made of lead, and even the soul feels heavy like lead. All this imagery is more than enough for the readers to understand the connection with the conceptual metaphor sad is down (Crawford, 2009; Godfrey, 2011; Hurtienne et al, 2020; Lakoff & Johnson, 2020). These conceptual metaphors offer some templates for the

way we understand life experiences, such as sad is down, or happy is up. The lead clearly weighs a lot and pulls us down and, especially, our moods. We apply this way of understanding life and, in this case, emotions, to both literary works and to our own life experiences.

The “autumnal rainfall,” in Șerban Codrin's poem (1994), works in auch a way as to suggest a downward movement. The rain falls, and also autumn itself is called the season of the fall. It is the season when leaves are falling, together with ripened fruits. We can also relate the fall to our sinking hearts, sonce we tend to feel sad about endings. The end of summer and the end of the cycle of the seasons find parallels in the life of the human beings. We have, in Romanian, the phrase “a se afla în toamna vieții,” which can be translated literally as to be in the autumn of one's life. Autumn suggests not only endings, but also changes. Aurumn indeed announces changes, în the process of transition towards winter. In dream analysis în pyschology and psychoanalysis, death can symbolize change (Frantz, 2013), or transformation (Clift & Clift, 2020). We find a similar situation in nature, when in autumn everything seems to be dying, while it is also changing and, after all, moving towards a new beginning, the time of nature's rebirth in spring.

This variety of states of mind and moods is suggested in a very concise manner. In the haiku poem we only have autumnal rainfall, while the readers can develop a lot of free associations (Schachter, 2018) around this phrase, saying anything that comes to their minds în relation to it, just like in the psychoanalytic technique.

The second part of the poem confirms the mood of feeling down, sad, and even depressed: “And my shadow nearby/ with no hope at all” (Codrin, 1994). This line serves as a free association done by the poetic persona to the first part, “Autumnal rainfall” (Codrin, 1994). The phrase “no hope at all” clearly shows and confirms some readers’ expectations about the negative moods association with the autumn season.

The hopeless mood is, however, transfered to the shadow, and is not portrayed as belonging to the poetic persona. Once we are familiar with the basic rules of the haiku poem, although rules can be challenged any time in art, we know that there should not be any directly expressed feelings in haiku poems. The emotions should be interpreted and communicated through the power of suggestion of various words, phrases, and visual images. All of these have allusive powers which allow readers to connect with the poetic persona and interpret them based on common experience.

While free associations can be understood as belonging to one specific individual alone, they can also refer to experiences that are common to more individuals. While we can experience reality in our own, unique way, there are also universally human elements of psychology which can allow us to resonate and to connect emotionally with the others. Understanding the autumn season in correlation with moods that are depressive, or at least sad, melancholy, nostalgic ones, is, thus, part of common personal experience and common cultural background. Such an interpretation is done based on reader-response theories (Mart, 2019), where readers bring their educational and cultural background to understanding and interpreting any text, together with their personal life experiences and emotional reactions.

The poetic persona uses his own shadow in this poem as a double, or as a projection, as something that is both himself and outside himself. Through using the shadow, the poetic persona takes a distance from himself, once the shadow is felt as external, as another person, that is so similar to himself. The shadow, thus, has an ambiguous role. The poetic persona can be, by referring to his shadow, a bit more objective and detached, just as the haiku writing style expects of its authors. The shadow also acquires the function of a person close to the poetic persona, or of a companion, someone to walk along together with him, in the absence of a completely different person. It allows the poetic persona to have somene next to him who understands him and expresses precisely his own feelings and thoughts about the autumn season and about the rainy day. The shadow acquires the role of someone to confess to, as well as to understand the poetic persona, and agree with him about his emotional reality. From a psychoanalytic point of view, the shadow in this poem can function as someone else, on which the poetic persona projects his own

unconscious, as well as conscious, beliefs and emotions. This is a frequent behaviour, and, according to psychoanalysis, a defense mechanism. We apply this mechanism of projection (Baumeister et al, 1998; Holmes, 1978) in both reality and in dreams, in an attempt to protect ourselves from being confronted with a reality that otherwise causes us sadness, anxiety, fear, depression, and other negative states of mind. At the same time, the shadow is a means of allowing the poetic persona to express his concerns, depression, and anxieties faced with the changes brought by autumn. These changes can be related not only to the seasons, but also to his own life. The poetic persona could be facing accepting that he is slowly sliding down into old age, with all the concerns that accompany it, such as decaying health, together with having to come to terms with the fact that there is not much time left for him to live and enjoy life as before. Readers can also interpret that the poetic persona only has his own shadow left around, that, maybe, his loved ones have left him, either to live their own lives, in the case of his children, either due to old age and death, since they were old themselves. In such conditions, when we witness the majority of our age around us dying, we cannot help but to think about our own end of life.

According to Jungian analysis, the shadow is one of the archetypes (Casement, 2012; Marlan, 2010) we are confronted with along the way on our psychological development. This archetype refers to what we do not know about ourselves, as well as to what we push aside, not being able to admit to ourselves or to come to terms with. In this haiku poem, the Jungian interpretation is clearly visible, since the shadow is separate, at least visually speaking, from the poetic persona. Through writing this haiku poem, we can notice how the poetic persona becomes aware, if interpreting it, of the state of mind he is in related to the setting of the autumn season. From this point of view, we can understand the current tendencies to practice haiku therapy (Stephenson & Rosen, 2015), since by writing down in a very concise form our associations related to some element in the natural setting, we can become aware of what we are dealing with emotionally, and to express it. Even if the haiku poem uses indirect communication, it is easy to be decoded and quite obvious through interpretation. Unlike classical, Freudian psychotherapy, which is a method of treatment for neuroses, easy cases or more obvious cases of emotional difficulties can be at least identified and brought to awareness through haiku therapy. In this way, the persons practising haiku therapy can become aware of what they are feeling. This can be seenas an extension to the practice of mindfulness, derived from Zen Buddhism (Dawson, 2012), which promotes a high sense of awareness about our emotional needs, emotions we are experiencing, as well as of the way we relate to our surroundings and to the others.

It should be mentioned that Japanese culture is an indirect communication culture (Ciubancan, 2015), where, in order to understand the meaning of a conversation, we need to rely on a common cultural background. This means that we need to rely on the context and on other clues offered by the interlocutor regarding what they actually mean, when they are polite and wish to maintain a harmonious relationship. Hesitation and facial expressions, as well as the language of gestures offer clues as to what the interlocutor clearly means. The situation is less complicated in Western cultures, where communication is generally direct, with the exception of politeness rules which are, however, much easier to infer than in Asian cultures.

In the poem by Serban Codrin analysed in this paper, communication is indirect, and readers interpret the meaning starting from the context provided by the autumn setting. Dealing with any change in our life can bring around anxieties and even depression. In this poem, the changes in the seasonal cycles reflect the changes in human life.

RESULTS

The analysis of the haiku poem by Serban Codrin has shown how we can translate the means of extremely direct, uncontrolled, spontaneous expression of feelings through lyrical means, and figures of speech specific to Western culture poetry, to indirect means of expression, where emotion is apparently restrained, and attributed through suggestion and allusion to elements in

nature or in our surrounding reality. Western culture poetry uses figures of speech which distort reality, by atttibuting to it, directly, our human emotions and qualities. The Japanese culture haiku poem deals with this issue in a more subtle way, through allusions, which are made possible by common free associations with various elements in nature and seasons, as well as by means of juxtaposition, or the combination of the two parts of the poem. By combining the two parts of the poem, we gain a fresh perspective on the realities expressed in them both or a confirmation about that reality, as in the case of the poem by Serban Codrin analysed in this paper. The rain falling in autumn proves to be, indeed, a depressing moment, as confirmed by teh second part, where everything moves downward, the rain falls, autumn means change and falling down towards winter, the mood of the poetic persona falls down. The shadow can become a symbol of the human life sliding, or falling, towards its end, with the shadow being what is left of a human life. The ephemenrality of Zen Buddhism is clearly present.

DISCUSSION

Through practising and reading haiku poems, we can get into contact with the mindset of a completely different culture from our own. The different types of communication provide a landmark in differentiating Western and Eastern cultures. The haiku poem can allow us to have contact with these differences. In the end, we realize that we are not that different and that we also have the tendency to express our emotions in an indirect way at times. Psychoanalysis offers clearly such proofs. Our emotions and thoughts need to be decoded in dreams, in free associations, as well as in various activities where our unconscious can surface, e.g. in artistic creations.

The haiku poem can be considered part of the Japanese cultural heritage, since it is a form of poetry which started in the seventeenth century. It has been not only preserved and practiced by the Japanese culture members themselves, but also by Western culture members to these days. In this way, the haiku poem can offer us a means of practising cultural empathy. More introvert persons can also find a means of expressing their emotions through haiku that is closer to their personality. We can always learn from other cultures.

CONCLUSIONS

By analysing the haiku poem by Serban Codrin, we can realize that the haiku poem is clearly a form of soft power (Nye, 2017) for Japan. It is a cultural product that is considered attractive by members of other cultures. It serves to promote Japanese culture, since, even if all countries can adapt the haiku poem to include elements in their own culture, they will always keep in mind that the haiku poem originates in Japan. They will likely become curious about other Japanese poems, such as tanka, kyoka, senryu, haibun, and others. They will start reading the works of Japanese masters such as Matsuo Basho, Masaoka Shiki, and others. They will find out about Japanese traditions and cultures and they may even wish to visit Japan.

REFERENCES

Baumeister, R. F., Dale, K., & Sommer, K. L. (1998). Freudian defense mechanisms and empirical findings in modern social psychology: Reaction formation, projection, displacement, undoing, isolation, sublimation, and denial. *Journal of personality*, *66*(6), 1081-1124.

Beach, C. (2019). Gendai Haiku: A Short History of the Modern Haiku. *Modern Haiku*, *50*(2), 55-67.

Caldwell, G. (2019). Non-Japanese Haiku Today. In *The Routledge Global Haiku Reader* (pp. 227-241). Routledge.

Casement, A. (2012). The shadow. In *The handbook of Jungian psychology* (pp. 94-112). Routledge.

Ciubancan, M. (2015). Principles of communication in Japanese indirectness and hedging. *Romanian Economic and Business Review*, *10*(4), 246.

Clift, W., & Clift, J. D. (2020). Symbols of transformation in dreams. In *Encyclopedia of Psychology and Religion* (pp. 2319-2322). Cham: Springer International Publishing.
Codrin, S. (1994). Dincolo de tacere. Aux confins du silence. Beyond Quietness. Editura Haiku, Bucuresti.
Crawford, L. E. (2009). Conceptual metaphors of affect. *Emotion review*, *1*(2), 129-139.
Dawson, G. (2021). Zen and the mindfulness industry. *The Humanistic Psychologist*, *49*(1), 133.
Frantz, G. (2013). Dreams and Sudden Death. *The Dream and Its Amplification*, *2*, 205.
Gilli, F. (2001). The power of juxtaposition. *New Zealand Poetry Society, http://www. poetrysociety. org. nz/juxtaposition*.
Godfrey, H. K. (2011). *Conceptual metaphors of emotion in spoken language: Good is up in semantics and prosody* (Doctoral dissertation, Open Access Te Herenga Waka-Victoria University of Wellington).
Gurguţă, N. S., Murgu, L., Diaconu, I. F., Tecuceanu, F., Aprodu, N., & Pîrvu, B. C. (2020). Dysthymia. The case of George Bacovia. *Romanian Journal of Artistic Creativity*, *8*(2), 87-100.
Hiraga, M. K. (1999). " Blending" and an Interpretation of Haiku: A Cognitive Approach. *Poetics Today*, 461-481.
Holmes, D. S. (1978). Projection as a defense mechanism. *Psychological bulletin*, *85*(4), 677.
Hurtienne, C. H. J., Löffler, D., & Husch, C. (2020). *Happy is Up, Sad is Down*. Laurence King Publishing Limited.
Kern, A. L. (2021). The rise and fall and spring of haiku. In *The Tokugawa World* (pp. 781-798). Routledge.
Kimura, T. (2022). Haiku and Modernism in Japan. *Haiku, Other Arts, and Literary Disciplines*, 237.
Kimura, T. (2022). Haiku and Modernism in Japan. *Haiku, Other Arts, and Literary Disciplines*, 237.
Lakoff, G., & Johnson, M. (2020). Conceptual metaphor in everyday language. In *Shaping entrepreneurship research* (pp. 475-504). Routledge.
Lien, N. T. M. (2019). Poetics of Japanese Classical Haiku. *Ho Chi Minh City University of Education Journal of Science-Social Science and Humanities*, *16*(7), 105-113.
Marlan, S. (2010). Facing the shadow. *Jungian psychoanalysis: Working in the spirit of CG Jung*, 5-13.
Mart, C. (2019). Reader-response theory and literature discussions: A Springboard for exploring literary texts. *The New Educational Review*, *56*(2), 78-87.
Murgu, L., Aprodu, N., Tecuceanu, F., Diaconu, I. F., & Pirvu, B. C. (2020). Melancholia. The Case of George Bacovia. *Romanian Journal of Artistic Creativity*, *8*(3), 31-42.
Nye, J. (2017). Soft power: the origins and political progress of a concept. *Palgrave communications*, *3*(1), 1-3.
Oyama, S. (2021). *Life and Zen Haiku Poetry of Santoka Taneda: Japan's Beloved Modern Haiku Poet (Includes a Translation of Santoka's" Diary of the One-Grass Hut")*. Tuttle Publishing.
Schachter, J. (2018). Free association: From Freud to current use—the effects of training analysis on the use of free association. *Psychoanalytic Inquiry*, *38*(6), 457-467.
Stephenson, K., & Rosen, D. H. (2015). Haiku and healing: An empirical study of poetry writing as therapeutic and creative intervention. *Empirical Studies of the Arts*, *33*(1), 36-60.
Taylor, J. (2015). Poetry Today: The Poetry of Yellow Lead: George Bacovia's Neo-Symbolism. *The Antioch Review*, *73*(1), 178-185.
Thomas, R. K. (1994). The Essence of Modern Haiku: 300 Poems by Seishi Yamaguchi.
Trumbull, C. (2003). An analysis of haiku in 12-dimensional space. In *Paper for HAS Meeting*.
Trumbull, C. (2012). Meaning in Haiku. *Haiku Society of America*, 92-118.
Watson, B. (2003). *For All My Walking: Free-Verse Haiku of Taneda Santoka*. Columbia University Press.

AFET DURUMLARINDA BİREYLERİN YARDIM NİYETİNE SOSYAL MEDYANIN ETKİSİ: MAKİNE ÖĞRENİMİ İLE BİR İNCELEME

THE EFFECT OF SOCIAL MEDIA ON INDIVIDUALS' WILLINGNESS TO HELP IN DISASTER SITUATIONS: A MACHINE LEARNING ANALYSIS

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ÖZET
Doğal veya insan yapımı olsun, felaketler deprem, sel ve yangın gibi ciddi acil durumlar yaratır ve önemli kayıplara ve hasara yol açar. Etkilerini azaltmak ve dayanıklılığı artırmak için sürekli önleyici tedbirler hayati önem taşır. Krizlerde, insanlar genellikle sosyal medyaya önemli bir iletişim aracı olarak güvenir. Sosyal medyanın afet yardımlaşması ve kriz iletişimi süreçlerindeki rolünü anlamak günümüz iletişim ortamının dinamiklerini göz önünde bulundurmak açısından son derece önemlidir. Bu çalışma, afet kavramının tanımıyla başlayarak, Planlı Davranış Teorisi çerçevesinde oluşturulan bir anket ile Hatay ve Kahramanmaraş depremleri kapsamında gerçek kişilerden toplanan verilerin, makine öğrenimi algoritmaları ile yorumlanması sonucunda, sosyal medyanın afet yardımlaşması niyeti ve kriz yönetimi üzerindeki etkisi hakkında araştırma sonuçlarını ortaya koymaktadır. Bu vasıtayla, afet sırasında ve sonrasında sosyal medya üzerinden gerçekleşen iletişimin, kişilerin yardım etme niyetlerine etkisinin gözlemlenmesi amaçlanmaktadır ki, günümüzde sosyal medya iletişimi çoğu iletişim alternatifini geride bırakarak kriz anlarında insanların bilgi paylaşımı ve diğer kişiler ve kurumlar ile bağlantıya geçmesinde önemli rol oynamaktadır. Afetler sırasında ve sonrasında ortaya çıkan bu iletişim ağı üzerinden birçok afetzede yardım talep etmekte veya kişiler afetzedelere yardım etmektedir. Bundan dolayı sosyal medya üzerinde ortaya çıkan bu iletişimi incelemek ve anlamak tüm kişiler ve kurumlar için önem arz etmektedir. Sonuç olarak, gelecekte olabilecek olası afetler sırasında sosyal medyada kurulabilecek iletişim ağları kişiler ve kurumlar tarafından doğru bir şekilde yönetilebilecektir ve koordinasyon artırılabilecektir. Bu çalışma, afet yardımlarının koordinasyonunu yönetmeyi ve toplumların afetlere hazırlık süreçlerini geliştirmeyi hedeflemektedir.

Anahtar Kelimeler: Afet, Deprem, Yardımlaşma, Sosyal Medya, Makine Öğrenimi, Yardım Etme Niyeti

ABSTRACT
Disasters, whether natural or human-made, create severe emergencies such as earthquakes, floods, and fires, leading to significant loss and damage. To lessen their impact and boost resilience, continuous preventive measures are crucial. In crises, people often rely on social media as a key communication tool. Understanding the role of social media in disaster relief and crisis communication is crucial for considering the dynamics of today’s communication environment.

This study, beginning with the definition of the disaster concept, presents research findings on the impact of social media on disaster relief intentions and crisis management, based on data collected from individuals affected by the Hatay and Kahramanmaraş Earthquakes through a survey designed within the framework of the Theory of Planned Behavior. By analyzing this data using machine learning algorithms, the study aims to observe how communication via social media during and after disasters influences individuals' intentions to assist. In modern times, social media communication has surpassed many traditional alternatives, playing a critical role in facilitating information sharing and enabling connections between individuals and institutions during crises. The communication network that emerges during and after disasters allows many victims to request aid or for individuals to offer help to those affected. Therefore, it is essential for both individuals and institutions to examine and understand this interaction on social media. As a result, in future disasters, communication networks established via social media can be effectively managed and coordinated by individuals and institutions, enhancing overall coordination. This study aims to manage the coordination of disaster assistance and contribute to improving community preparedness processes for disasters.

Keywords: Disaster, Earthquake, Solidarity, Social Media, Machine Learning, Intention to Help

GİRİŞ

Afet, maddi ve manevi kayıplara sebep olan ve sahip olunan imkanların yetersiz kalmasından dolayı hayatın doğal akışını etkileyen ve ihtiyaçların karşılanamamasına sebep olan olaylardır. Bilinen tarihte insanoğlu tarafından tutulan kayıtlar detaylı bir şekilde incelendiğinde, afet kavramının varoluşun bir parçası olduğu görülmektedir. Bireyler ve toplumlar afet anlarında iletişim ihtiyaçlarını karşılayabilmek için geçmişte ve bugün çeşitli araçlar kullanmış ve bu olağanüstü hallerde birbirlerine yardım etmenin veya durumlarını haber vermenin yordamlarını geliştirmişlerdir. Geçmişte bu, mektup veya doğadaki çeşitli canlılar gibi ilkel yöntemler ile sağlanırken günümüzde cep telefonları ve sosyal medya kanalları gibi dijital yordamlarla yapılmaktadır. Özellikle sosyal medya platformlarında kişiler ve kurumlar çok daha geniş bir kitleyle kısa sürelerde erişim sağlamakta ve iletişim ağları kurulabilmektedir. Bu da beraberinde hem sosyal medyanın kişilerin afet anındaki iletişim ihtiyacına cevap vermesini sağlamış hem de kurumların bireyleri bilgilendirmek amaçlı vermesi gereken bilgilerin bireylere ulaşımını kolaylaştırmıştır. Örneğin, 6 ve 7 Şubat 2023 tarihlerinde Hatay ve Kahramanmaraş merkezli peş peşe gerçekleşen iki deprem afeti sırasında çeşitli sosyal medya platformları üzerinden birçok kişi birbirlerini ve yakınlarını bilgilendirmiş, kurumlar ise halkı aydınlatıcı ve krizleri engelleyici bilgilendirme faaliyetlerinde bulunmuşlardır. Öyle ki, deprem sırasında enkaz altında kalan bazı vatandaşlar erişebildikleri internet altyapısı sayesinde sosyal medyadan yayınladıkları yardım gönderileri sayesinde yerlerini bildirmiş ve yetkililerden yardım istemiştir. Bu bağlamdan hareketle, sosyal medyanın afet sırası ve sonrasındaki kullanımı ve gücü hakkında birçok araştırma yapılmış, ulusal ve uluslararası literatürde konu edilmiştir. (Yıldırım, 2023, Doğuç, 2022, Kumar vd., 2019, Sreelakshmi vd., 2022, Çanakçı vd., 2022). Bu çalışma kapsamında, yukarıda bahsedilen tarihlerde ortaya çıkan ve Hatay ve Kahramanmaraş yöresinde gerçekleşen depremler sonrasında, sosyal medya kullanıcılarının yardım niyetlerini ölçmek amacıyla oluşturulmuş ankete verdikleri cevaplar toplanmış, daha sonrasında ise toplanan bu cevaplar çeşitli makine öğrenimi içerisindeki çeşitli regresyon modelleri kullanılarak incelenmiş ve sosyal medyanın kullanıcıların yardım niyetlerine etkileri ortaya konmaya çalışılmıştır. Bu kapsamda beş adet bağımsız değişken ortaya konarak bu değişkenlerin niyet bağımlı değişkenine etkisi incelenmiştir.

METOT

Bu çalışmadaki temel hedef, sosyal medyanın afet ve kriz iletişimindeki yardım niyetine etkisini belirlemek ve bu etkinin ne yönde olduğunu ortaya koymakla birlikte bu konu hakkında gelecekte gerçekleşebilecek araştırmalara yardımcı kaynak oluşturmaktır. Araştırma kapsamında, Planlı

Davranış Teorisi'nden faydalanarak sosyal medya kullanıcılarının yardım niyetlerine etki edebilecek güven, tutum, subjektif norm, algılanan davranışsal kontrol ve gözlenebilirlik olarak beş farklı bağımsız değişkeni ölçmek amacıyla toplamda 23 adet soru oluşturulmuş ve bu sorulara cevap olarak beş aşamalı bir likert ölçek eklenmiştir. Yine niyet bağımlı değişkenini ölçmek amacıyla altı sorudan meydana gelen bir soru seti hazırlanarak yine beş aşamalı likert ölçek ölçüm amacıyla dahil edilmiştir. Bunlarla birlikte cevaplayıcıların demografik profillerini belirlemek amacıyla ek soru setleri oluşturulmuş ve anket çalışmasına dahil edilmiştir. Daha sonrasında ise bu anket vasıtasıyla toplanan cevaplar Python Scikit-Learn kütüphanesi içerisinde bulunan Lineer, Logaritmik, Ridge ve Lasso regresyon modelleri kullanılarak analiz edilmiştir. Bu analiz süreci öncesinde toplanan cevapların tamamı literatürde yer alan kaynaklardan faydalanılarak sayısal olarak dönüştürülmüş ve ayrıca ayıklama işlemine tabi tutulmuştur.

ARAŞTIRMA VE BULGULAR

Çalışma kapsamında yayınlanan anket 16 Ocak 2024 ile 16 Mayıs 2024 tarihleri arasında dört ay kullanıcıların cevaplarına açık bırakılmıştır. Bu kapsamda verilen toplam 256 cevap daha sonrasında belirli filtrelerden geçirilerek ve eksik cevaplar indirgenerek 242 cevaba kadar indirilmiştir. Katılımcıların demografik profilleri ile ilgili detaylı bilgi aşağıda verilmiştir.

Demografik Profil		**Frekans**	**Oran (%)**
Cinsiyet			
	Kadın	133	54.96%
	Erkek	109	45.04%
Yaş			
	18 – 23	58	23.97%
	24 – 29	89	36.78%
	30 – 35	59	24.38%
	36 – 41	19	7.85%
	42 ve üzeri	17	7.02%
Eğitim Seviyesi			
	İlkokul	4	1.65%
	Lise	8	3.31%
	Ön Lisans	9	3.72%
	Lisans	158	65.29%
	Yüksek Lisans	54	22.31%
	Doktora	9	3.72%
Gelir seviyesi			
	Yeterli düzeyin çok altında	10	4.13%
	Yeterli düzeyin altında	55	22.73%
	Yeterli düzeyde	139	57.44%
	Yeterli düzeyin üstünde	37	15.29%
	Yeterli düzeyin çok üstünde	1	0.41%
Günlük Sosyal Medya Kullanımı			
	0 – 2 Saat	87	35.95%
	2 – 5 Saat	121	50.00%
	5 – 8 Saat	28	11.57%
	8 – 12 Saat	6	2.48%

Tablo 1: Anket Katılımcıları Demografik Profili

Cevaplayıcıların demografik bilgileri incelendiğinde, katılımcıların yarıdan biraz fazlasını kadınların oluşturmasıyla birlikte yaklaşık 85%'i 35 yaş altı katılımcılardan meydana gelmektedir. Ayrıca anket katılımcılarının yaklaşık 91%'i lisans ve daha üzerinde eğitim almış ve yaklaşık 73%'ü gelirlerinin yeterli ve yeterli düzeyin üzerinde olduğunu beyan etmişlerdir. Anket sonucu elde edilen bu demografik bilgiler sonuçların yorumlanması konusunda yardımcı olmakla beraber araştırmanın hangi profildeki deney grubu üzerinde yapıldığını ortaya koymaktadır ve araştırmanın olası sonuçlarının geçerliliği bu demografik profilin dahil edildiği topluluk ile sınırlıdır.

Çalışma kapsamında cevaplayıcıların yardım niyetlerini ölçmek amacıyla beş adet bağımsız değişken belirlenmiştir. Bunlardan güven bağımsız değişkeni için beş adet, tutum bağımsız değişkeni için beş adet, subjektif norm bağımsız değişkeni için beş adet, algılanan davranışsal kontrol bağımsız değişkeni için dört adet ve gözlenebilirlik bağımsız değişkeni için dört adet soru oluşturulmuştur. Ayrıca niyet bağımlı değişkeni için ise altı adet soru ortaya konmuştur. Bu sorular oluşturulurken Planlı Davranış Teorisi kapsamında daha önce literatürde yapılan araştırmalar kullanılmış olup referans alınan sorular konu özelinde uyarlanmıştır. Araştırma sorularının cevap ölçeği olarak tamamında "kesinlikle katılmıyorum – katılmıyorum – kararsızım – katılıyorum – kesinlikle katılıyorum" likert ölçeği birden beşe kadar seviyeler eklenerek kullanılmıştır. Ankete katılım sağlayan kullanıcılar tarafından verilen cevapların analize hazırlanması hususunda ise demografik soruların cevabında bulunan sözel ifadelerin sayısal verilere çevrilmesi amacıyla etiket kodlaması yaklaşımı benimsenmiş, eksik verilerin ayrıştırılması konusunda ise eksik verilerin izole edilmesi metoduna başvurulmuştur. Böylece sayısal cevabı olmayabilecek soruların cevaplarının tamamı sayısal olarak dönüştürülmüş ve ankete eksik cevap veren katılımcıların cevapları dikkate alınmamıştır. Bu yaklaşım sonucunda ise veri setinde toplamda 256 olan cevap sayısı analiz edilebilir 242 cevaba kadar indirgenmiştir.

Elde edilen verilerin analizinde dört farklı regresyon modeli kullanılmıştır. Bunlardan ilk olarak en temel regresyon modeli olan Lineer regresyon modeline başvurulmuş ve sonuçlar elde edildikten sonra sırasıyla Logaritmik, Lasso ve Ridge regresyon modelleri uygulanmıştır. Bu modeller arasında en önemli fark ise regresyon analizi yapılırken cevapların analizi sırasında matematiksel olarak L1 ve L2 ceza terimlerinin farkından kaynaklanmaktadır. Lasso regresyon modelinde L1 tipi cezalandırma kullanılırken, Ridge metodunda ise L2 tipi cezalandırma metodu kullanılmaktadır. Çalışma kapsamında elde edilen verilerin söz konusu regresyon modelleri ile incelenmesi sonucu çıkan sonuçlar aşağıdaki tabloda özetlenmiştir.

Regresyon Analizi						
Bağımsız Değişken Analizi		**Skor**	**R^2**	**MAE**	**MSE**	**RMSE**
	Lineer	0.541	0.541	0.433	0.337	0.580
	Lojistik	0.665	0.293	0.397	0.545	0.739
	Ridge	0.540	0.540	0.434	0.337	0.581
	Lasso	0.518	0.518	0.455	0.353	0.594
Demografi ve Bağımsız Değişken Analizi						
	Lineer	0.583	0.583	0.418	0.306	0.553
	Lojistik	0.657	0.368	0.338	0.488	0.698
	Ridge	0.582	0.582	0.419	0.306	0.554
	Lasso	0.522	0.522	0.454	0.351	0.592

Tablo 2: Regresyon Analizi Sonuçları

Söz konusu regresyon sonuçları incelemesinde tutarlılık referans değeri R^2 olarak alınmıştır. Burada R^2 değerinin sıfır ile bir arasında değişmesi, tahmin edilen sonuçların gerçek sonuçlar ile arasındaki hatanın ölçülmesini sağlar. Bu değer model tutarlılığı arttığında bire yaklaşırken azaldığında sıfıra yaklaşmaktadır. Analiz sonuçları detaylı bir şekilde incelendiğinde, R^2 değerinin Lineer, Ridge ve Lasso modellerinde 0.5'in üzerinde seyrettiği, Lojistik regresyon modelinde ise 0.3 dolaylarında olduğu gözlemlenmiştir. Bu sonuçlar dikkate alındığında sosyal bilimler açısından sonuçların tutarlı olduğu ve daha önce bahsedilen beş farklı bağımsız değişkenin niyet bağımlı değişkeni üzerinde doğrudan etkili oldukları söylenebilir.

SONUÇ VE ÖNERİLER

Çalışma kapsamında, Planlı Davranış Teorisi'nden faydalanılarak beş bağımsız değişken ve bir bağımlı değişkeni içeren bir araştırma modeli oluşturulmuş, daha sonrasında ise bu değişkenlerin ölçülmesi amacıyla literatür kaynakları referans alınarak bir anket çalışması yapılmıştır. Toplamda 256 kişinin katılımıyla gerçekleştirilen anket neticesinde elde edilen sonuçlar Python programlama dili içerisindeki Scikit-Learn kütüphanesinden faydalanılarak dört farklı regresyon modeli ile değerlendirilmiş ve bağımsız değişkenlerin niyet bağımlı değişkenine etkileri incelenmiştir. Bu araştırma sonucunda bulunan sonuçlar, güven, tutum, subjektif norm, algılanan davranışsal kontrol ve gözlenebilirlik bağımsız değişkenlerinin niyet bağımlı değişkenine doğrudan etkisi olduğunu göstermiştir. Bu da sosyal medya üzerinden afet sırasında ve sonrasında gerçekleşen iletişimin yardım niyeti üzerindeki etkisini göz önüne çıkarmaktadır. İleriki zamanlarda literatürde bu tür çalışmalar artırılarak kamu kurumlarının ve özel işletmelerin bu alandaki iletişimi daha sağlıklı ve verimli yönetmesi hususunda yapılacak girişimlere ön ayak olunabilir ve bu alanda çalışmalar genişletilebilir.

BİLGİ NOTU

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KAYNAKÇA

Yıldırım F. E., (2023), 6 Şubat 2023 Depreminde Türkiye'de Twitter'ın Kullanımı, Intermedia International e-Journal, 2023, 10(19).

Doğuç Ö., (2022), Twitter Verisi İle Doğal Afet Müdahale Süreci İçin Karar Destek Uygulaması, Afet ve Risk Dergisi 5(2), 2022, (408-419).

Yoldaş, M.A., Dilek, N., (2020), Tüketicilerin Özel Günlerdeki Hediye Satın Alma Davranışlarının Planlı Davranış Teorisi Çerçevesinde İncelenmesi, Yönetim Ekonomi ve Pazarlama Araştırmaları Dergisi, 4(4), 234-251

Anser, M.K., Zaigham, G.H.K., Rasheed, M.I., Pitafi, A.H., Iqbal, J., Luqman, A., (2020), Social Media Usage and Individuals' intentions Toward Adopting Bitcoin: The Role of the Theory of Planned Behaviour and Perceived Risk, Int J Commun Syst., 33:e4590

Hartmann, M., Klink, J., Simons, J., (2015), Cause related marketing in the German Retail Sector: Exploring the role of customers' trust, Food Policy, 108-114

Moore, G.C., Bensabat, I., (1991), Development of an Instrument to Measure the Perceptions of Adopting and Information Technology Innovation, Information System Research(2:3), 192-222

Taylor, S., Todd, P.A., (1995), Understanding Information Technology Usage: A Test of Competing Models, Information System Research(6:2), 144-176

George, J.F., (2004), The theory of planned behaviour and internet purchasing, Emerald Internet Research(14:3), 198-212

Ntemana, T.J., Olatokun, W., (2012), Analyzing The Influence of Diffusion of Innovation Attributes on Lecturers' Attitudes Toward Information and Communication Technologies, An Interdisciplinary Journal on Humans in ICT Environments(8:2), 179-197

Lerro, M., Raimondo, M., Marcello, S., Concetta, N., Marotta, G., (2019), Cause related marketing among Millenial Consumers: The role of trust and loyalty in the food industry, Sustainability(11), 535

Saeri, A.K., Ogilvie, C., Macchia, S.T., Smith, J.R., Louis, W.R., (2014), Predicting Facebook Users' Online Privacy Protection: Risk, Trust, Norm Focus Theory, and the Theory of Planned Behavior, The Journal of Social Psychology(154:4), 352-369

Ali-Hassan, H., Nevo, D., Wade, M., (2015), Linking dimensions of social media use to job performance: The role of social capital, Journal of Strategic Information Systems, (24), 65-89

Bayram, A.T., (2018), Planlanmış Davranış Teorisi Çerçevesinde E-spor Turizmine Katılma Niyeti, Turizm Akademik Dergisi, 5 (2), 17-31

Kumar A., Singh J.P., Saumya S., (2019), A Comparative Analysis of Machine Learning Techniques for Disaster-Related Tweet Classification, 2019 IEEE Region 10 Humanitarian Technology Conference, 12-14 November.

Argın, Y., (2023), Doğal Afetlerde Sosyal Medya Kullanımı: 2023 Kahramanmaraş Depremi Özelinde Twitter Örneği, İnsanat: Sanat, Tasarım ve Mimarlık Araştırmaları Dergisi 2023, 3(1) s. 140-165.

Ata F. (2023), Afet Haberciliği: Kahramanmaraş Merkezli Depremler Sürecinde Sosyal Medyaya Yönelik Bir Değerlendirme, TRT Akademi , 8(18) , pp. 606-629.

Sreelakshmi S. and Chandra S. S. V., "Machine Learning for Disaster Management: Insights from past research and future implications," 2022 International Conference on Computing, Communication, Security and Intelligent Systems (IC3SIS), Kochi, India, 2022, pp. 1-7.

Çanakçi, M., Şaşmazlar, C., & Öztürk, S. (2022). Afet ve Kriz Yönetiminde Sosyal Medyanın Kullanımı Üzerine Bir Araştırma: Twitter Örneği. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 11(3), 882-897.

CONDITION RATING OF THE ROAD PAVEMENT AND SELECTION OF REPAIR METHODS

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ABSTRACT
Condition rating of the road pavement is essential for making effective decisions about the type of maintenance or rehabilitation that will be carried out on a pavement section. Reliable quantitative assessment of the volume of necessary repairs will ensure the performance characteristics and durability throughout the entire service life at minimal cost.
This article presents detailed results from Falling Weight Deflectometer (FWD) and Ground Penetrating Radar (GPR) studies. In addition, an analysis of these results and recommendations for strengthening the road pavement for the Sh-176 „Sighnaghi-Saint Nino Monastery" road to develop rehabilitation and maintenance scenarios. FWD results combined with road pavement layer thickness and traffic load information to determine residual service life and necessary treatment type. Thus, using the nonlinear theory of layered half-space elasticity, pavement structure analyzed in the same way as other civil engineering structures.

Keywords: Falling Weight Deflectometer (FWD); Ground Penetrating Radar (GPR); layer thickness; maintenance; rehabilitation; road pavement; service life; structure.

INTRODUCTION
The constant increase of road traffic volume and the number of heavy vehicles require the provision of more durable and expensive road pavements. Road pavements are a complex engineering building, as they are suitable for operation with temporary traffic loads and permanent effects of climatic and hydrogeological factors. At the same time, the most expensive part of road is the pavement structure. Therefore, road pavement structural condition evaluation is quite an important and responsible task.
The Falling Weight Deflectometer (FWD) and Ground Penetrating Radar (GPR) results determine the full dynamic deflection of the bowl under standard wheel load and thicknesses of road pavement structural layers. Using appropriate analysis software, it is possible to determine the structural condition of the road pavement and residual service life quickly and accurately. The corresponding requirements for the rehabilitation or maintenance of road pavement section can be determined based on calculations of the stresses and strains in each layer. More detailed information regarding the application of FWD and GPR testing results is described below in the main part of the article.

Design traffic loads on the road section were derived from the average annual daily traffic (AADT) counts combined with estimates of equivalent single axle load (ESAL) factors for each vehicle type.

The field survey was implemented using the Swedish firm KUAB equipment to conduct and analyze the existing condition of the Sh-176 „Sighnaghi-Saint Nino Monastery" road pavement. The measurements were carried out with an FWD KUAB 50 owned by a Georgian state agency. KUAB was selected for this task, since the Department of Roads already possesses a FWD machine manufactured by KUAB.

In addition to the actual FWD survey, a subsidiary survey was also conducted using GPR with 500 MHz and 1600 MHz antennas to provide an estimate of the existing road pavement structure along the entire length. This GPR survey was supplemented by a series of test holes across the road to provide confirmatory data on the thickness of the pavement layer.

CHAPTERS

Investigation Of Road Pavement - To assess the structural condition of the pavement, measurements were taken at the Sh-176 „Sighnaghi-Saint Nino Monastery" road. The average annual daily traffic (AADT) estimate was received from the Georgian Road Department with estimates of an equivalent single axle load (ESAL) 450 000 over a 20-year design period.

The Falling Weight Deflectometer (FWD) measurement files show test point position expressed as distance along the road from a reference point, drop number, peak load, peak deflections, air temperature, E Mod, the position measured with an EGNOS GPS, and time. E Mod is the so-called surface modulus, which is the modulus of an assumed linearly elastic, homogenous and isotropic half-space with Poisson's ration 0.5, that would get the same deflection in the center of the load plate as the actual pavement. Picture 1 bellow shows photographs taken on the road during FWD testing.

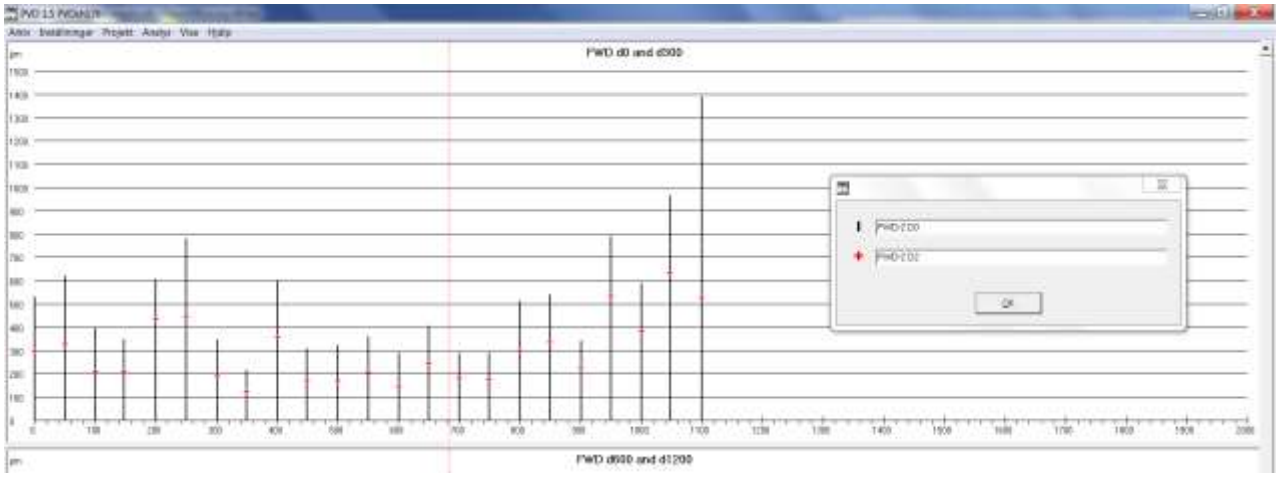


Pic.1. Falling Weight Deflectometer FWD KUAB 50 during testing

The measurements were made in the wheel path close to the pavement edge, approximately every 100 m in both directions. The maximum peak load used was about 50 kN, and the rise time about 23 ms. The diameter of the load plate was 300 mm, and deflection sensors were placed 0, 200, 300, 450, 600, 900 and 1200 mm from the load plate center. Fig. 1 bellow show the deflections at 0, 300 mm from load plate center.

Fig 1. Deflections at 0 and 300 mm from load center

There is much variation in deflections along the road, mainly due to subgrade modulus variation. The deflection bowls are typical for flexible pavement. Although there is much



variation, all bowls are good in relation to the anticipated traffic loading. The higher deflections at the end of the road do not indicate insufficient bearing capacity, but rather, a lack of compaction. Fig 2 shows bowls with high and low deflection.

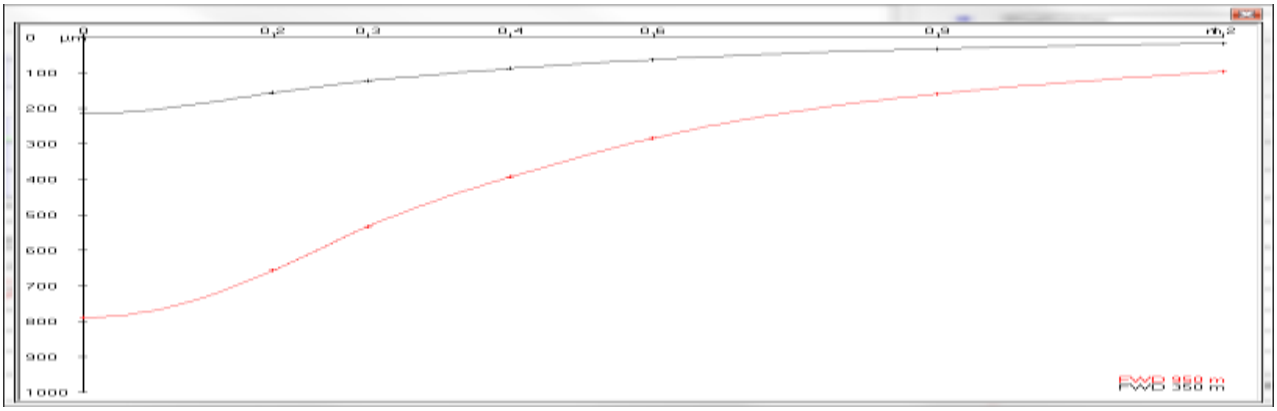


Fig 2. Examples of deflection bowls

The Ground Penetrating Radar (GPR) layer data was recorded 10 times per meter with the high frequency antenna and 5 times per meter with the low frequency antenna. Fig 3 shows the layer thicknesses from GPR measurement and from test pit data.

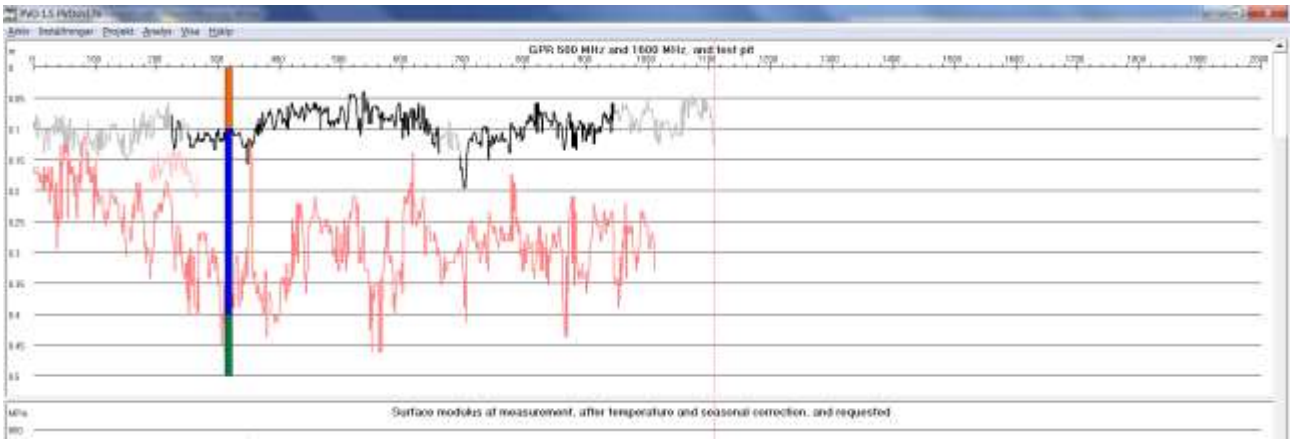


Fig 3. Layer thicknesses from GPR and test pits

There is perfect agreement between asphalt thickness measured in the test pit and calculated with the typical propagation velocities 0.13 m/ns for asphalt. There is also a clear indication of a base layer. The colors in the diagram have no specific significance, they are just to make the layers visible.

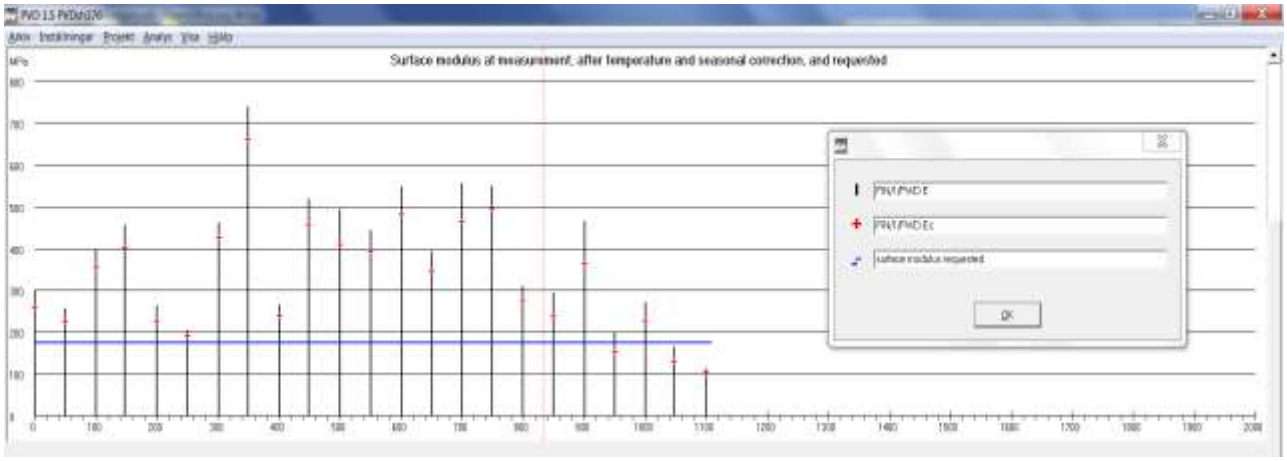
Calculation principle **-** The calculations were made with the analysis program PVD. Two different calculation methods were typically tested on this type of road. One is the so-called MET, Method of Equivalent Thicknesses. A mathematical model of the pavement as a layered elastic structure is created, based on the information from construction records, test pits and GPR. The essential elements of the model are thickness and modulus of elasticity of each layer. In the mathematical model, the FWD load is applied and the deflections calculated. The calculated deflections are compared with the measured values, and the properties of the layers adjusted until there is agreement between the two sets of deflections. The above back-calculation is made at the actual temperature of the measurement. When the final values have been determined, the modulus of the asphalt layer is adjusted to a reference temperature with a temperature adjustment function.

In the mathematical models thus obtained the strains are calculated and compared to the criteria for strain in the different layers. Different institutions suggest different strain criteria. One set of criteria is 195 microstrain horizontal tensile strain for asphalt with 5000 MPa modulus at one million load applications, and 885 microstrain vertical compressive strain for unbound layers at one million load applications. The exponent for adjustment to actual number of load repetitions for asphalt was 5.62 and for unbound materials 4.00. These criteria are taken from the Shell pavement design manual, published by Shell research laboratory in London. Another example is from the Swedish Transport Administration, which uses the more tolerant Kingham's criteria for asphalt layers, and allows only about half the strain for subgrade. When the criteria are not met, additional asphalt layer is added in the model until the strain is small enough.

The other method is also based on equivalent thicknesses. Depending on the design traffic loading a certain surface modulus is required. If the modulus determined for the existing pavement is too small, overlay is added and the new pavement modulus is calculated with the method of equivalent thicknesses. Two calculations are made, one with an asphalt overlay on existing pavement, and one where the current pavement is used as subbase and a base of calculated thickness and an asphalt layer of fixed thickness are added. Fig. 4 shows the pavement modulus under measuring conditions, the modulus after correction for temperature and season and the required modulus 175 MPa.

Fig 4. Surface modulus at measuring conditions, surface modulus after correction for temperature and season and the required surface modulus

The former method is more exact if the materials and thicknesses are well known, while the second is more tolerant to variations and deviations between the real pavement and theoretical



assumptions.

DISCUSSION

Based on the above results, the following conclusions can be made:

- With conventional flexible pavement and typical material properties, this modulus can be sufficient for traffic up to about 600 000 ESAL. The traffic is in this case substantially less, but if the modulus of a road with asphalt pavement is below 175 MPa there is a risk of direct damage by heavy trucks, so 175 MPa is recommended as a minimum even when design traffic is substantially less than 600 000 ESAL.
- This method shows that there are some parts with adequate strength. However, the method is based on average conditions, and tends to overestimate the problems on weak subgrade. Because of this, and because of the risk of reflection cracking it is recommended that the asphalt on the entire length should be ground and mixed with the material below, and that a base of good crushed stone should then be added and surfaced with 5 cm asphalt concrete.
- There may be short sections of road where patching with surface dressing would be sufficient, but there are not enough savings to be made to justify such short variations in the strengthening.

REFERENCES

1. Evaluation of a Novel Calibrated Mechanistic Model to Design Against Fracture under Swedish Conditions - David Gullberg, Bj örn Birgisson & Denis Jelagin - Highway and Railway Engineering. KTH-Royal Institute of Technology, Stockholm, Sweden 2012
2. Shishinashvili, M. T. (2020). Geotextile in the construction of roads. ISJ Theoretical & Applied Science, 05 (85), 126-128.
3. Pavement Design Guide, AUSTROADS Publication No AP-17/92, Australia 1992

4. Pavement Design Guide, TNZ Publications, TRANSIT, New Zealand 1997
5. Shishinashvili, M. T. (2016). Use of semi-rigid composite pavements in different regions of georgia. ISJ Theoretical & Applied Science, 3(35), 80-83.
6. Pavement Management For Airports, Roads and Parking Lots, Kluwer Academic Publishers, Shain, MY,USA 1998
7. Shell Pavement Design Manual, Asphalt Pavements and Overlays for Road Traffic. Shell International Petroleum Company, Ltd., London,. England 1978
8. Shishinashvili, M. T., & Chubinidze, G. A. (2020). The methods of ice removal from motor roads. Theoretical & Applied Science, (11), 183-185.
9. Unsealed Road Manual, ARRB Transport Research Ltd Publications, Australia 1993
10. Use of Spray Patching for Pavement Maintenance and Preservation, co-hosted by the FHWA, AASHTO and the New Jersey Department of Transportation, USA 2006

PHYSIOLOGICAL EFFECTS OF DIFFERENT BIOCHAR SOURCES ON MAIZE PLANTS UNDER EXTREME TEMPERATURE CHANGES

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ABSTRACT
In recent times, there has been a growing emphasis on environmentally friendly agro-strategies, such as the use of biochar, as a means of mitigating the adverse effects of global climate change on maize cultivation. This study examined the impact of biochar applications derived from diverse sources, including apple orchard pruning waste, animal manure, and urban waste, on chlorophyll content, canopy temperature, membrane durability index, leaf relative water content, turgor loss, and proline content in maize plants cultivated under varying temperature conditions (25, 4, and 48°C). The experiment was conducted under controlled conditions with three replications according to a factorial experimental design. Biochar materials derived from pruning waste, animal manure, and urban waste were applied at a rate of 4%. Once the plants had reached the four-leaf stage, samples were taken from those grown under normal conditions. Some plants were subjected to extreme cold stress at 4 ℃ for 24 hours, while others were subjected to extreme high temperature stress at 48 °C. The application of biochar resulted in a reduction in the decline of chlorophyll content observed in plants subjected to low and high temperature stress. Additionally, the membrane durability index of biochar-treated plants was found to be higher. Proline accumulation was observed to be at low levels with biochar application. Concurrently, biochar-treated plants demonstrated the capacity to maintain their water content and turgor. It was thus concluded that biochar of animal manure origin was more efficacious in improving the physiological characteristics of maize plants when exposed to low and high temperatures.

Keywords: Biochar Application, Cold Stress, Heat Stress, Membrane Damage, Osmoregulation.

INTRODUCTION
Low and high temperatures are the primary factors limiting plant productivity and frequently inhibit the germination of maize seeds and the growth of seedlings, which is disadvantageous for early spring planting (Bhattacharya, 2022; Khaeim et al., 2022). Prior research indicates that under low temperature stress conditions, the most pronounced alterations in plants' cellular membranes and osmotic potential occur (Turk et al., 2020; Mira et al., 2021; Salika and Riffat, 2021; Zeng et al., 2024). In order to withstand stressful environments, plants require stable membranes. However, cold stress has been demonstrated to decrease membrane stability, which results in the loss of crucial osmolytes (Manasa et al., 2022). The formation of ice crystals under cold stress conditions results in the loss of water from the cell, thereby reducing the water potential of the apoplast. Drought stress is a principal factor contributing to reduced plant growth, which is often precipitated by cold stress. Drought under cold stress causes significant yield losses due to decreased water and nutrient intake, turgidity, and hydraulic conduction at the outset of the drought (Bhattacharya, 2022). Furthermore, cold stress impairs microbial activity in the soil, which affects the interactions and uptake of nutrients by plants. As stated by Sun et al. (2019), the formation of ice crystals has been observed to exacerbate electrolyte leakage, perforate cells, and enhance cytosolic outflow.

High temperatures have a detrimental impact on evapotranspiration, which in turn impairs solute production, a process that is vital for stress tolerance and has an irreversible effect on plant osmotic adjustment (Hassan et al., 2021). As a consequence of the reduction in absorption and the increase in respiration caused by rising temperatures, there is a considerable loss of yield (Hassan et al., 2021). Turgor loss is the result of heat stress-induced downregulation of water intake, which in turn disrupts cell metabolism (Sagar et al., 2022). Furthermore, reactive oxygen species (ROS) generated by heat stress cause damage to cellular membranes and an increase in osmolyte leakage (Sachdev et al., 2022). Further research has demonstrated that high temperatures can alter plant water-use patterns, resulting in accelerated soil drying and an exacerbation of drought-related consequences (Teuling, 2018; Wang et al., 2021). In a study, the temperature was increased from 27°C to 35°C, which resulted in a twofold increase in the water demand for maize. This reduction in soil water availability was directly attributed to the decline in maize yield (Waqas et al., 2021). Consequently, the development of alternative techniques to mitigate heat stress necessitates an understanding of the means to reduce canopy temperatures and offset the heightened evapotranspiration demand from the crop canopy and soil resulting from higher temperatures (Luan et al., 2021).

As evidenced by recent research, enhancing soil moisture through irrigation can mitigate the adverse effects of intense cold or heat (Lesk et al., 2022). Another strategy is to enhance the soil's capacity to retain water by incorporating organic components such as biochar. As posited by Bao et al. (2024), the incorporation of biochar into soil enhances its organic matter content, exerting a profound influence on pore space distribution and soil aggregation. Biochar has the potential to influence soil bulk density and porosity, as well as regulate daily and seasonal soil temperatures, due to its distinctive structure and physical and chemical properties (Khan et al., 2024). The use of biochar has also been proposed in recent years as a technique to combat global warming. A significant agricultural approach can be to convert organic waste left in the soil after harvest into biochar, which can make carbon (C) more stable, instead of tillage, which releases CO_2 into the atmosphere (Arif et al., 2020). The pyrolysis of organic materials at various temperatures in an oxygen-deficient or oxygen-free environment produces biochar, a porous, low-density, carbon-rich product with a variety of recognized impacts on plant ecophysiology. Biochar can be produced from waste materials, dead animals, tree trimmings, and crop residues (Narzari et al., 2015).

The effects of biochars obtained from different sources on plant development and stress resistance are contingent upon the nutrients present in the source material. This study investigated for the first time the effects of biochars obtained from diverse sources on membrane resistance, plant water status, and proline accumulation in maize plants exposed to extreme low and high temperature stress.

MATERIALS AND METHODS

The soil samples were characterized as sandy loam textured, alkaline, salt-free, moderately calcareous, and deficient in organic matter. The fertilizer contains 5.6 kg ha^{-1} of P_2O_5, 254.7 kg ha^{-1} of K_2O, and 5.4 mg kg^{-1} of Mn, 1.73 mg kg^{-1} of Cu, 0.24 mg kg^{-1} of Zn, and 2.81 mg kg^{-1} of Fe, respectively.

Three different forms of biochar were used in the study: animal manure (AMBC), pruning waste (PWBC) from apple orchards and urban waste (UWBC). Isparta Lakes Region Tecnocity PAL Aviation Agricultural, Industry and Trade Limited Company, Turkey, provided the AMBC and PWBC. The UWBC was sourced from Synpet Technologies, which has facilities in Istanbul, Turkey, and New York, USA. To produce UWBC, the company employs a three-stage thermal conversion process, which involves depolymerization, hydrolysis, and the conversion of a material comprising 60% sewage sludge and 40% domestic waste into short hydrocarbon chains in a cracker reactor at 550°C. Table 1 presents a summary of the chemical properties of biochars.

Maize plants (Zea mays L. cv. DKC5685) were cultivated in 2.5-liter plastic pots containing a mixture of soil, sand, peat, and perlite in a 2:1:1:1:1 ratio, in accordance with a factorial experimental design with three replications and three plants per pot. The plants were fertilized with Hogland's solution throughout the growth period. The biochar materials were applied at a rate of 4%. The plants were grown under conditions of 25/17°C, 14 h of light and 10 h of darkness, with an illumination intensity of 800 µmol m^{-2} s^{-1} and a humidity level of 65%. This period of growth continued until the onset of the stress treatments, which was defined as the point at which the plants had developed four leaves. Sampling of plants that had not been subjected to temperature stress was conducted at the conclusion of the experimental period. Following the application of low (4°C) and high (48°C) temperature stresses, samples were collected after 24 hours. This was achieved by decreasing and increasing the set temperatures by 2°C per hour, commencing from 25°C.

Table 1. Chemical properties of the experimental biochar materials.

Parameters	**Unit**	**PWBC**	**UWBC**	**AMBC**
Total N	%	1.19	1.38	1.79
Total P	mg kg^{-1}	1488	22980	11309
Total K	mg kg^{-1}	6732	10290	31510
Total Ca	mg kg^{-1}	12990	57500	54755
Total Mg	mg kg^{-1}	1265	7372	12695
Total Fe	mg kg^{-1}	103	25680	4130
Total Cu	mg kg^{-1}	10.2	393	81.9
Total Zn	mg kg^{-1}	25.9	1187	389
Total Mn	mg kg^{-1}	33.3	549	462

At the end of each treatment period and before harvesting the plants, the chlorophyll content of the leaves was proportionally determined with a chlorophyll meter (Spectrum Field Scout CM 1000) and the canopy temperature was determined with an infrared thermometer. The measurements were taken with the devices held at a distance of 30 cm from the leaf.

To ascertain the leaf relative water content (RWC) and turgor loss (TL) values of the plants, three discs with a diameter of 1.5 cm were excised from the leaf samples and weighted the fresh weights (FW). Turgor weights (TW) and dry weights (DW) of the discs were recorded after they were kept in pure water for four hours, kept at 70°C for 24 hours and subsequently weighed. The RWC and TL values were subsequently calculated using the following formulas, based on the data obtained.

$RWC = (FW - DW) / (TW - DW) \times 100$

$TL = (TW - FW) / TW \times 100$

A 1 cm leaf section was meticulously excised from the leaf samples, placed in 25 ml tubes, and 25 ml of pure water was added. The samples were then shaken on a shaker for 4 hours. Following this, the relative amount of ion transferred to pure water (A) was quantified with an electrical conductivimeter. Subsequently, the same samples were placed in a water bath maintained at 100°C for 30 minutes, then allowed to reach room temperature after boiling. The relative ion content (B) was then measured once more. Finally, the membrane durability index (MDI) of the leaves was calculated using the following formula.

$MDI= (1-A/B)\times100$

Proline content was determined using Bates' method (1973) by modified. A 0.2 g plant leaf sample was homogenized with 4 ml 3% sulfosalicylic acid and centrifuged at 6000 rpm for 10 minutes. Two ml of the supernatant were transferred to test tubes with 2 ml of acid ninhydrin and 2 ml of glacial acetic acid. The tubes were sealed and placed in water bath at 100°C for one hour. Samples

were cooled for 10 minutes in an ice bath. After cooling, 4 ml of toluene was added and shaken for 5 minutes. Samples were extracted and concentrations were determined at 520 nm. The quantity of proline was determined according to the following formula:
Proline (µmol/g fresh sample) = [(µg proline/ml) x (ml toluene)] / (115.5 µg/µmol) / (g sample) / 5]
A completely at random factorial design was employed to examine the study data for variance using IBM SPSS 26. The differences between the means were compared using the Tukey test. The data are presented in bar graphs with error bars, which illustrate the mean and standard error. The figures were generated using IBM SPSS 26.

RESULTS AND DISCUSSION

The analysis of variance of chlorophyll content and canopy temperature of maize plants grown with biochar and heat treatments is illustrated in Figure 1. The biochar treatments were found to be statistically insignificant for canopy temperature; however, other variables were significant at the 1% level.
The chlorophyll content values of maize plants were analyzed, and it was observed that the highest value (216 SU) belonged to the plants grown at 25°C and treated with PWBC. This value was followed by the plants treated with AMBC and not subjected to temperature stress, with 203.25 SU. The lowest value (81.5 SU) was measured in plants grown at 48°C without biochar treatment (Figure 1). The canopy temperatures of the plants ranged from 9.17°C to 23.15°C. The highest recorded temperature was observed in plants cultivated with AMBC, reaching 48°C, while the lowest temperature was noted in plants grown with PWBC, at 4°C.
The application of biochar resulted in an increase in chlorophyll content in maize plants. However, exposure to low and high temperatures led to a reduction in chlorophyll content. The lowest observed decrease in chlorophyll content was 1.4% in the UWBC treatment and 28% in the AMBC treatment, respectively, in response to low temperature stress. Previous studies have indicated that low and high temperature stress have a deleterious effect on chlorophyll content (Tiwari and Yadav, 2019; Meng et al., 2022). Conversely, biochar treatments have been shown to enhance chlorophyll content in plants (Ali et al., 2021). The application of biochar did not result in any discernible impact on the canopy temperature of maize plants. The plants exhibited typical physiological responses to low and high temperature conditions. In this study, the observed increase in canopy temperature of approximately 8°C under high temperature stress and the observed decrease in canopy temperature of approximately 5°C under low temperature stress are sufficiently large to visually detect changes in transpiration in the leaves of plants and to monitor plant growth under stress. Consequently, infrared thermography has significant potential as a means of rapidly monitoring the impact of temperature-induced water stress in fields (Jones, 2004).

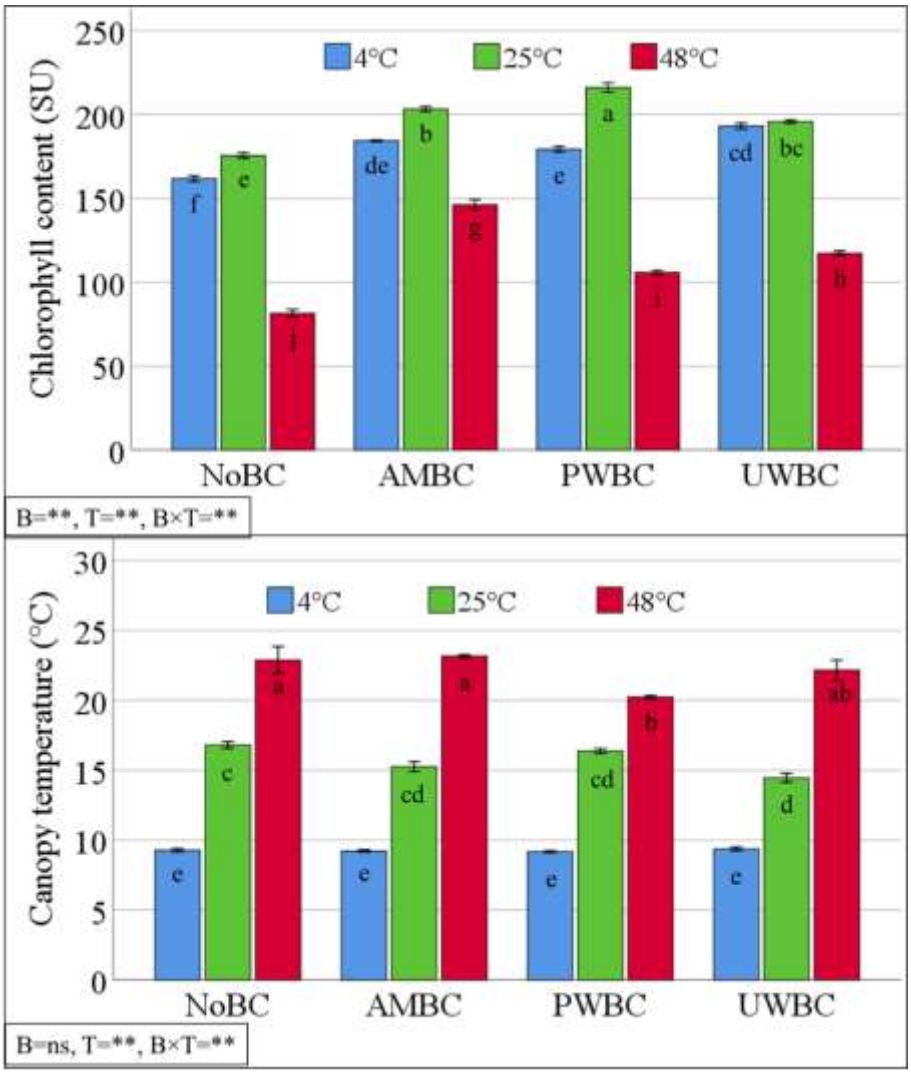


Figure 1. Chlorophyll content and canopy temperature variation of maize plants

The plants with the highest leaf relative water content (96.13%) were those grown at 25°C and treated with UWBC (Figure 2). Plants subjected to high temperature stress at 48°C in the absence of biochar application exhibited the lowest leaf relative water content (50.83%). The plants showed the highest turgor loss were those exposed to high temperature stress, while the lowest turgor loss (3.34%) was observed in plants grown at normal temperature and treated with UWBC.
The relative water content decreased in maize plants exposed to low and high temperatures, while turgor loss increased. The reduction in water content and loss of turgor were more pronounced under conditions of high temperature stress. This may be attributed to the fact that the transpiration rate of the plants increased due to the elevated temperature and they were also subjected to drought stress. It was observed that the water content and turgor status of the plants were higher with biochar treatments and could be maintained under stress conditions. It has been documented that stress conditions result in reduced water content and turgor loss in plants. However, biochar applications have been shown to enhance the water status of plants (Tanure et al., 2019; Sattar et al., 2020; Ali et al., 2021).

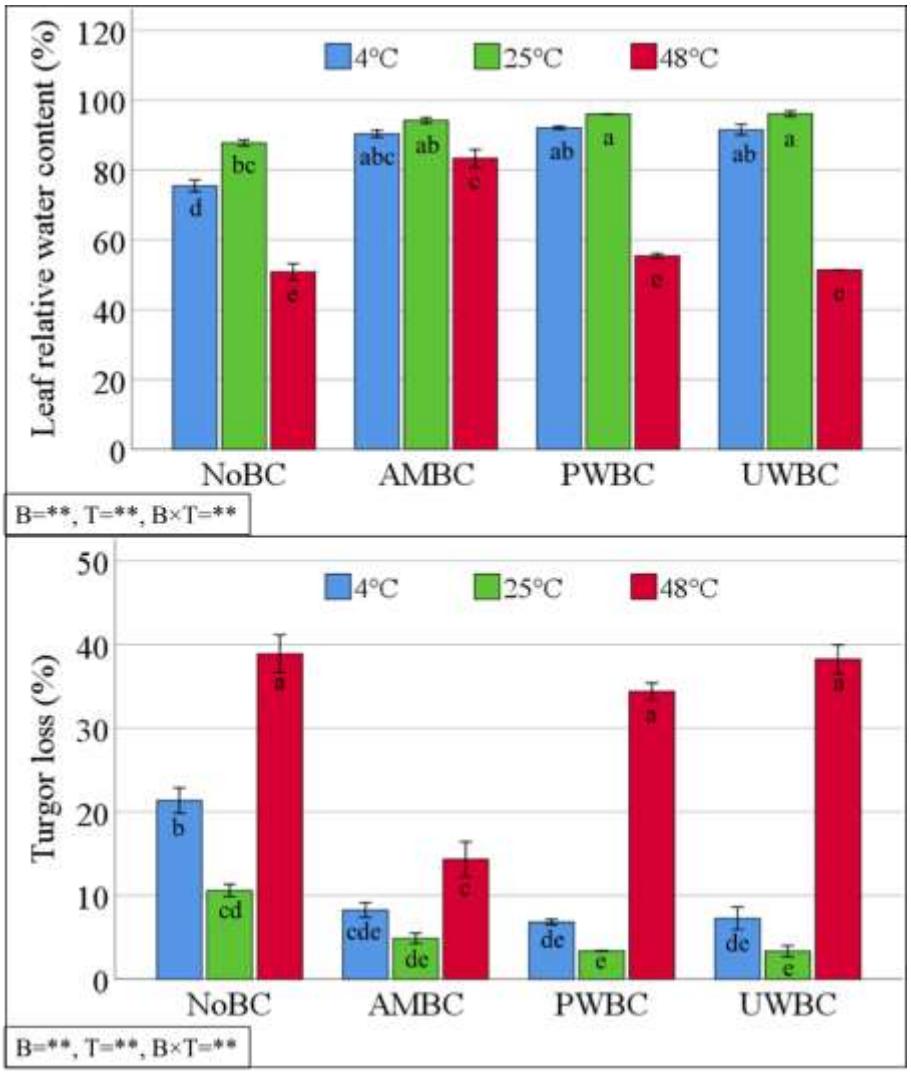


Figure 2. Relative water content and turgor loss variation of maize plants

Figure 3 illustrates the alterations in membrane durability index and proline content of maize plants exposed to low and high temperatures following biochar treatment. As an indication of the absence of cell damage in maize plants grown under normal temperature conditions (25°C), the plants with the highest membrane durability index (92.66%) were those treated with UWBC. The lowest level of cell damage (6.44%) was observed in plants treated with AMBC and experiencing low-temperature stress at 4°C, as indicated by a membrane durability index of 84.9%. The highest level of damage was observed in plants exposed to a high temperature stress of 48°C in the absence of a biochar treatment, with a damage score of 53.70%. The membrane durability index of these plants was the lowest at 41.54%, which is inversely proportional to the cell damage values.

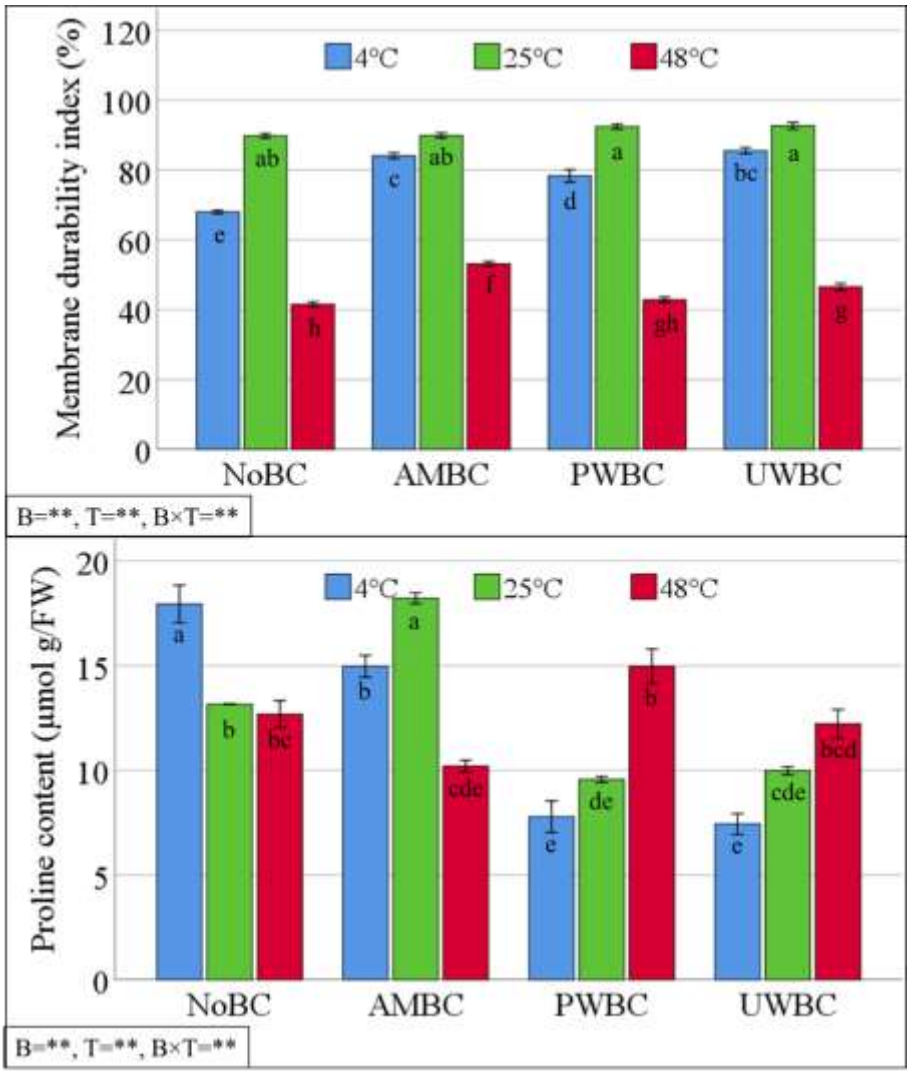


Figure 3. Membrane durability index and proline content variation of maize plants

The proline content of maize plants varied between 7.44-18.22 µmol g/FW (Figure 3). The proline content of the plants increased or decreased in response to low and high temperatures and according to the biochar treatment. It is generally assumed that increased proline accumulation is due to an increased osmotic potential, which serves to prevent dehydration caused by low or high temperatures in maize plants (Wu et al., 2022). In plants without biochar treatment, the proline content increased at low temperatures and slightly decreased at high temperatures. In biochar treatments, a decrease in proline content was observed at low temperatures. It is postulated that this may be attributed to the fact that the plants did not undergo dehydration. In biochar applications, an increase in proline content was observed at high temperatures when PWBC and UWBC was applied. The proline content of plants treated with AMBC and exposed to high temperature stress was observed to be lower than that of plants under normal conditions. It was observed that the water content of the plants was maintained under the AMBC treatment. Given the plant's resilience to stress, it is unlikely that proline accumulation occurred.

CONCLUSION

A synthesis of the data examined in the research reveals that biochar applications enhance the resilience of plants to fluctuations in temperature. In particular, the application of biochar derived from urban waste and animal manure has been observed to contribute to the preservation of chlorophyll content in plants exposed to stress, a reduction in cellular damage, the maintenance of optimal water status through the regulation of osmotic pressure within the plant, and an enhancement of stress resistance.

It was observed that the application of biochar to soil may serve as a rational strategy to mitigate the adverse effects of low and high temperature stress, reinforce the defense system by facilitating the adaptation processes of plants, and enhance yield by imparting beneficial effects on plant growth and development. Furthermore, it is essential to consider the potential variations in outcomes based on the source of biochar when selecting and utilizing this material.

The application of biochar has been demonstrated to eliminate the negative effects of low and/or high temperature stress on maize plants, thereby enabling the attainment of higher yields. The optimal biochar source for growers can be determined by considering the specific conditions of the region in question. For instance, animal manure biochar may be a suitable recommendation in regions where livestock is intensively raised in addition to maize cultivation. The accessibility of biochar derived from urban waste can be more straightforward and cost-effective on a regional scale. Concurrently, the production of biochar from these waste materials will contribute to environmental protection. The effectiveness of prune waste biochar may be contingent upon the plant utilized. To ascertain this, biochar can be procured as a composite of assorted plants and employed in novel research initiatives.

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REFERENCES

Ali, L., Xiukang, W., Naveed, M., Ashraf, S., Nadeem, S. M., Haider, F. U., & Mustafa, A. (2021). Impact of biochar application on germination behavior and early growth of maize seedlings: insights from a growth room experiment. *Applied Sciences*, *11*(24), 11666.

Arif, M., Jan, T., Riaz, M., Fahad, S., Adnan, M., Amanullah, ... & Rasul, F. (2020). Biochar; a remedy for climate change. *Environment, climate, plant and vegetation growth*, 151-171.

Bao, Z., Dai, W., Su, X., Liu, Z., An, Z., Sun, Q., ... & Meng, J. (2024). Long-term biochar application promoted soil aggregate-associated potassium availability and maize potassium uptake. GCB Bioenergy, 16(4), e13134.

Bates, L. S., Waldren, R. P. A., & Teare, I. D. (1973). Rapid determination of free proline for water-stress studies. *Plant and soil*, *39*, 205-207.

Bhattacharya, A. (2022). Low temperature stress and plant-water relationship: A review. Physiological processes in plants under low temperature stress, 107-197.

Hassan, M. U., Chattha, M. U., Khan, I., Chattha, M. B., Barbanti, L., Aamer, M., ... & Aslam, M. T. (2021). Heat stress in cultivated plants: Nature, impact, mechanisms, and mitigation strategies—A review. Plant Biosystems-An International Journal Dealing with all Aspects of Plant Biology, 155(2), 211-234.

Jones, H. G. (2004). Application of thermal imaging and infrared sensing in plant physiology and ecophysiology. In *Advances in botanical research* (Vol. 41, pp. 107-163). Academic Press.

Khaeim, H., Kende, Z., Jolánkai, M., Kovács, G. P., Gyuricza, C., & Tarnawa, Á. (2022). Impact of temperature and water on seed germination and seedling growth of maize (Zea mays L.). Agronomy, 12(2), 397.

Khan, S., Irshad, S., Mehmood, K., Hasnain, Z., Nawaz, M., Rais, A., ... & Ibrar, D. (2024). Biochar production and characteristics, its impacts on soil health, crop production, and yield enhancement: A review. Plants, 13(2), 166.
Lesk, C., Anderson, W., Rigden, A., Coast, O., Jägermeyr, J., McDermid, S., ... & Konar, M. (2022). Compound heat and moisture extreme impacts on global crop yields under climate change. Nature Reviews Earth & Environment, 3(12), 872-889.
Luan, X., & Vico, G. (2021). Canopy temperature and heat stress are increased by compound high air temperature and water stress and reduced by irrigation–a modeling analysis. Hydrology and Earth System Sciences, 25(3), 1411-1423.
Manasa S, L., Panigrahy, M., Panigrahi, K. C., & Rout, G. R. (2022). Overview of cold stress regulation in plants. *The Botanical Review*, *88*(3), 359-387.
Meng, A., Wen, D., & Zhang, C. (2022). Maize seed germination under low-temperature stress impacts seedling growth under normal temperature by modulating photosynthesis and antioxidant metabolism. *Frontiers in plant science*, *13*, 843033.
Mira, M. M., Ibrahim, S., Hill, R. D., & Stasolla, C. (2021). Cold stress in maize (Zea mays) is alleviated by the over-expression of Phytoglobin 1 (ZmPgb1. 1). *Plant Physiology and Biochemistry*, *167*, 901-910.
Narzari, R., Bordoloi, N., Chutia, R. S., Borkotoki, B., Gogoi, N., Bora, A., & Kataki, R. (2015). Biochar: an overview on its production, properties and potential benefits. *Biology, biotechnology and sustainable development*, *1*(1), 13-40.
Sachdev, S., Ansari, S. A., Ansari, M. I., Fujita, M., & Hasanuzzaman, M. (2021). Abiotic stress and reactive oxygen species: Generation, signaling, and defense mechanisms. Antioxidants, 10(2), 277.
Sagar, L., Praharaj, S., Singh, S., Attri, M., Pramanick, B., Maitra, S., ... & Sahoo, U. (2022). Drought and heat stress tolerance in field crops: consequences and adaptation strategies. In Response of field crops to abiotic stress (pp. 91-102). CRC Press.
Salika, R., & Riffat, J. (2021). Abiotic stress responses in maize: a review. *Acta Physiologiae Plantarum*, *43*(9), 130.
Sattar, A., Sher, A., Ijaz, M., Ul-Allah, S., Butt, M., Irfan, M., ... & Cheema, M. A. (2020). Interactive effect of biochar and silicon on improving morpho-physiological and biochemical attributes of maize by reducing drought hazards. *Journal of Soil Science and Plant Nutrition*, *20*, 1819-1826.
Sun, X., Zhu, Z., Zhang, L., Fang, L., Zhang, J., Wang, Q., ... & Xin, H. (2019). Overexpression of ethylene response factors VaERF080 and VaERF087 from Vitis amurensis enhances cold tolerance in Arabidopsis. *Scientia horticulturae*, *243*, 320-326.
Tanure, M. M. C., da Costa, L. M., Huiz, H. A., Fernandes, R. B. A., Cecon, P. R., Junior, J. D. P., & da Luz, J. M. R. (2019). Soil water retention, physiological characteristics, and growth of maize plants in response to biochar application to soil. *Soil and Tillage Research*, *192*, 164-173.
Teuling, A. J. (2018). A hot future for European droughts. Nature Climate Change, 8(5), 364-365.
Tiwari, Y. K., & Yadav, S. K. (2019). High temperature stress tolerance in maize (Zea mays L.): Physiological and molecular mechanisms. *Journal of Plant Biology*, *62*, 93-102.
Turk, H., Erdal, S., & Dumlupinar, R. (2020). Carnitine-induced physio-biochemical and molecular alterations in maize seedlings in response to cold stress. Archives of Agronomy and Soil Science, 66(7), 925-941.
Wang, X., Yan, Y., Xu, C., Wang, X., Luo, N., Wei, D., ... & Wang, P. (2021). Mitigating heat impacts in maize (Zea mays L.) during the reproductive stage through biochar soil amendment. Agriculture, Ecosystems & Environment, 311, 107321.
Waqas, M. A., Wang, X., Zafar, S. A., Noor, M. A., Hussain, H. A., Azher Nawaz, M., & Farooq, M. (2021). Thermal stresses in maize: effects and management strategies. Plants, 10(2), 293.

Wu, J., Nadeem, M., Galagedara, L., Thomas, R., & Cheema, M. (2022). Effects of chilling stress on morphological, physiological, and biochemical attributes of silage corn genotypes during seedling establishment. *Plants*, *11*(9), 1217.
Zeng, R., Zhang, X., Song, G., Lv, Q., Li, M., Fu, D., ... & Shi, Y. (2024). Genetic variation in the aquaporin TONOPLAST INTRINSIC PROTEIN 4; 3 modulates maize cold tolerance. Plant Biotechnology Journal.

WHEAT YIELD PREDICTION IN TURKEY'S CENTRAL ANATOLIA REGION USING SPECTRAL VEGETATION INDICES

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ABSTRACT
Wheat production in the Central Anatolia Region is a primary income source for local farmers. However, droughts exacerbated by climate change have negatively impacted yields, making early yield prediction essential for advising farmers and assisting policymakers in planning import-export strategies and economic risk assessments. This study aimed to predict wheat yields using daily PlanetScope satellite imagery with three-meter resolution, focusing on spectral vegetation indices (NDVI, SAVI, EVI). The METRIC algorithm was also applied to determine crop coefficients (Kc) using Landsat satellite data, which were then correlated with Planet NDVI data.The relationship between Planet NDVI and crop coefficients was then used to estimate crop coefficients (Kc-estimated) based on Planet satellite imagery. The study was conducted between 2021 and 2023, during which all available cloud-free daily Planet satellite images were analyzed. Each year, approximately 25-30 cloud-free images were used to calculate NDVI, SAVI, EVI, and Kc-estimated indices across over 100 pilot plots with varying yield levels. For yield prediction, the spectral vegetation indices obtained at specific intervals were converted to daily values using an iterative method, and cumulative and spatial values were calculated during pre-harvest phenological stages. These values were then compared with actual yield data across four distinct periods: from sowing to the beginning of the maturity stage, from sowing to the peak of the maturity stage, from sowing to the end of the maturity stage, and the entire maturity period. The results indicated that the highest yield prediction accuracy was achieved when using the spatial values of the estimated crop coefficient (Kc-estimated) from sowing to the end of the maturity period. For each year from 2021 to 2023, the validation determination coefficient R^2 ranged between 0.81 and 0.90, while the lowest root mean square error (RMSE) was found to be between 39 and 47 kg/da.Keywords: Cicim, Şanlıurfa, Cultural Heritage, Traditional Weaving

Keywords: Yield prediction, wheat, vegetation indices, planet scope, metric

INTRODUCTION
Crop yield forecasting is of significant importance, particularly for policymakers and stakeholders involved in decision-making. Crop yield calculations play a crucial role in support planning, shaping international agricultural policies, pricing in the food sector, impacts on the livestock industry, and maintaining the export-import balance (Bosso & Liu, 2019). The ability to predict crop yields in advance allows stakeholders and producers in the agriculture, livestock, and food sectors to take preventive measures and conduct product planning. Additionally, the adverse effects of climate change on agricultural production have altered phenological processes, leading to negative impacts on crop yields (Kaplan & Rozenstein, 2021). Yield forecasting studies, which directly affect production activities and policies in the food, agriculture, and livestock sectors, require the use of various methods, models, and remote sensing technologies. In early yield

forecasting studies, empirical models were developed using meteorological parameters. However, since the empirical relationships between crop yield and climatic variability differ from region to region, the models lacked generalizability and were limited in their applicability when relying solely on climatic parameters (Burke & Lobell, 2010). Recent technological advancements have enabled the monitoring and evaluation of the spatial distribution of crop yields, along with the creation of large digital databases through advanced remote sensing technologies (Kamilaris et al., 2017). For instance, earth observation satellites monitor land cover variability at short intervals. By using spectral indices derived from satellite imagery, strong correlations have been identified between crop variables and classification, including LAI (Leaf Area Index) and yield (Duchemin et al., 2006; Manivasagam & Rozenstein, 2020). Crop growth and yield forecasting models that utilize climate parameters typically assume homogeneous plots in studies. However, the majority of agricultural lands, particularly in countries like ours, are heterogeneous. High-resolution satellite imagery can capture this variability (Kaplan & Rozenstein, 2021). LAI is estimated through remote sensing methods in many crop growth and yield forecasting models and serves as an input in various models (e.g., DSSAT, AgroMetShell, WOFOST, and STICS) (Ines et al., 2013).

Remote sensing technology has become a key focus in both determining the vegetation periods of crops and conducting yield prediction studies throughout the growth period by utilizing spectral bands and vegetation indices (Cao, Z et al., 2019). In yield prediction studies based on remote sensing, research has commonly utilized the spectral band properties of Landsat and Sentinel satellite imagery. However, due to challenges like cloud cover and the ability to capture images from the same surface on average only once a week, the crop growth curve may not be fully monitored. Additionally, with a resolution of 30 meters for Landsat and 10 meters for Sentinel, it can be difficult to track crop growth in small plots. Planet satellite images, on the other hand, provide a resolution of 3 meters and can capture daily images of the same surface, making them highly suitable for studies related to crop growth, disease monitoring, and yield prediction (Breunig, F.M et al., 2020), (Rafif, R et al., 2021). Spectral vegetation indices are widely used in crop yield prediction and monitoring crop development. (Polinova, M et al., 2018). Additionally, crop coefficient values derived from actual evapotranspiration, which account for water stress conditions during crop development stages, have been observed to be directly related to yield (Khan et al., 2019).

In this study, a wheat yield prediction is conducted at the county level using Planet satellite imagery, commonly used spectral vegetation indices such as NDVI, SAVI, and EVI, as well as estimated crop coefficient methods.

MATERIAL AND METHODS

The study was conducted in the Gölbaşı district of Ankara province by establishing a relationship between the actual yield values of approximately 100 plots and remote sensing methods.

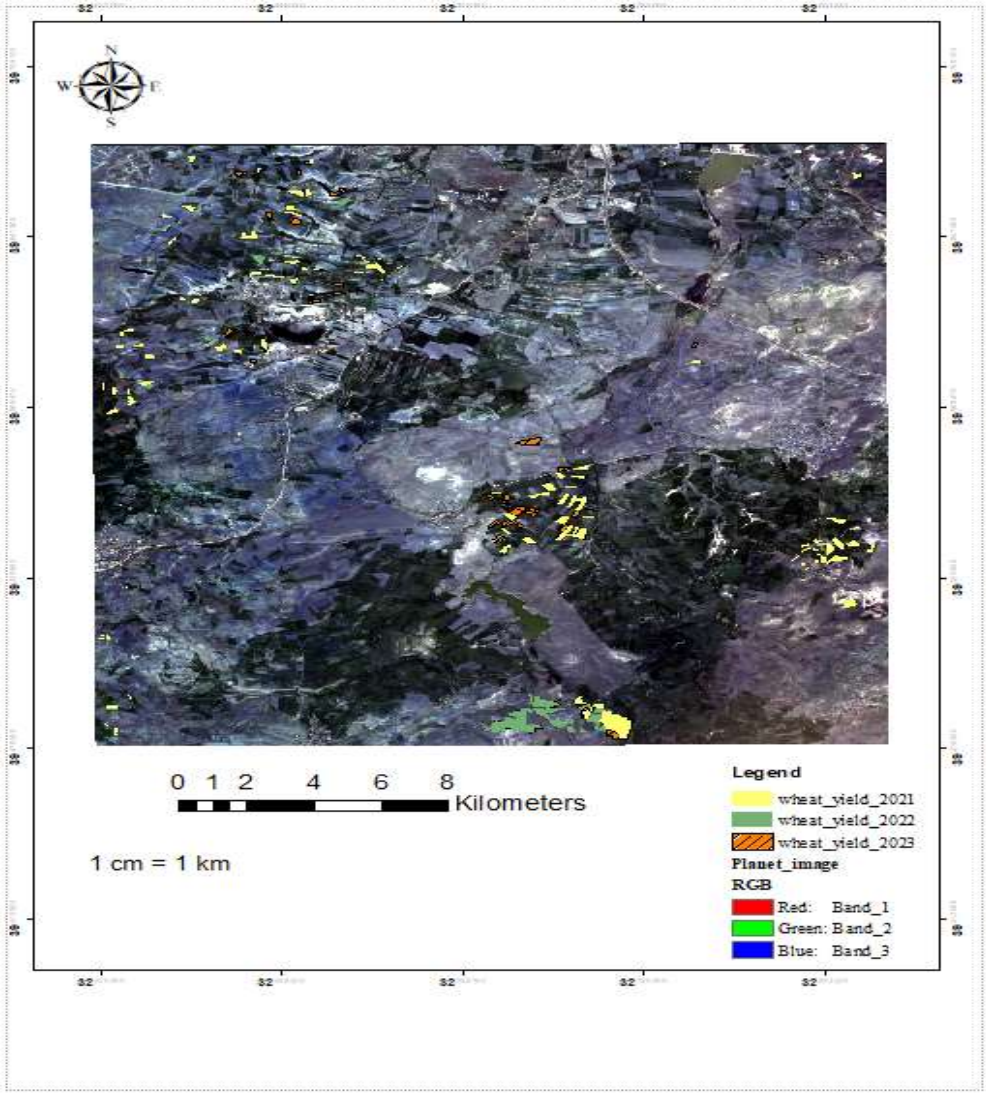


Figure 1. Wheat plots within the scope of the study

Actual wheat yields from the years 2021, 2022, and 2023 were used to investigate their relationship with vegetation indices and estimated crop coefficients. The wheat plots shown in Figure 1 are plots with the same climatic characteristics, encompassing all conditions such as irrigated, non-irrigated, fertilized, or non-fertilized. In the selected plots, the maximum yield between 2021 and 2023 was calculated as 820 kg/da, and the minimum yield as 80 kg/da.

PLANET SCOPE

PlanetScope satellite imagery provides 3-meter resolution and captures daily images of the same land surface, functioning as a research satellite. In this study, the Planet satellite images obtained as part of the research contain 4 bands, and the band specifications are provided in

Table 1.

Table 1. Planet Scope Band Properties

Planet Scope Band Name	Wavelength (nm)	Resolutions (m)
Band 1 - Blue	455-515	3
Band 2 - Green	500-590	3
Band 3 - Red	590-670	3
Band 4 - NIR	780-860	3

PlanetScope satellite images were obtained from http://www.planet.com as part of the research to be used in the yield prediction study for each year separately.
Throughout the wheat growing seasons from 2021 to 2023, Planet satellite images were analyzed for all cloud-free days within the study area, with each year being examined separately. In this study, where an average of 25 cloud-free images were obtained per year, a total of 80 different image processing operations were conducted.

SPECTRAL VEGETATION INDICES

After obtaining the actual yield values of the wheat crop for different years and the satellite images as material, the relationship between spectral vegetation indices and actual yield values was analyzed as a method. The spectral vegetation indices analyzed include NDVI, EVI, SAVI, and LAI, which are widely used in international literature.

Table 2. Planet Scope Band Properties

Index	Equations	**Reference**
NDVI	$\frac{nir - red}{nir + red}$	Rouse et al. (1974)
EVI	$EVI = G \times (nir - red)/((NIR + C1 \times RED - C2 \times BLUE +$	Gitelson et al. (1996)
SAVI	$\frac{nir - red}{nir + red + Lc}(1 + Lc)$	Huete (1988)
LAI	$\frac{\ln[\frac{0,69 - SAVI}{0,59}]}{0,91}$	Allen er al. (2007)

ESTIMATED CROP COEFFICIENT

The crop coefficient values, being the main component of plant water consumption, were estimated using the METRIC algorithm throughout the wheat plant's growth period to analyze the relationship between crop coefficient and wheat yield.

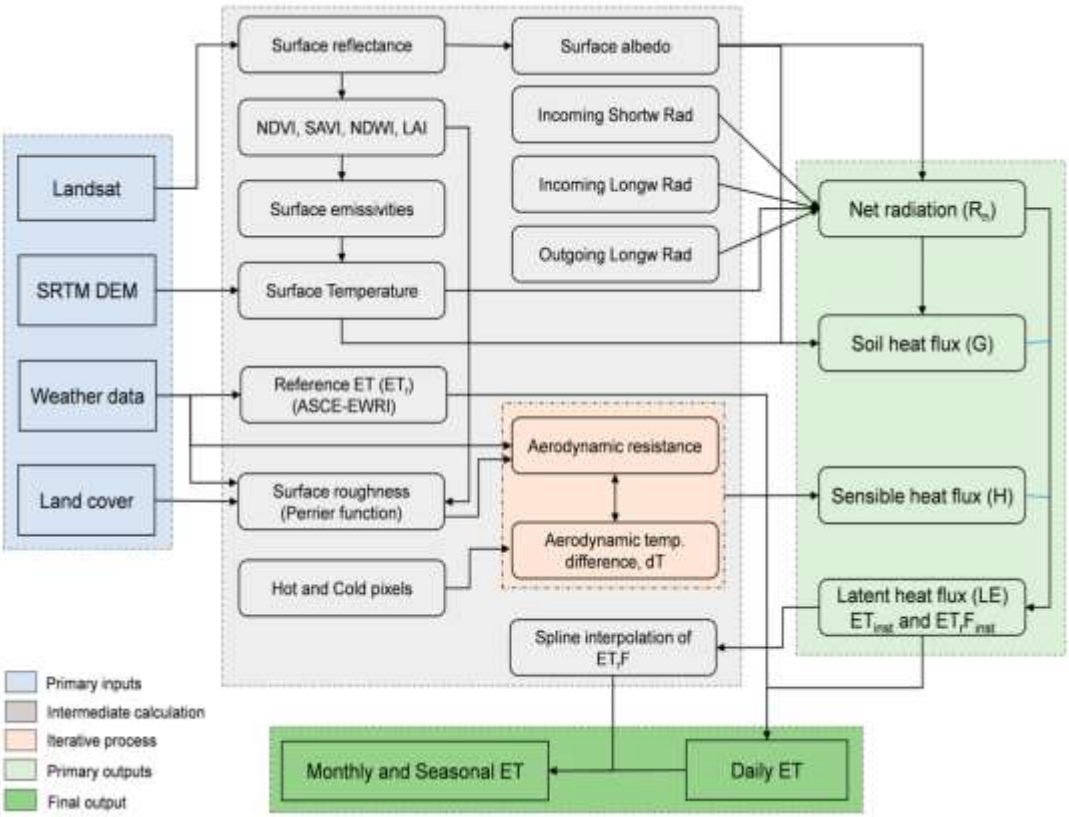


Figure 2. METRIC Algorithm

Actual evapotranspiration and crop coefficient values calculated using the METRIC algorithm are analyzed based on Landsat satellite imagery. In this study, the METRIC algorithm was applied to two different plots larger than 100 decares, and estimated crop coefficients were generated from Planet satellite images based on the regression relationship between the determined crop coefficients and the NDVI index. These estimated coefficients were then correlated with yield according to the phenological stages.

RESULTS

In this study, a wheat yield prediction was conducted by obtaining spectral vegetation indices and estimated crop coefficient values through the processing of Planet Satellite images. In the Planet satellite images, cloud-free images covering the study area were analyzed. For cloudy days, the spectral vegetation index values and estimated crop coefficient values were predicted using the iteration method, and all values were prepared on a daily basis.

All wheat growing periods between 2021 and 2023 were divided into yield prediction phases from a phenological perspective. The first phase, Sowing Time – Beginning of Maturation (PHASE I), the second phase, Sowing Time – Peak Maturation Period (PHASE II), the third phase, Sowing Time – End of Maturation Period (PHASE III), and the Maturation Period (PHASE IV) were defined. The total and area-based spectral index and estimated crop coefficient values in each phase were compared with the actual yield values in the plots, and the phase and method with the highest correlation were analyzed.

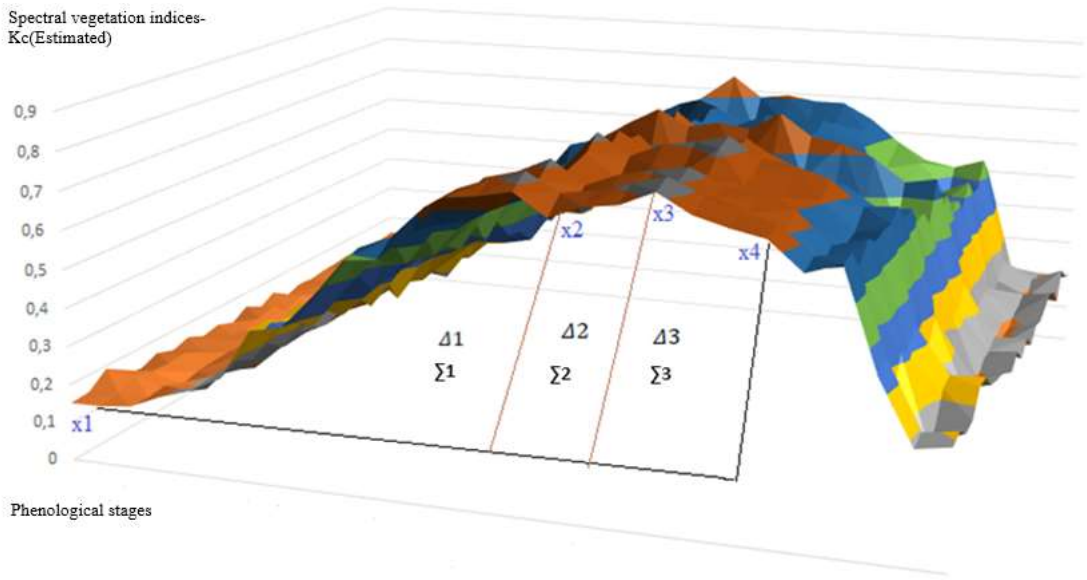
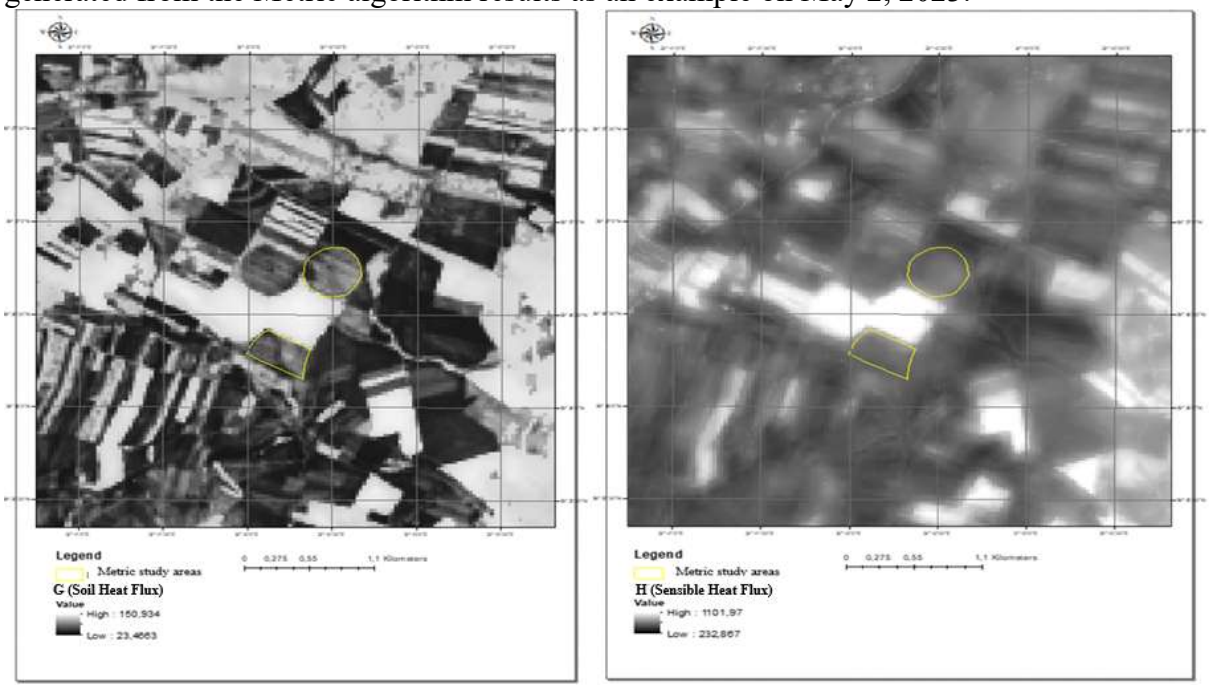


Figure 3. Spatial development curve graph of the wheat crop

Initially, actual crop coefficients were determined for two different pilot watersheds based on the Metric algorithm, and a relationship equation was established with Planet-NDVI values to derive daily estimated crop coefficients. Figure 4 displays the flux and evapotranspiration raster maps generated from the Metric algorithm results as an example on May 2, 2023.



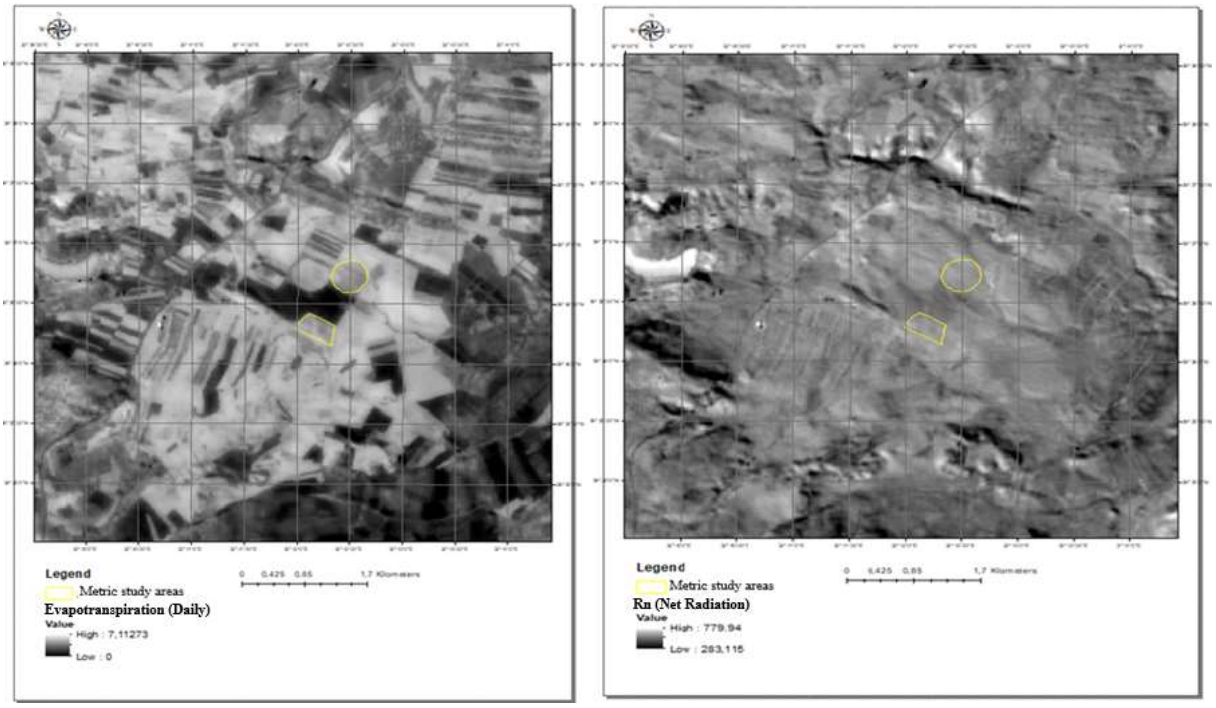


Figure 4. Metric algorithm results on May 2, 2023, raster outputs

Between 2021 and 2023, after obtaining cloud-free Landsat 8 and Landsat 9 satellite images, two parcels larger than 100 decares were identified within the study area, and a relationship was established between the crop coefficient values determined by the METRIC algorithm and the Planet NDVI values in these parcels. The generated correlation curve was obtained from the METRIC algorithm results processed according to 22 different cloud-free Landsat satellite images.

The regression curve of the actual crop coefficient values generated according to the Planet NDVI and metric algorithm is presented in Figure 5.

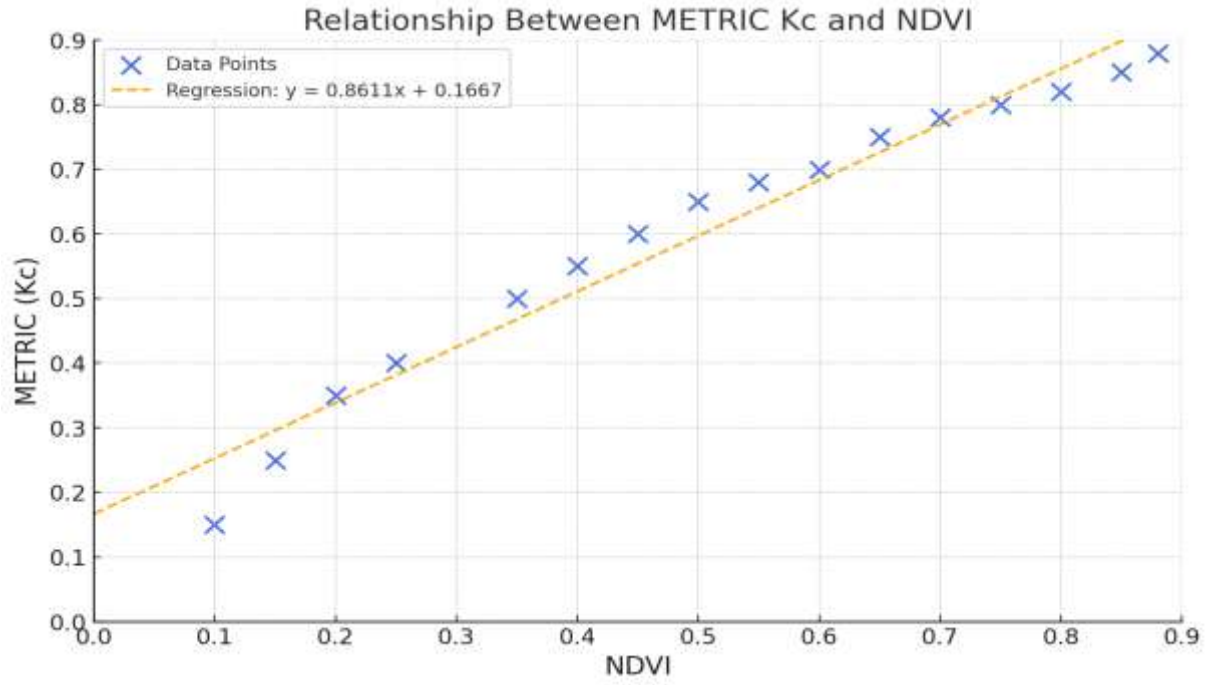


Figure 5. Relationship Between METRIC Kc and NDVI

The vegetation indices and estimated crop coefficient values in the current 3-year production data were analyzed separately for each estimation model, with a study design of 2 years for calibration and 1 year for validation.Firstly, the correlation coefficients for the years 2021-2023 have been calculated separately (Figure 6).

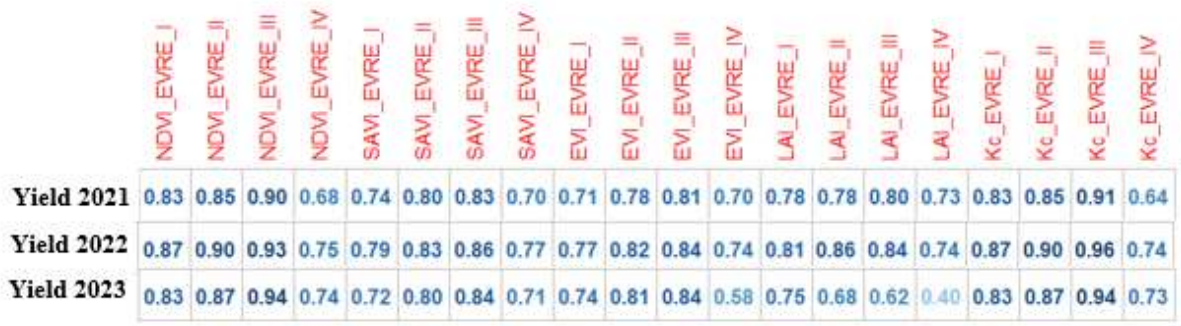


Figure 6. The correlation coefficient results between the spatial vegetation indices and estimated crop coefficient values according to phenological stages and actual yield

it is understood that the highest correlation coefficient is in the 3rd stage of the estimated crop coefficient. In addition,, it is observed that the 3rd stage of the NDVI index also shows a high correlation with yield. In addition to the correlation relationship, it is also necessary to determine the error rate. In this regard, the root mean square error (RMSE) for all stages of the vegetation indices and estimated crop coefficient, expressed in kg/ha, is presented in Table 3.

Table 3. Root Mean Square Error (RMSE) values of vegetation indices and estimated crop coefficient curves are provided in kg/da units spatially for different stages

2023_Spatial Analysis	STAGE_I	STAGE_II	STAGE_III	STAGE_IV
NDVI	108,86	75,94	51,56	202,71
SAVI	109,50	87,42	86,64	192,37
LAI	161,69	219,92	165,92	232,02
EVI	114,89	85,05	74,35	153,58
Kc(E)	117,71	77,24	47,38	175,78
2022_Spatial Analysis	**STAGE_I**	**STAGE_II**	**STAGE_III**	**STAGE_IV**
NDVI	148,22	117,73	59,99	68,72
SAVI	172,14	143,32	79,07	70,27
LAI	141,96	194,18	142,78	166,6
EVI	144,94	114,39	64,53	63,02
Kc(E)	157,16	107,67	39,27	53,14
2021_Spatial Analysis	**STAGE_I**	**STAGE_II**	**STAGE_III**	**STAGE_IV**
NDVI	111,73	102,58	45,66	67,86
SAVI	137,16	121,4	58,61	56,8
LAI	141,47	169,76	123,97	128,26
EVI	113,01	99,05	51,11	65,49
Kc(E)	114,93	87,53	39,23	110,13

Root Mean Square Error (RMSE) was calculated for each year and each stage. As shown in the table, Stage III presents the lowest error rate, as determined by the estimated crop coefficient, with values ranging between 39 and 47 kg/da.

As a result of statistical analyses, a very high correlation was found between the spatial values of the estimated crop coefficient in its 3rd stage and yield. Consequently, the yield prediction regression curve for each year, separately formed between the spatial 3rd stage of the estimated crop coefficient and actual yield values.
The regression equation and determination coefficients for the relationship between the estimated plant coefficient of the area for stage III period and the actual yield in Table 3 are provided separately for each prediction year.

Table 4. Spatial Validation Determination Coefficient and RMSE

Prediction Year	Prediction stage	Spatial Validation Determination Coefficient and RMSE
2021	STAGEIII(Estimated Kc)	R^2=0.81 RMSE = 39.23 kg/da
2022	STAGEIII(Estimated Kc)	R^2=0.9025 RMSE = 39.27 kg/da
2023	STAGEIII(Estimated Kc)	R^2=0.884 RMSE = 47.38 kg/da

DISCUSSION

In this study, using Planet satellite images, daily values of spectral vegetation indices and estimated crop coefficients for wheat throughout the growing season were obtained, and their relationship with yield according to phenological stages was investigated. The use of satellite imagery is a highly effective method in crop yield prediction studies. However, clean images without any obstructions must be available throughout all phenological stages of the crops. In order to use the developed yield prediction model in other fields, the methods calculated from satellite images throughout the crop development stages need to be converted to daily values.It is very important to know the phenological cycle of the crop to be predicted according to its variety and growing conditions Since satellites like Sentinel or Landsat, which are obtained for free, pass over the same surface approximately every 10 days, This can create problems with capturing images throughout the entire phenological cycle of the crop. Therefore, radar images can be obtained for free, such as Sentinel-1, or Planet satellites provide daily imaging services for a certain fee, can be utilized. Alongside yield prediction methods developed using satellite imagery, the depth of new research can also be enhanced through machine learning or deep learning techniques

REFERENCES

A. Kamilaris, A. Kartakoullis, F.X. Prenafeta-Boldú A review on the practice of big data analysis in agriculture Comput. Electron. Agric., 143 (Dec. 2017), pp. 23-37, 10.1016/J.COMPAG.2017.09.037

Basso, B.; Liu, L. Seasonal crop yield forecast: Methods, applications, and accuracies. In Advances in Agronomy; 2019; Volume 154, pp. 201–255.

Breunig, F. M., Galvão, L. S., Dalagnol, R., Dauve, C. E., Parraga, A., Santi, A. L., & Chen, S. (2020). Delineation of management zones in agricultural fields using cover–crop biomass estimates from PlanetScope data. International Journal of Applied Earth Observation and Geoinformation, 85, 102004.

Cao, Z., Yao, X., Liu, H., Liu, B., Cheng, T., Tian, Y., ... & Zhu, Y. (2019). Comparison of the abilities of vegetation indices and photosynthetic parameters to detect heat stress in wheat. Agricultural and Forest Meteorology, 265, 121-136.

Coelho, Anderson Prates, David Luciano Rosalen, and Rogério Teixeira de Faria. "Vegetation indices in the prediction of biomass and grain yield of white oat under irrigation levels." Pesquisa Agropecuária Tropical 48 (2018): 109-117.
Duchemin, B.; Hadria, R.; Erraki, S.; Boulet, G.; Maisongrande, P.; Chehbouni, A.; Escadafal, R.; Ezzahar, J.; Hoedjes, J.C.B.; Kharrou, M.H.; et al. Monitoring wheat phenology and irrigation in Central Morocco: On the use of relationships between evapotranspiration, crops coefficients, leaf area index and remotely-sensed vegetation indices. Agric. Water Manag. 2006, 79, 1–27
Ines, A.V.M.; Das, N.N.; Hansen, J.W.; Njoku, E.G. Assimilation of remotely sensed soil moisture and vegetation with a crop simulation model for maize yield prediction. Remote Sens. Environ. 2013, 138, 149–164.
Kaplan, G.; Rozenstein, O. Spaceborne Estimation of Leaf Area Index in Cotton, Tomato, and Wheat Using Sentinel-2. Land 2021, 10, 505.
Khan, A., Stöckle, C. O., Nelson, R. L., Peters, T., Adam, J. C., Lamb, B., ... & Waldo, S. (2019). Estimating biomass and yield using metric evapotranspiration and simple growth algorithms. Agronomy Journal, 111(2), 536-544.
Lobell, D.B.; Burke, M.B. On the use of statistical models to predict crop yield responses to climate change. Agric. For. Meteorol. 2010, 150, 1443–1452.
Manivasagam, V. S., Sadeh, Y., Kaplan, G., Bonfil, D. J., & Rozenstein, O. (2020). Studying the Feasibility of Assimilating Sentinel-2 and PlanetScope Imagery into the SAFY Crop Model to Predict Within-Field Wheat Yield. Remote Sensing, 13(12), 2395.
Polinova, M., Jarmer, T., & Brook, A. (2018). Spectral data source effect on crop state estimation by vegetation indices. Environmental Earth Sciences, 77, 1-12.
Rafif, R., Kusuma, S. S., Saringatin, S., Nanda, G. I., Wicaksono, P., & Arjasakusuma, S. (2021). Crop intensity mapping using dynamic time warping and machine learning from multi-temporal PlanetScope data. Land, 10(12), 1384.

THE MECHANICAL PROPERTIES OF FIBER REINFORCED MORTARS CONTAINING AIR ENTRAINING ADMIXTURES

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ABSTRACT
This study investigates the effects of steel, carbon, basalt, and polypropylene fibers on the workability and mechanical properties of mortar mixtures containing an air-entraining admixture. Five mortar mixtures were prepared using CEM I 42.5R cement, standard sand, water-reducing admixture, and air-entraining chemical admixture, along with four different fibers (steel, basalt, carbon, and polypropylene). All mixtures contained 0.1% by weight of cement as an air-entraining admixture. The control mixture was prepared without fibers, while the other mixtures were added 0.5% by volume of fibers. The water/cement ratio, sand/binder ratio, and spreading values of all mortar mixtures were kept constant at 0.485, 2.75, and 190±20 mm, respectively. As part of the fresh properties, the amount of water-reducing chemical admixture required to achieve the target spreading value was determined. Compressive strength, flexural strength, and water absorption tests were carried out on the mortar mixtures at 28 days. The results showed that the workability of mixtures containing basalt, carbon, and polypropylene fibers was negatively affected, leading to an increased need for water-reducing admixture to reach the target spread. The mixtures with basalt and carbon fibers exhibited the lowest water absorption rates, while the control, steel, and polypropylene fiber mixtures showed similar, but higher, water absorption rates compared to the others. Mixtures containing basalt and carbon fiber had the highest compressive and flexural strengths. The control mixture had the lowest strength, while mixtures containing steel and polypropylene fibers exhibited slightly higher strength performance than the control mixture.

Keywords: Fiber, basalt fiber, steel fiber, carbon fiber, polypropylene fiber, air-entraining admixture, water absorption, mechanical properties

INTRODUCTION
Concrete is one of the most widely utilized building materials today, primarily due to its affordability, strength, and versatility in achieving the desired shapes and characteristics. The hydration reactions between cement and water confer concrete its strength; however, concrete inherently possesses low tensile strength and a limited capacity for deformation. These properties lead to a fragile structure, even though it is resistant to external influences.
To enhance the durability of concrete and reduce the likelihood of cracking, fiber-reinforced concrete has gained significant popularity. Fibers are incorporated into concrete to control crack formation and improve overall structural properties. By increasing the tensile strength, various types of fibers can inhibit crack propagation (Afroughsabet & Ozbakkaloglu, 2015; Boulekbache

et al., 2016; Chandramouli et al., 2010). The primary purpose of incorporating fibers is to enhance mechanical characteristics, including tensile strength, ductility, and crack resistance.

Fibers can be classified into two main categories: synthetic and natural, both of which contribute to the improvement of the mechanical and physical properties of concrete. Various types of fibers, such as steel, basalt, carbon, and polypropylene, can enhance concrete's performance. The primary function of these fibers is to provide ductility and toughness by bridging the cracks that develop in the concrete matrix.

The use of steel fibers in concrete and mortar mixtures stands out as a method that significantly increases structural performance. Research shows that steel fibers improve properties such as density, flexural strength, compressive strength, and toughness, especially in high-strength mortars. Steel fibers used in optimum amounts reduce the number of microcracks by preventing crack expansion and also increase wear resistance. In addition, steel fibers can double the load-carrying capacity with the correct orientation. However, steel fibers used in high volumes can negatively affect the workability of fresh concrete and limit fluidity. For this reason, the volume fraction of steel fibers is generally kept between 0.8 and 2.5%. Proper distribution of fibers in concrete mixes is critical because this distribution cannot be changed after mixing. Proper distribution ensures that the fibers do not rotate or clump in certain areas during placement of the concrete. Problems such as clumping or alignment in one direction are particularly common in concrete mixes reinforced with steel fibers (Bing, 2006; Gueciouer et al., 2022; Hannant & Spring, 1974; Kwon & Lee, 2009; Ramli & Dawood, 2011; Wang et al., 2021).

Research shows that basalt fiber reinforcement significantly improves the mechanical and durability properties of cement mortars. While the large surface area of basalt fibers can slightly reduce workability by increasing water absorption, these fibers enhance the cohesion of the composites (Hanafi et al., 2020). Basalt fibers, derived from natural resources, offer important structural properties such as high tensile strength, high temperature resistance, and chemical durability(Gao et al., 2021). In the 21st century, basalt fibers have emerged as an eco-friendly material, providing not only a high elastic modulus and fracture elongation but also excellent insulation, durability, and fire resistance(Yang, Xie, Zhang, et al., 2021). When used in appropriate amounts, basalt fibers can delay early cracking in concrete, leading to the transformation of long surface cracks into smaller micro-cracks. With these properties, basalt fibers present a sustainable and environmentally friendly alternative to traditional reinforcement materials in construction applications (Yang, Xie, Fang, et al., 2021; Yang, Xie, Zhang, et al., 2021).

Carbon fibers are gaining increasing popularity in cement-based materials due to their high strength, high elastic modulus, low weight, and excellent wear resistance (Chung, 1999). However, it is important to note that as fiber content increases, porosity and water absorption also rise; thus, the fiber ratio should be maintained at an optimal level. Carbon fibers present an attractive option for cement composites because of their superior chemical stability at ambient temperatures. These fibers are inert, medically safe, as strong as steel fibers, and chemically stable in alkaline environments. Additionally, carbon fibers are lightweight and possess a higher strength-to-density ratio than other fibers. The incorporation of carbon fibers in mortar offers several advantages, including lower unit costs, reduced shrinkage, and improved rheological behavior, along with excellent mechanical properties (Safiuddin et al., 2018).

Room temperature polypropylene fibers are low-density, low-elastic-modulus solid materials (Mazzucco et al., 2015). Compared to other synthetic fibers, they are less expensive, have a lower weight, have a lower thermal conductivity, and are more resistant to acid and alkali attacks. The cement paste does not wet the hydrophobic surfaces of the polypropylene fibers used in cement-based concretes. These fibers act as bridges to hold different particles in close proximity, thereby improving mechanical properties such as compressive and tensile strength under shear (Raif Boğa et al., 2022). The addition of polypropylene fibers to concrete can improve its post-cracking ductility because of its crack-bridging properties. These fibers have the potential to melt at

temperatures above 170 °C, releasing internal pressure and preventing spalling on concrete surfaces (Yin et al., 2015).

Furthermore, both polypropylene and steel fibers enhance concrete's resistance to high temperatures (Bošnjak et al., 2019). Studies suggest that steel fibers outperform polyester or polypropylene in crack bridging due to their superior stiffness (Sivakumar & Santhanam, 2007).

While some properties of concrete are improved by the use of fibers, some fresh and hardened properties are adversely affected. At this point, superplasticizers, together with chemical and mineral additives such as air-entraining agents, play an important role in achieving the desired performance properties of concrete.

This study aims to investigate the effects of steel, carbon, basalt, and polypropylene fibers on the workability and mechanical properties of mortar mixtures containing an air-entraining admixture, ultimately contributing to the development of more durable and efficient construction materials.

MATERIAL AND METHODS

Materials

For preparing the mortar mixtures, portland cement, fine aggregate (sand), steel fiber, basalt fiber, carbon fiber, polypropylene fiber, air-entraining admixture, and superplasticizer were used.

Cement

Portland Cement (CEM I 42.5R), complying with TS EN 197-1 standard(2002), with a specific gravity of 3.15 g/cm³ and a specific surface area of 3530 cm²/g, was used in the study. The physical, chemical and mechanical properties of cement are provided in Table 1.

Table 1. Physical, chemical and mechanical properties of cement

Oxide (%)	Cement	Physical Properties		
SiO_2	18.86	Specific Gravity		3.15
Al_2O_3	5.71	**Fineness**		
Fe_2O_3	3.09	Specific surface (Blaine, cm²/g)		3530
CaO	62.70	Residue on 0.045 mm sieve (%)		7.6
MgO	1.16	**Mechanical Properties**		
SO_3	2.39	Compressive Strength (MPa)	1-day	14.7
Na_2O+0,658 K_2O	0.92		2-days	26.80
Cl’	0.01		7-days	49.80
Insoluble residue	0.32		28 days	58.5
Loss on ignition	3.20			
Free CaO	1.26			

Fine Aggregate

According to TS EN 196-1, CEN(2009) standard sand was used for the preparation of mortar specimens. Standard sand is characterized by its uniform particle size distribution, which is essential for ensuring consistent properties in mortar mixtures. In Figure 1, fine aggregate granulometry curve is provided.

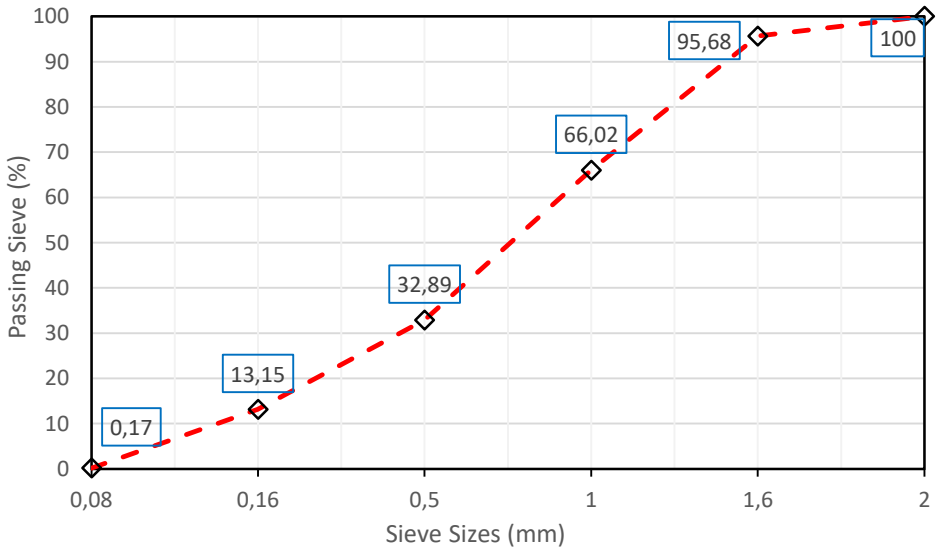


Figure 1. Fine aggregate granulometry curve

Fibers

In this study, various types of fibers were incorporated into the mortar, specifically steel fibers measuring 6 mm in length, basalt fibers measuring 8 mm, carbon fibers measuring 6 mm, and polypropylene fibers measuring 12 mm. The properties of the fibers used in the mortar are provided below at Table 2.

Table 2. Properties of fibers

Fiber	Steel	Basalt	Carbon	Polypropylene
Length	6 mm	8 mm	6 mm	12 mm

Air-Entraining Admixture

Air-entraining admixtures are surface-active agents that increase the resistance of concrete to freeze-thaw cycles by introducing small, stable air bubbles into the mix. The properties of the air-entraining admixture to be used in the mixtures are provided in Table 3.

Table 3. Properties of the air-entraining admixture

Product Information	Value
Appearance	Yellowish or colorless clear liquid
Chemical Composition	Liquid composed of special surfactants
Density	0,99-1,03 kg/l
pH value	3-7
Freezing Point	0 ºC
Alkali Content	Maximum 3%

Water Reducing Admixtures

Within the scope of the study, water reducing admixture was used in the mortar mixtures to achieve the target spreading values.

The physical and chemical properties of the water reducing admixture used in the study are presented in Table 4.

Table 4. Physical and chemical properties of water reducing admixture

Properties	Values
Recommended dosage range (%)	0.8-1.5*
Density (g/cm³)	1.073
Solid content (%)	28.76
Chloride content (% by weight)	0.0618
Alkali content (% by weight)	≤4
pH Value (10% solution)	4.89

*As a percentage of the cement weight

Production of Mortar Mixtures

In the production process, mortar mixtures were prepared by 0.1% air-entraining admixture, and 0.5% steel fiber, carbon fiber, basalt fiber, or polypropylene fiber. A total of 5 mortar mixtures were produced, and the flow-spread values of these mixtures were determined. Table 5 provides the codes and material ratios of the mortar mixtures.

Table 5. Materials used in the produced mortar mixtures

Code	Cement (g)	AEA (g)	WRA (g)	Fine aggregate (g)	Water (g)	Steel fiber (g)	Basalt fiber (g)	Carbon fiber (g)	PP fiber (g)
C	500	0,5	0,4	1375	242,5	-	-	-	-
C-ST	500	0,5	0	1375	242,5	35,36	-	-	-
C-BS	500	0,5	1,5	1375	242,5	-	12,02	-	-
C-CR	500	0,5	3,3	1375	242,5	-	-	8,21	-
C-PP	500	0,5	1	1375	242,5	-	-	-	4,11

*AEA: Air-Entraining admixture
*WRA: Water reducing admixture

The mortar mixtures were prepared according to the ASTM C109(2009). The water/binder ratio and sand/binder ratio of the prepared mortar mixtures were kept constant at 0.485 and 2.75, respectively.

The prepared mortar mixtures were placed into prismatic flexural molds (40x40x160 mm) in two layers and compacted. The molds were then placed on a shaking table to ensure proper settling. The molded samples were kept for 24 hours in an environment with a temperature of 20±2°C and at least 90% relative humidity, covered with a plastic plate. After 24 hours, the samples were demolded and stored in saturated limewater at 20±2°C until the test day, which was 28 days later.

Determination of Fresh State Properties

The flow of the produced mixtures was determined according to the ASTM C1437(2020). The target flow value was set at 190±20 mm. The water reducing admixture requirement to achieve the target flow value in the mortar mixtures was determined.



Figure 2. Flow table test

The mortar was transferred from the mixing container to the mold on the flow table, filling half of the mold. After applying 25 blows with a tamper, the remaining portion of the mold was filled, followed by another 25 blows (Figure 2). After leveling the top surface of the mold with a trowel, the mold was carefully lifted, and the fresh mortar was dropped 25 times at a rate of once per second. The flow diameter was measured in two different directions using a ruler, and the average of these two measurements was taken.

Water Absorption

The water absorption rates of the concrete samples were calculated according to TS EN 12390-7, (2002), using the following equation:

$$\text{Water Absorption by Weight} = \left(\frac{W_1 - W_2}{W_2}\right) \times 100$$

where:

- W_1: Saturated surface dry sample weight (g)
- W_2: Dry sample weight (g)

Flexural and Compressive Strength Test

The flexural strength of the mortar mixtures was determined according to the TS EN 196-1 standard. Fifteen minutes before the test, the 40×40×160 mm samples were removed from the curing pool, dried with a cloth, and placed in the flexural testing machine. The flexural test was conducted on at least three prismatic samples, with the load applied at the midpoint of each sample.

The two prism halves obtained from the flexural test were subjected to a compressive strength test, using a 40×40×40 mm metal breaking head to simulate a cube effect. The compressive strength of the mortar mixtures was determined on 40×40×40 mm prismatic samples according to the TS EN 196-1 standard. Flexural and compressive tests are shown in Figure 3.



Figure 3. Flexural and compressive strength test

RESULTS AND DISCUSSIONS

Fresh Properties

Figure 4 shows the amount of water-reducing admixture required to achieve the target spread, along with the corresponding spread diameter.

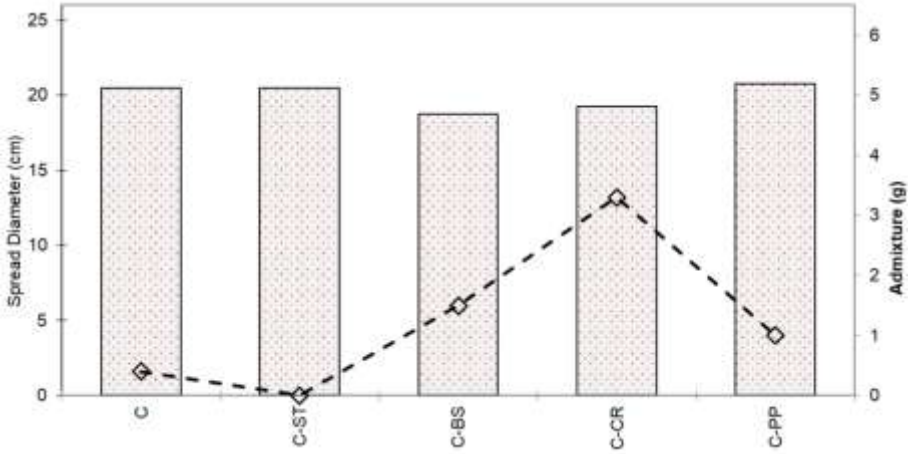


Figure 4. Admixture-spread diameter results

As seen from the results in Figure 4, the amount of water-reducing admixture required to achieve the target spreading increased with the addition of fiber (excluding steel fibers) to the mortar mixtures. The carbon fiber mixture utilized the highest amount of water-reducing admixture, which was 3.3 grams. In contrast, the control mixture required only 0.4 grams of admixture, while the steel fiber mixture met the targeted workability without needing any admixture.

Previous studies have reported that the addition of fibers to cementitious mixtures decreases workability (Köksal et al., 2012). Kızılılgın (2009) stated that as the volume of microfibers increased, the spread performance of the mortars decreased. In steel fiber-reinforced mortars, an increase in fiber content led to a reduction in spread values. A similar trend was noted in the carbon fiber series, although the performance loss was more pronounced in this case. Specifically, as the carbon fiber ratio increased, the decrease in the spread performance of the mortar became more evident (Kızılılgın, 2009). This decrease is attributed to the large surface area of the carbon fibers, which restricts the mobility of the fresh mortar and causes the fibers to interlock (Safiuddin et al., 2018).

Hardened Properties

Figure 5 displays the water absorption ratios for the different mortar mixtures. The polypropylene fiber mortar mixture exhibited the highest water absorption rate, recorded at 10.24%. Water absorption rates of C and C-ST mixtures were close to C-PP mixture.

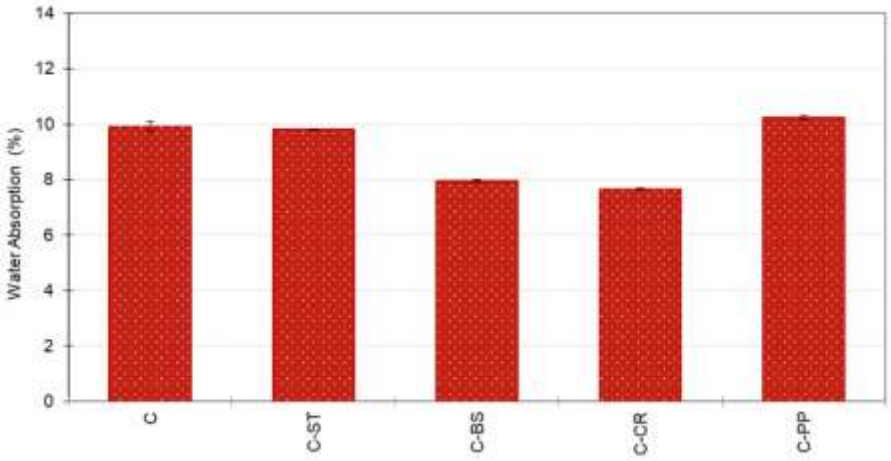


Figure 5. Water absorption percentage results

The lowest water absorption percentage was measured in the carbon fiber-reinforced mixture. The mixture containing polypropylene fibers showed a value quite close to the control and C-ST mixture. It was found that the water absorption values of the samples increased or decreased depending on the type of fiber. Compared to the control mixture, the water absorption value increased by 3.23% with the addition of polypropylene fibers, while it decreased with the addition of steel, basalt, and carbon fibers. The water absorption value was observed to decrease by 22.88% in the carbon fiber mixture compared to the control.

It is known that adding fibers to cementitious systems has a significant effect on the water absorption. Previous studies have shown that the water absorption rate increased when polypropylene fibers were added. However, this increase was greater when longer fibers were used compared to shorter fibers. It can be concluded that the increase in water absorption is related to the entrapment of air during the mixing process, resulting in the formation of voids in the concrete. The interlocking phenomenon of long fibers causes the emergence of voids that are suitable for water diffusion (Bayasi & Zeng, 1993; Richardson, 2006). An increase in the fiber ratio leads to a significant increase in water absorption levels for both fiber lengths (at a 0.95 confidence interval) (Bagherzadeh et al., 2012) .

The results illustrated in Figure 6 below present the compressive strength test outcomes, highlighting that the mortar incorporating basalt fibers achieved the highest compressive strength, reaching 31.06 MPa.

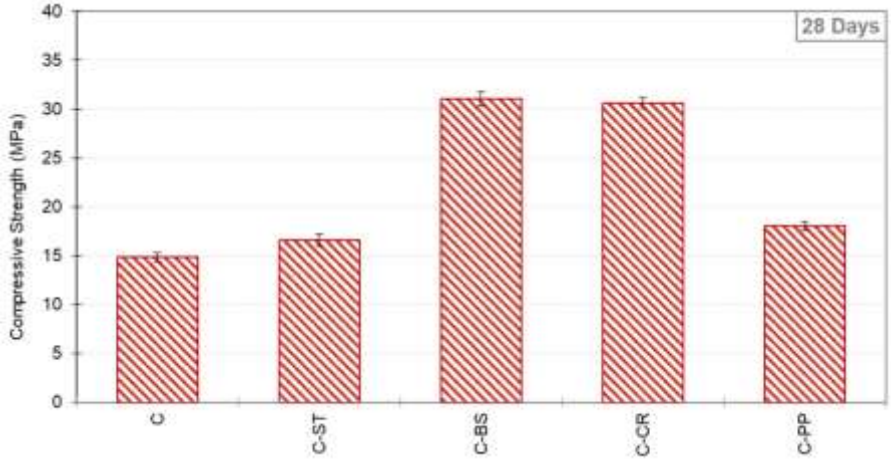


Figure 6. Compressive strength test results

The carbon fibre reinforced mixture followed closely behind, providing the second-best result at 30.57 MPa. Compared to the control mixture, all fibre types contributed positively to the compressive strength. The closest result to the control was measured at 16.59 MPa in the steel

fibre reinforced mixture. It is anticipated that factors such as fibre aggregation and alignment may have caused the strength reduction.

In a study conducted by El-Gelani et al. (2018), the inclusion of basalt fibers in the mixture led to an increase in compressive strength of up to 10% on both the 3rd and 7th days of curing. This improvement can be attributed to the ability of basalt fibers to facilitate early strength development within the concrete matrix. By increasing the bonding capacity and strengthening the internal structure, these fibers effectively prevent crack propagation. As a result, this mechanism contributes to higher compressive strength and allows greater energy absorption under load.

The results of the flexural strength test, as illustrated in the graph below (Figure 7), demonstrate that the basalt fiber mortar mixture achieved the highest flexural strength at 5.01 MPa.

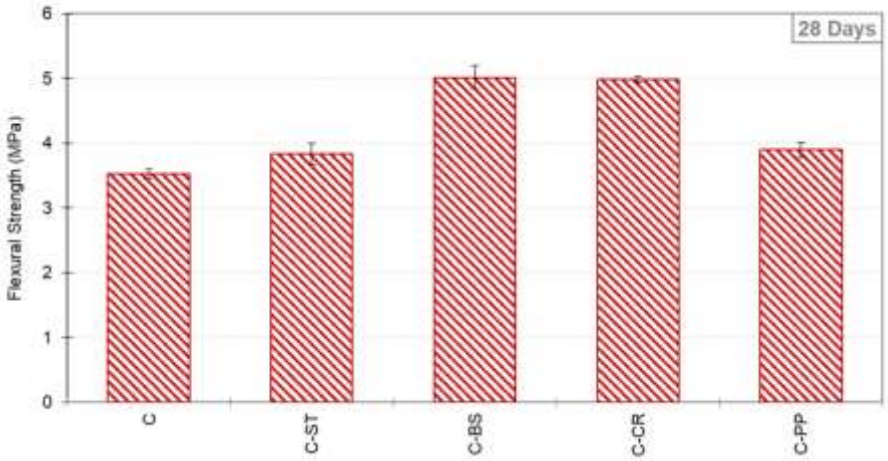


Figure 7. Flexural strength test results

The basalt fiber mortar mixture exhibited the highest flexural strength, measuring 5.01 MPa, closely followed by the carbon fiber mixture with a value of 4.98 MPa. These results were similar to those observed for compressive strength.

Based on these findings, it can be concluded that the addition of basalt and carbon fibers yields better mechanical properties than the addition of steel or polypropylene fibers to mortar mixture. Compared to the control mixture, the basalt fiber-reinforced mortar showed a remarkable increase of 56.09% in flexural strength. In contrast, the mixtures containing steel and polypropylene fibers did not demonstrate any significant increase in flexural strength.

Joshi et al (2014), reported that additions of basalt fibers resulted in significant improvements in both compressive and flexural strengths. Basalt fibers promote early strength development within the concrete matrix, enhancing its binding capacity and reinforcing the internal structure. Furthermore, the presence of basalt fibers impedes crack propagation, thereby facilitating higher compressive strength and allowing for greater energy absorption under load. The microstructural effects of the fibers contribute to an increased resistance to deformation and cracking, ultimately improving the overall durability of the concrete. Consequently, the incorporation of basalt fibers emerges as a significant strategy for enhancing the mechanical performance of concrete mixtures. This study underscores the potential of basalt fibers in achieving desired strength characteristics and improving the overall performance of concrete.

CONCLUSION

- The highest proportion of water reducing additives required to achieve the target spread was found in the carbon fiber mixture.
- The control, steel fiber, and polypropylene fiber mortar mixtures exhibit the highest water absorption rate, while the basalt and carbon fiber mixtures demonstrate the lowest water absorption rate.
- In terms of compressive strength and flexural strength, the mixtures containing basalt and carbon fiber showed the highest strength performance. The control mix has the lowest compressive and flexural strength.

REFERENCES

Afroughsabet, V., & Ozbakkaloglu, T. (2015). Mechanical and Durability Properties of High-Strength Concrete Containing Steel and Polypropylene Fibers. *Construction and Building Materials*, *94*, 73–82. https://doi.org/10.1016/J.CONBUILDMAT.2015.06.051

Bagherzadeh, R., Pakravan, H. R., Sadeghi, A. H., Latifi, M., & Merati, A. A. (2012). An investigation on adding polypropylene fibers to reinforce lightweight cement composites (LWC). *Journal of Engineered Fibers and Fabrics*, *7*(4), 13–21. https://doi.org/10.1177/155892501200700410

Bayasi, Z., & Zeng, J. (1993). PROPERTIES OF POLYPROPYLENE FIBER REINFORCED CONCRETE. *ACI Materials Journal*, *90*(6).

Bing, S. (2006). Properties and Applıcation of Steel-Fiber Reinforced Magnesia Phosphate Cement Mortar. *Architecture Technology*.

Bošnjak, J., Sharma, A., & Grauf, K. (2019). Mechanical Properties of Concrete with Steel and Polypropylene Fibres at Elevated Temperatures. *Fibers 2019, Vol. 7, Page 9*, *7*(2), 9. https://doi.org/10.3390/FIB7020009

Boulekbache, B., Hamrat, M., Chemrouk, M., & Amziane, S. (2016). Flexural Behaviour of Steel Fibre-Reinforced Concrete Under Cyclic Loading. *Construction and Building Materials*, *126*, 253–262. https://doi.org/10.1016/J.CONBUILDMAT.2016.09.035

C109/C109M Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens). (2009).

C1437 Standard Test Method for Flow of Hydraulic Cement Mortar (2020). https://www.astm.org/c1437-20.html

Chandramouli, K. & R., P Srinivasa Rao & Narayanan, & Pannirselvam & Tirumala. (2010). *Long Term Durability Studies on Glass Fibre Reinforced Concrete Using Rapid Chloride Permeability Test*.

Chung, D. D. L. (1999). Carbon Fiber Cement-Matrix Composites. *Carbon*, *1999*(190), 300–312. https://doi.org/10.7209/TANSO.1999.300

El-Gelani, A. M., High, C. M., Rizkalla, S. H., & Abdalla, E. A. (2018). Effects of Basalt Fibres on Mechanical Properties of Concrete. *MATEC Web of Conferences*, *149*, 01028. https://doi.org/10.1051/MATECCONF/201814901028

Gao, L., Adesina, A., & Das, S. (2021). Properties of eco-friendly basalt fibre reinforced concrete designed by Taguchi method. *Construction and Building Materials*, *302*, 124161. https://doi.org/10.1016/J.CONBUILDMAT.2021.124161

Gueciouer, D., Youcef, G., & Tarek, N. (2022). Rheological and mechanical optimization of a steel fiber reinforced self-compacting concrete using the design of experiments method. *European Journal of Environmental and Civil Engineering*, *26*(3), 1097–1117. https://doi.org/10.1080/19648189.2019.1697758

Hanafi, M., Aydin, E., & Ekinci, A. (2020). Engineering Properties of Basalt Fiber-Reinforced Bottom Ash Cement Paste Composites. *Materials 2020, Vol. 13, Page 1952*, *13*(8), 1952. https://doi.org/10.3390/MA13081952

Hannant, D. J., & Spring, N. (1974). Steel-fibre-reinforced mortar: a Technique for Producing Composites with Uniaxial Fibre Alignment. *Magazine of Concrete Research*, *26*(86), 47–48. https://doi.org/10.1680/MACR.1974.26.86.47

Joshi, A., Student, P. G., Patil, D., & Students, P. (2014). *The use of Basalt Fibers to Improve the Flexural Strength of Concrete Beam*.

Kızılılgın, B. (2009). *Çelik ve karbon lifli harçların sülfat etkilerine dayanıklılığının incelenmesi*. http://acikerisim.deu.edu.tr:8080/xmlui/handle/20.500.12397/8249

Köksal, F., Gencel, O., Unal, B., & Durgun, M. Y. (2012). Durability properties of concrete reinforced with steel-polypropylene hybrid fibers. *Science and Engineering of Composite Materials*, *19*(1), 19–27. https://doi.org/10.1515/SECM.2011.0064

Kwon, S., & Lee, H. K. (2009). A Computational Approach to Investigate Electromagnetic Shielding Effectiveness of Steel Fiber-Reinforced Mortar. *Cmc-Computers Materials & Continua*. https://doi.org/10.3970/CMC.2009.012.197

Mazzucco, G., Majorana, C. E., & Salomoni, V. A. (2015). Numerical simulation of polypropylene fibres in concrete materials under fire conditions. *Computers & Structures*, *154*, 17–28. https://doi.org/10.1016/J.COMPSTRUC.2015.03.012

Raif Boğa, A., Karakurt, C., & Ferdi Şenol, A. (2022). The effect of elevated temperature on the properties of SCC's produced with different types of fibers. *Construction and Building Materials*, *340*. https://doi.org/10.1016/J.CONBUILDMAT.2022.127803

Ramli, M., & Dawood, E. (2011). High-strength Flowable Mortar Reinforced by Steel Fiber. *Slovak Journal of Civil Engineering*, *19*(3), 10–16. https://doi.org/10.2478/V10189-011-0013-0

Richardson, A. E. (2006). Compressive strength of concrete with polypropylene fibre additions. *Structural Survey*, *24*(2), 138–153. https://doi.org/10.1108/02630800610666673

Safiuddin, M., Abdel-Sayed, G., & Hearn, N. (2018). Effects of Pitch-Based Short Carbon Fibers on the Workability, Unit Weight, and Air Content of Mortar Composite. *Fibers*, *6*(3). https://doi.org/10.3390/FIB6030063

Sivakumar, A., & Santhanam, M. (2007). Mechanical Properties of High Strength Concrete Reinforced with Metallic and non-metallic Fibres. *Cement and Concrete Composites*, *29*(8), 603–608. https://doi.org/10.1016/J.CEMCONCOMP.2007.03.006

TS EN 196-1 Methods of testing cement - Part 1: Determination of strength. (2009).

TS EN 197-1 Cement- Part 1: Compositions and conformity criteria for common cements. (2002).

TS EN 12390-7 Testing Hardened Concrete - Part 7: Density of Hardened Concrete (2002).

Wang, W., Shen, A., Lyu, Z., He, Z., & Nguyen, K. T. Q. (2021). Fresh and rheological characteristics of fiber reinforced concrete——A review. *Construction and Building Materials*, *296*, 1–39. https://doi.org/10.1016/J.CONBUILDMAT.2021.123734

Yang, L., Xie, H., Fang, S., Huang, C., Yang, A., & Chao, Y. J. (2021). Experimental study on mechanical properties and damage mechanism of basalt fiber reinforced concrete under uniaxial compression. *Structures*, *31*, 330–340. https://doi.org/10.1016/J.ISTRUC.2021.01.071

Yang, L., Xie, H., Zhang, D., Zhang, F., Lin, C., & Fang, S. (2021). Acoustic emission characteristics and crack resistance of basalt fiber reinforced concrete under tensile load. *Construction and Building Materials*, *312*. https://doi.org/10.1016/J.CONBUILDMAT.2021.125442

Yin, S., Tuladhar, R., Shanks, R. A., Collister, T., Combe, M., Jacob, M., Tian, M., & Sivakugan, N. (2015). Fiber Preparation and Mechanical Properties of Recycled Polypropylene for Reinforcing Concrete. *Journal of Applied Polymer Science*, *132*(16). https://doi.org/10.1002/APP.41866

COPING WITH STRESS

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ABSTRACT
Stress is an unavoidable aspect of modern life that significantly impacts both the physical and psychological well-being of individuals. In today's rapidly changing and increasingly complex living conditions, factors such as competitive pressures in the workplace, problems in social relationships, and financial challenges contribute to rising levels of stress among individuals. This situation can lead to a wide range of negative outcomes, from health issues to decreased job performance. In this context, examining coping methods for stress and identifying effective strategies is critical for enhancing individuals' quality of life. The aim of this study is to investigate individuals' coping strategies for stress and assess the effectiveness of these strategies. The effects of stress on individuals manifest across a broad spectrum. On the physical side, various symptoms may include headaches, gastrointestinal disturbances, sleep issues, and heart diseases, while psychological effects can present as anxiety, depression, irritability, and concentration difficulties. Furthermore, it is well-documented that stress diminishes job performance, weakens relationships, and negatively impacts overall quality of life. Coping strategies for stress are generally categorized into two main types: problem-focused and emotion-focused strategies. Problem-focused strategies involve active efforts to eliminate or reduce the source of stress, while emotion-focused strategies concentrate on managing the emotional effects of stress. Additionally, factors such as individuals' personal characteristics, social support networks, and lifestyles influence their coping abilities and strategy preferences.

Key Words: stress, coping strategies, effects of stress

INTRODUCTION
Stress is an inevitable part of daily life, a complex phenomenon that can negatively impact individuals' physical, emotional, and mental health. The fast pace of modern life, balancing work and personal life, financial issues, health problems, and social relationships are among various factors that increase individuals' stress levels. The widespread and significant nature of stress makes it important for individuals to develop stress management techniques and to study the effectiveness of these methods. The effects of stress on individuals span a wide range. On physical health, symptoms such as headaches, stomach problems, sleep disorders, and heart diseases can be observed; while psychologically, symptoms such as anxiety, depression, irritability, and concentration disorders may arise. Additionally, it is known that stress lowers job performance, weakens relationships, and negatively affects overall quality of life.
Stress management strategies are generally divided into two main categories: problem-focused and emotion-focused strategies. Problem-focused strategies involve active efforts to eliminate or reduce the source of stress, while emotion-focused strategies aim to manage the emotional effects of stress. Furthermore, factors such as individuals' personal characteristics, social support networks, and lifestyles also influence their stress management skills and strategy preferences.

The aim of this study is to examine individuals' stress management strategies and the effectiveness of these strategies.

CONCEPT OF STRESS

Definition and Characteristics of Stress

The concept of "stress" was first introduced by Canadian physician Hans Selye. Selye (1956) defined stress as "the body's response to any pressure exerted on it" (Kaba, 2019). The word "stress" originates from the Latin term "estrica" and the French word "estree," both of which mean strain, tension, and pressure (Koçhan, 2019). In the Turkish Language Association (TDK), it is defined as "mental tension." In the 17th century, it was also used to describe trouble, sorrow, grief, and distress, and was considered a state of discomfort and a threat to health in individuals' inner world (Timuroğlu and Yılmaz, 2019).

Stages of Stress

Stress is an emotional state that affects individuals' behavior, productivity, relationships, and communication. It does not arise spontaneously but is triggered by the effects of changes occurring in a person's environment or situation (Türk et al., 2008). Stress is classified into internal and external stress. External stress refers to pressures and expectations from family, work, friends, and social circles, while internal stress stems from an individual's own ambitions, materialism, competitive pressures, and personal expectations (Özkaya et al., 2008). Selye described the body's three-stage response to stress as "General Adaptation Syndrome." These stages are alarm, resistance, and exhaustion (Güçlü, 2001).

- **Alarm Stage**: When an individual encounters the source of stress, the sympathetic nervous system is activated, causing the body to react with a fight-or-flight response. As a result, the person will either confront the stressor or take action to avoid it.
- **Resistance Stage**: Following the alarm stage, the resistance and exhaustion stages occur. If the individual adapts to the stress source, the changes occurring in the body begin to return to normal during this stage.
- **Exhaustion Stage**: If the individual fails to adapt to the stress source, the changes in the body continue, and with the activation of the parasympathetic nervous system, the exhaustion stage begins. At this point, the person experiences a sense of exhaustion and becomes vulnerable to the effects of other stress sources.

Symptoms of Stress

There are three different models related to stress: stimulus-based, response-based, and interaction-based models. The first model focuses on the defense mechanism that individuals develop in response to stress imposed by society. The second model deals with evaluating the effects of stress on an individual. The third model addresses the process that results from stress caused by a person's environment. Stress symptoms are divided into three groups: physical symptoms, behavioral symptoms, and psychological symptoms (Aydın, 2019).

- **Physical Symptoms**: These include an increased heart rate, faster digestion, rapid breathing, elevated blood pressure, and frequent urination. If these conditions persist over a long period, they may lead to various diseases or even result in death.
- **Behavioral Symptoms**: These can vary among individuals and may include excessive sleep or insomnia, lack of appetite or overeating, difficulty speaking, alcohol or cigarette use, and aggressive behavior.
- **Psychological Symptoms**: These include a constant state of tension, conflicts with others, chronic worry, feelings of inadequacy, being in a state of panic and frustration, outbursts of anger, and irritability.

COPING with STRESS

Definition and Importance

Research on coping with stress dates back to late 19th-century psychoanalytic theories, particularly Freud's defense mechanisms. Lazarus and Folkman (1984) define coping with stress as an individual's continuously changing cognitive and behavioral efforts to manage situations that cause stress. This transactional approach views stress as an individual's effort to cope with demands that exceed their resources. Coping aims to alleviate stress through cognitive restructuring and individual learning. According to Bandura's social learning theory, coping is the result of the interaction between personality and the situation (Jones & Bright, 2001).

Coping strategies involve efforts to manage internal and external demands. Their effectiveness is determined by their impact on adaptation and aims to eliminate the stress source, change evaluations, or regulate emotions. Richard Pettinger (2002) emphasizes the importance of understanding the sources, symptoms, and outcomes of stress in order to comprehend and identify effective coping methods. Snyder and Pulvers (2001) state that coping has become a central concept in psychology, encompassing the activities individuals engage in to maintain their well-being. Coping with stress is shaped by the interaction between the individual and their environment, and various strategies are employed to reduce the effects of negative stress. These strategies may be functional or dysfunctional, but their primary goal is to help individuals adapt.

Types of Coping

Coping with stress can be categorized in several ways. One approach emphasizes that coping encompasses not only reactions to stressful experiences but also the importance of different coping mechanisms. Generally, coping strategies are divided into two categories: internal and external conditions. Internal conditions are related to an individual's personal coping methods, while external conditions include social support, which can be crucial in managing stress (Kraaij et al., 2002).

Coping strategies are usually grouped into two main types. The first type includes problem-focused strategies, which directly address the stressor through cognitive activities aimed at realistically solving the problem. This approach focuses on the issue and develops responses to potential solutions. The second type, emotion-focused coping, aims to regulate the emotions associated with the stressful situation rather than changing the situation itself. This method often seeks to alleviate or modify the emotional impact of stress through emotional regulation (Çankıroğlu, 2007).

Both problem-focused and emotion-focused coping strategies vary depending on the specific problems, individuals, and situations involved. These are the foundational elements of almost all scales developed to measure coping mechanisms. Problem-focused behaviors can involve assertive efforts to change the situation or more rational, calm, and deliberate actions. Emotion-focused behaviors, on the other hand, include strategies such as distancing from the stressor, self-control, seeking social support, avoiding the situation, taking responsibility, or positive thinking (Iwasaki & Schneider, 2003).

Some approaches combine both problem-focused and emotion-focused elements. The concept of coping can be examined through three different categories: coping contents, coping resources, and coping strategies. In general, types of coping include situational, specific, behavioral, and cognitive strategies.

COPING METHODS

The primary goal of implementing stress coping strategies is to reduce the negative effects of stress and increase life satisfaction. Stress exists in all areas of life. This study will focus on individual coping methods. Some individual strategies are necessary and important for managing stress. These methods share a common emphasis on controlling personal habits and physical, psychological, and behavioral aspects. By taking these countermeasures, harmful stress responses

in the body are neutralized (Güçlü, 2001). Individual coping methods will be examined under three main categories: physical methods, mental methods, and behavioral methods.

Physical Methods

Physical coping strategies target the central nervous system and sympathetic nervous system to manage the negative effects of stress on the body. These strategies include physical exercise, breathing exercises, relaxation techniques, biofeedback, nutrition habits, and ensuring adequate rest and sleep. Some clinical studies have shown that moderate stress can improve individual performance. However, excessive stress can negatively impact individual performance, physical health, and overall quality of life. There is a particularly strong relationship between stress and bodily functions (Leung et al., 2006).

Physical Exercise

Physical exercise techniques are crucial for improving a person's ability to cope with stress. They also serve as a psychosocial link to behaviors related to disease prevention, care, and overall well-being. The goal of exercise is to optimize oxygen distribution, improve metabolic processes, increase strength and endurance, reduce body fat, and enhance muscle and joint movements. Exercise typically consists of three basic steps: warm-up, exercise, and cool-down. The warm-up phase prepares the body for the tension required in exercise by warming up the muscles. The exercise phase is the actual workout. The cool-down phase involves continuing movements for a few minutes after exercise to maintain circulation and prevent blood pooling in the legs, which can sometimes cause fainting (Baltaş & Baltaş, 2002).

Proper exercise serves multiple purposes. It can improve skills, increase flexibility, muscle strength, and endurance, reduce tension, aid in weight loss and maintenance, and especially improve physiological conditions by facilitating the heart's ability to supply oxygen to body tissues. Physical activity naturally reduces the psychological and physiological levels of arousal in the body. Exercise has an immediate positive effect on stress by increasing energy expenditure and physical efficiency. Engaging in physical activity helps dissipate feelings of worry, anxiety, and irritability. Exercise is an excellent way to release accumulated tension, aggression, and frustration, thus relieving both mental and physical stress. The benefits of physical exercise include muscle relaxation, mental relaxation, increased work productivity, heightened alertness, more energy, emotional relaxation, better sleep, stronger bones, reduced anxiety, lower risk of heart disease, prevention and alleviation of back pain, increased self-confidence, and overall better health. Moreover, exercise boosts self-confidence, stimulates ambition, reduces excitement and stress, increases body awareness, contributes to a regular sexual life, improves mental efficiency through better oxygenation of the brain, enhances interpersonal relationships, promotes mutual respect, and fosters a sense of enjoyment (Garipoğlu, 2007).

As seen, physical exercise is a highly effective way to cope with stress. It is particularly useful in reducing the mental tension caused by stress. However, it is crucial to exercise correctly and at appropriate times; otherwise, it can increase tension instead of reducing it. Exercise triggers the release of certain hormones that make us feel happier, more peaceful, and stronger. Therefore, regular exercise positively affects our physical, psychological, mental, and behavioral well-being (Canpolat, 2006).

Breathing Exercises

There is a strong connection between body control and healthy breathing. Learning to breathe correctly is crucial for coping with stress. During a stress response, breathing becomes faster and heart rate increases. Deep breathing can slow the heart rate, and increased blood flow to the hands and feet can cause warmth and heaviness in these areas. This helps relax and ease the muscles throughout the body (Şimşek et al., 2003).

Correct breathing involves slowly and deeply inhaling through the nose with eyes closed, holding the breath for a moment, and then exhaling through the mouth. It is important to use the diaphragm and take slow, deep breaths. This breathing technique helps relax the muscles,

increases oxygen flow to the brain, and induces feelings of happiness. Proper breathing is also essential for relaxation exercises.

Relaxation Techniques

The aim of relaxation exercises is to facilitate physical and mental relaxation by naturally shifting the body into the parasympathetic nervous system. These exercises effectively reduce feelings of fear, excitement, anxiety, and related symptoms such as palpitations and muscle contractions. Stress often causes muscle tension, and relaxation exercises aim to relieve this by loosening tight muscle groups (Alpman, 2009). Relaxation techniques can be divided into two main categories: deep relaxation and quick relaxation. Deep relaxation is achieved based on bodily conditions and a sense of looseness. A deeply relaxed individual experiences deep and calm breathing, warm hands and feet, a steady heart rate, and a cool forehead. In this state, muscles relax, hormonal balance is restored, and the body's metabolism slows.

Deep relaxation techniques are further divided into two types: autogenic relaxation and progressive relaxation. Autogenic relaxation aims to teach individuals how to guide their bodies and minds through verbal commands. This technique involves imagining specific bodily changes to trigger them, with verbal commands usually given by an external person. The goal is to help the individual relax and restore the body's balance, serving as a form of autonomic self-regulation of the nervous system. This can be achieved through physical exercises, meditation, and specially designed exercises aimed at reducing stress-related symptoms such as headaches, neck, and back pain (KAN, 2009).

The second type of deep relaxation technique is progressive relaxation. This method involves recognizing the difference between tense and relaxed muscle states. Progressive relaxation begins by sitting or lying comfortably, closing the eyes, and focusing on different muscle groups. For example, a person can tense the muscles in their hands by clenching their fists, notice the effort required to maintain the tension, and then relax the fists and observe the difference. This process is repeated for all muscle groups in the body. Progressive relaxation is effective for stress management because it shifts focus from problems to relaxation, providing both physical and mental relief

Meditation

Meditation, in its simplest form, involves calming the mind. It is a state of consciousness that positively affects the body through the brain. The brain operates through electrical signals, and an electroencephalograph measures voltage changes in the brain. During meditation, the body is in a relaxed state, and the brain emits alpha waves at a frequency of eight to thirty cycles per second. Using visual imagery for meditation or relaxation activates the right hemisphere of the brain, which is responsible for passive behavior, inner awareness, circulating emotions, and feelings of calmness and peace (Weld, 1992). Meditation reduces adverse conditions such as heart rate, respiratory rate, oxygen consumption, blood flow, and skin resistance to electrical currents. The primary aim is to restore the body to its normal balance using appropriate physical conditions.

Biofeedback

Biofeedback is an innovative technique that stems from a familiar concept. While it is easy to notice feelings like heartbeats or fullness in the stomach, it is impossible to directly perceive physiological processes like brain waves, muscle activity, or blood pressure. Biofeedback fills this gap by using electronic devices to monitor these internal events. These devices convert physiological signals into easily observable feedback, often displayed visually on a monitor or as auditory cues like sound or graphical representations. Common tools used for biofeedback include polygraphs, thermometers, scales, and galvanic skin response meters. Through these devices, functions regulated by the autonomic nervous system, such as blood pressure, body temperature, brain waves, and heart rate, can be monitored (Weld, 1992).

Biofeedback is not only used for managing negative stress; it is also applied in the treatment of

various disorders, such as sleep disorders, asthma, hypertension, ulcers, digestive issues, and headaches.

Dietary Habits

Experts have suggested that certain foods or substances can either amplify or mitigate the negative effects of perceived stress. Excessive intake of caffeine, alcohol, salt, sugar, and fat is believed to hinder stress management. In contrast, fresh vegetables, fruits, legumes, and whole grains are thought to be beneficial for health. While smoking can provide short-term relief from stress, the long-term health consequences are harmful (Telman & Ünsal, 2004).
Sympathomimetic substances found in many foods can potentially worsen stress levels by mimicking the body's stress response when ingested. Caffeine, a common sympathomimetic found in coffee, tea, cocoa, and chocolate, can increase blood pressure, heart rate, and the heart's oxygen needs, potentially leading to anxiety (Girdano & Everly, 1998).
The relationship between stress and vitamins is also very important. During periods of stress, the body requires ample B complex and C vitamins to support the nervous and endocrine systems. Deficiencies in these vitamins can lead to reduced stress tolerance and coping skills, resulting in anxiety and irritability. Consumption of refined sugars can contribute to stress by depleting B complex vitamins. Additionally, diets high in cholesterol, saturated fat, and salt can increase the risk of hypertension and plaque formation in blood vessels, exacerbating the effects of stress factors on blood pressure. Another factor in dietary habits is hypoglycemia, which can result from excessive drops in blood sugar levels. Symptoms like anxiety, headaches, dizziness, tremors, and increased heart rate can intensify stress responses. Maintaining a balanced diet that provides adequate calories, vitamins, and minerals while minimizing processed foods and harmful chemicals is crucial for coping with stress. Emotional eating, especially of sugary foods, should be avoided. Smokers or those exposed to secondhand smoke should consider taking vitamin C supplements. In addition to minimizing intake of salt, saturated fats, and cholesterol, regular exercise is also recommended (Eroğlu, 2006).

Sleep

Staying awake late, having trouble falling asleep, or waking frequently throughout the night can significantly disrupt sleep quality and increase stress levels. Quality sleep is essential for a well-rested body, which, in turn, enhances resilience against stressful situations. When we do not get enough quality sleep, our ability to cope with stress diminishes. Various factors can obstruct good sleep, including excessive consumption of substances like alcohol, caffeine, and nicotine, which can lead to more frequent awakenings during the night. In general, relaxation exercises, as discussed in previous sections, are recommended for individuals experiencing sleep difficulties. Engaging in exercises that promote relaxation can help improve sleep quality (Yurtsever, 2009).

Mental Strategies

In coping with stress, mental coping strategies such as problem-solving skills, cognitive restructuring, time management, and communication skills have been found to be effective. This section will address each of these methods separately, discussing and analyzing their effectiveness.

Problem-Solving Skills

When dealing with any problem, a structured approach involves five key steps: identifying the problem, brainstorming options, selecting a solution, taking action, and evaluating the results. While some problems can be easily identified, others that cause stress may be more challenging. Defining the problem is often the most difficult step, especially when the situation is surrounded by uncertainty. Uncertainty reduces our sense of control and increases stress levels. Therefore, clarifying the problem alleviates much of the associated stress (Roskies, 1998).
After identifying the problem and relevant goals, the next step involves brainstorming potential solutions or alternative responses. When selecting a solution, it is crucial to carefully evaluate the potential positive and negative outcomes of each option. This assessment guides the selection of the most appropriate course of action. Once a solution is chosen, it is implemented, and the results

are evaluated against the established goals. Insufficient problem-solving skills can lead to various issues, including negative emotions such as depression, anxiety, and hopelessness. In severe cases, it may even contribute to suicidal thoughts. Therefore, developing problem-solving skills is essential for reducing stress levels and effectively addressing challenges (Onbaşıoğlu, 2004).

Cognitive Restructuring

Cognitive restructuring stands out as one of the most effective emotion-focused coping methods. This technique revolves around changing the interpretations individuals make about events or stimuli. It is not the events that cause stress but rather the individual's interpretations of those events. Emotions and stress experiences arise as a result of these thoughts (Baltaş & Baltaş, 2002). Stress arises from both external and internal sources. Stress from internal sources often continues with the individual's evaluation of events and their outlook on life, potentially leading to chronic stress. Various models, including Beck's Cognitive Model, Ellis's A-B-C Model, and Lazarus's Cognitive-Transactional Model, emphasize the importance of cognitive activity in shaping emotions and stress experiences. These models underline the role of cognitive evaluations between events and emotional responses (Tuğrul, 2000). According to Lazarus and Folkman, cognitive evaluation occurs in two stages: primary and secondary. Primary evaluation involves determining whether a situation poses a threat or danger. Concurrently occurring secondary evaluation involves assessing the individual's resources, health, social support, and other factors to determine how to respond to the situation. These evaluations shape the coping strategies individuals employ. The main idea in these models is that stress experiences often arise from misjudgments. Cognitive restructuring aims to enhance awareness of the individual's ability to choose their thoughts, replace negative thoughts with more adaptive ones, and ultimately reduce the intensity of stress by promoting positive and functional thinking patterns (Onbaşıoğlu, 2004).

Time Management

According to the Turkish Language Association's definition, time is the duration in which actions or events occur, are occurring, or will occur. However, beyond this definition, time has a unique value as a resource. Unlike money or raw materials, time cannot be accumulated or stored. Every individual has an equal share of this invaluable resource, and it cannot be saved. Although the expression "to save time" is commonly used, time, which is an ever-flowing entity, cannot be saved. However, we can optimize our productivity within the time we have (Rodoplu, 2001). Time management requires the effective use of this limited resource. Since time itself is beyond our control, what matters is managing ourselves effectively within its limits. Organizational skills play a crucial role in maximizing efficiency and productivity. Effective time management plays a significant role in reducing stress, as time is a major source of stress for most individuals. Unlike other resources, once time has passed, it cannot be accumulated or regained, making it a potential source of stress, especially when goals need to be met or tasks need to be completed (Silahtaroğlu, 2004). Determining priorities and making plans are fundamental aspects of effective time management and are inherently interconnected. After determining priorities and formulating plans, successful implementation becomes critical. Stress factors during implementation should be identified and minimized, and distractions or procrastination should be kept to a minimum (Onbaşıoğlu, 2004).

Communication Skills

Communication encompasses the exchange of information among various systems, including humans, animals, plants, and machines, in various ways. It serves four basic purposes: existence, communication, sharing, and development. In the field of communication, a structured series of events that involves the exchange of emotions, thoughts, and information and results in behavioral changes is referred to as the communication process. Ideally, this process unfolds in a mutual, interactive, and dialogical manner that promotes understanding and growth (Kaya et al., 2007). The quality of an individual's relationships significantly affects their overall quality of life. Relationship problems often stem from communication breakdowns and manifest as sources of

stress. For example, conflicts arising from the inability to express thoughts clearly or the need to articulate needs and wishes can create frustration, leading to a sense of helplessness and isolation (Cohen, 1988). Improving communication skills enables individuals to express their thoughts and feelings more effectively and facilitates the creation of healthy relationships. Positive communication with others can reduce stress levels and provide valuable social support. Conversely, communication problems can exacerbate stress. The importance of social support in managing stress is well-established. Individuals who can communicate their feelings and needs are likely to develop healthier relationships and experience lower levels of stress (Onbaşıoğlu, 2004).

Behavioral Approaches

Encouraging positive behavioral patterns can significantly reduce stress levels. Therefore, it is essential to adopt strategies aimed at promoting positive behaviors. In this section, we will explore methods for improving our behaviors for better stress management.

Regulation of Behaviors

Adjusting or moderating behavioral tendencies is crucial for using stress in a positive way. Unfortunately, some behavioral patterns exacerbate stress and amplify its effects. Individuals with Type A personalities, characterized by high activity levels, competitiveness, anxiety, impatience, and a preference for less rest, are particularly sensitive to stress. These traits contribute to elevated stress levels. Various personality traits make individuals prone to stress or intensify stress responses. Behavioral modification programs aim not to eliminate stress altogether but to regulate these traits and develop adaptive ways of coping with stress. According to Şahin, Güler, and Basım (2009), the stress symptoms individuals experience are influenced by various factors depending on their personality traits. It is essential to adapt stress management approaches according to Type A and B personalities. In addition to equipping both groups with coping skills, developing emotional intelligence competencies such as positivity, optimism, and enjoying life is especially beneficial for Type A individuals in stress management efforts.

Anger Control

According to Selçuk Budak (2003), anger is a strong negative emotion typically triggered by situations involving obstruction, aggression, threats, deprivation, or restriction, often leading to aggressive responses toward the source of discomfort. When examining definitions of anger, it emerges as a natural response that allows individuals to protect themselves against perceived threats to their physical and psychological well-being, such as obstruction or injustice. Anger serves as a motivating force against external threats, making it an unavoidable emotion. Individuals become angry when they feel frustrated, overlooked, humiliated, or subjected to arbitrary treatment or aggression because these conditions obstruct their pursuit of pleasure, a fundamental tendency in human nature. When personal goals are obstructed beyond their tolerance levels or cause anxiety, individuals often experience high tension and become more prone to anger, especially during stressful times. The roots of anger extend to the "fight or flight" stress response, where perceived threats or dangers raise stress levels and subsequently trigger anger. Chronic anger and hostility negatively impact health, leading to various adverse outcomes, such as an increase in health issues and substance use. The goal of anger and hostility management techniques is to alleviate the emotional and physiological responses caused by anger, as anger sources cannot always be eliminated, prevented, or changed. Instead, individuals focus on constructively managing their internal and external responses through relaxation techniques, cognitive restructuring, problem-solving strategies, healthy communication, the use of humor, and environmental adjustments (Yazgan, 2007).

Utilizing Social Support Systems

In the early 1970s, researchers began to emphasize the role of social connections in buffering the negative effects of stress, leading to an increase in studies exploring the link between social support and both mental and physical well-being. While some aimed to demonstrate a direct

correlation between social support and the severity of psychological and physical symptoms, others sought to prove that individual responses could mitigate stressful events. Despite various interpretations of the definition and function of social support, it generally refers to the assistance provided to individuals by those around them, especially family members and friends, who are perceived as natural allies during times of crisis and emotional tension. The support network created by these informal helpers significantly influences an individual's coping process and health outcomes (Çakır and Palabıyıkoğlu, 1997).

Following periods of excessive stress, interpersonal relationships often become strained, leading individuals to experience increased tensions or withdraw from social interactions. However, research consistently shows that being with family, friends, and colleagues can alleviate stress. Talking to others helps individuals gain perspective on their problems, learn about potential solutions, and overcome feelings of insecurity. While family, friends, and social groups serve as vital sources of social support, there are also situations where coping independently with problems can be beneficial. Therefore, the quality of support received from various social networks is crucial (Torun, 1997).

Eker, Arkar, and Yaldız (2001) conducted a study on social support systems to validate the psychometric properties of the Revised Multidimensional Perceived Social Support Scale. Their findings, based on psychiatric and surgical patient samples, revealed significant correlations between social support, loneliness, hopelessness, and negative social relationships. In particular, support received from close individuals was identified as a determinant of health, with spouses, children, family members, and close friends playing important roles as social support providers.

Similarly, Bardavit (2007) researched the impact of personality traits on coping mechanisms for stress through a survey study involving administrative and medical staff at a private hospital in Istanbul. The findings showed that extroverted individuals tended to perceive stress less and generally exhibited positive coping strategies based on social support systems.

In another study conducted by Koç (2006) on university students, individuals with lower levels of shyness were found to be more likely to seek social support as a coping strategy. Furthermore, Siu and Watkins (1997) identified a significant relationship between self-esteem and coping strategies for stress, showing that individuals with high self-esteem more frequently sought social support.

Social support not only enhances the functioning of the immune system and reduces negative stress but also fosters a sense of meaning in life and decreases exposure to risk factors like loneliness. Joining support groups with individuals exposed to similar stressors or creating support groups facilitated by trained professionals can provide invaluable assistance. These discussions promote a sense of solidarity among participants, reduce feelings of isolation, and empower individuals struggling with stress factors.

Yoga

Derived from the Sanskrit word meaning unity or wholeness, yoga is a self-discipline practice that offers both physical and emotional benefits. Yoga, which has been part of Indian tradition for over two thousand years and has significantly contributed to the fundamental texts of the esteemed Indian sage Patanjali, is known for its deep impact on the well-being of practitioners. In his writings, Patanjali defined yoga as the control of mental fluctuations and emphasized its profound effect on practitioners' well-being (Altuntaş, 2003).

Often likened to relaxation exercises, yoga serves as a method for personal care and spiritual development. When practiced mindfully and according to its principles, yoga can positively influence an individual's health. It is renowned for its ability to reduce stress levels, instill vitality in both body and mind, and cultivate a heightened sense of physical awareness. Like relaxation techniques, yoga encourages relaxation and effectively creates a state of calmness in stress management. Utilizing the power of breath control, mindfulness, and physical postures, yoga provides practitioners with a holistic approach to stress reduction and overall well-being (Yurtsever, 2009).

Massage

Massage therapy stands out as one of the most effective methods for relaxing and rejuvenating the body. One of its most important benefits lies in its ability to provide deep relaxation and revitalization. Through regular massage sessions, individuals gain a heightened awareness of muscle tension caused by stress, empowering them to self-regulate and reduce tension. The benefits of regular massage therapy are diverse. It plays a crucial role in enhancing blood circulation, alleviating muscle tension, and preventing spasms, thereby generally relieving pain associated with stress-induced muscle tension. Moreover, massage therapy fosters a sense of deep relaxation and vitality, boosting self-confidence and nurturing feelings of well-being. Some proponents of massage therapy claim it has the capacity to improve digestion, alleviate constipation, and reduce the emergence of negative emotions. By incorporating massage therapy into their routines, individuals can experience numerous physical and emotional benefits, paving the way for improved overall health and vitality (Rowshan, 2003).

Utilizing Humor

Humor serves as a valuable tool in reducing the intensity of stress levels through various mechanisms. First, it facilitates a more balanced perspective, allowing individuals to view stressful situations more calmly. When individuals consciously try to maintain a smile amid stress, they often experience an uplift in their mood, leading to more positive interactions with others. Engaging with humor and laughter does not entail ignoring problems; rather, it involves addressing them constructively. As individuals learn to face stress factors through humor, they often feel calmer and more relaxed. However, it is crucial to use humor sensitively, avoiding sarcastic or derogatory expressions that may increase tension (Yurtsever, 2009).

Participation in Social, Cultural, and Sports Activities

When individuals have excessive free time, they often experience boredom, decreased creativity, and increased stress levels. Therefore, filling these gaps in life with meaningful activities becomes essential. Engaging in social, cultural, and recreational pursuits is highly beneficial for our physical, mental, and emotional health, promoting vitality, dynamism, and sociability. These activities serve to rejuvenate diminishing spirits and leave a positive impact on stress levels. Whether going to the cinema, theater, listening to music, painting, or participating in sports, each activity contributes to holistic enrichment. Karahan, Dicle, and Eplikoç (2007) conducted a study examining the coping mechanisms of university students based on their social skills and happiness levels. Their research, which involved 17,473 students from various faculties, revealed that individuals with high social skills and a sense of happiness tended to utilize problem-focused coping strategies more effectively. Conversely, those with low social skills and diminished happiness levels more frequently resorted to passive coping methods. The study also found that students reporting lower levels of happiness exhibited weaker social skills compared to their happier peers. These findings highlight effective stress management strategies.

REFERENCES

Alpman A. (2009). Stres İle Mücadele “,
http://www.ahmetalpman.com/brosurler/stresilemucadele.pdf
Altuntaş, E. (2003). Stres Yönetimi, İstanbul: Alfa Yayınları.
Aydın, E. (2019) Okul Öncesi Dönemde Özel Gereksinimli Çocukların Ebeveynlerinin Sosyal Destek Algılarının, Aile Stresi ve Stresle Başa Çıkma Tutumlarını Yordama Gücü. Yüksek Lisans Tezi. Eğitim Bilimleri Enstitüsü. Akdeniz Üniversitesi.
Baltaş, A. ve Baltaş, Z. (2002). Stres ve Başaçıkma Yolları, 21. Basım, İstanbul: Remzi Kitabevi.

Bardavit, M. (2007). Kişilik Yapılarının-Stresi Değerlendirme, Stresle Başa Çıkma Yaklaşımları, Algılanan Stres ve İş Doyumu Üzerinde Olan Etkisinin Karşılaştırılmalı Olarak İncelenmesi. (Yayımlanmamış Yüksek Lisans Tezi). T.C. İstanbul Üniversitesi, Sosyal Bilimler Enstitüsü.
Budak, S. (2003). Psikoloji Sözlüğü, 2. Basım, Ankara: Bilim ve Sanat Yayınları.
Canpolat, Ö. (2006). Çalışanların Stres Düzeylerini Etkileyen Faktörler ve İş Sağlığı Hemşiresinin Stres İle Baş Etmede Etkililiği. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Kocaeli Üniversitesi, Sağlık Bilimleri Enstitüsü.
Cüceloğlu, D. (20059. Yeniden İnsan İnsana, 33. Basım, İstanbul: Remzi Kitabevi.
Çakır, Y. ve Palabıyıkoğlu, R. (1997). Gençlerde Sosyal Destek-Çok Boyutlu Algılanan Sosyal Destek Ölçeğinin Güvenirlik ve Geçerlik Çalışması. Türk Psikiyatri Dizini, Kriz Dergisi, 5(1).
Çankıroğlu, S. B. (2007). Üniversite Adayı Ergenlerin Stresle Başa Çıkma ve Sınav Kaygılarının Bazı Değişkenlere Göre İncelenmesi. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Sakarya Üniversitesi, Sosyal Bilimler Enstitüsü, Sakarya, 2007.
Doğan, E.; Arkar, H. ve Yaldız, H. (2001). Çok Boyutlu Algılanan Sosyal Destek Ölçeği'nin Gözden Geçirilmiş Formunun Faktör Yapısı, Geçerlik ve Güvenirliği. Türk Psikiyatri Dizini, Türk Psikiyatri Dergisi, 12(1).
Epli Koç, Hatice; Üniversite Öğrencilerinin Utangaçlık Düzeylerine Göre Stresle Başa Çıkma Stratejilerinin İncelenmesi. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Ondokuz Mayıs Üniversitesi, Sosyal Bilimler Enstitüsü.
Eroğlu, H. (2006). Durumluluk-Süreklilik Kaygı Düzeyi İle Algılanan Stres, Kontrol Düzeyi ve Stresle Başaçıkma Stratejileri Arasındaki İlişkinin İncelenmesi, T.C. Gazi Üniversitesi. (Yayımlanmamış Yüksek Lisans Tezi). Eğitim Bilimleri Enstitüsü.
Garipoğlu, E. (2007). Stres Yönetimi ve Banka Çalışanları Üzerine Yapılan Bir Araştırma. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Niğde Üniversitesi, Sosyal Bilimler Enstitüsü.
Gırdano, D. A. and Everly, G. S.. (1998). Stresi Arttıran Beslenme Alışkanlıkları. (Çev.: Nihan Sezgin), (Ed.: Nesrin Hisli Şahin), Stresle Başa Çıkma: Olumlu Bir Yaklaşım, 3. Basım, Ankara: Türk Psikologlar Derneği Yayınları.
Gökçe, F. S. (2004). Stres Yönetimi: Bedene Yönelik Teknikler. Türk Psikoloji Bülteni, 10, 34-35.
Güçlü, N. (2001). Stres Yönetimi. Gazi Üniversitesi Eğitim Fakültesi Dergisi, 21(1).
Iwasakı, Y. and Schneıder, I. E.. (2003). Leisure, Stress And Coping: An Evolving Area Of Inquiry. Leisure Sciences, 25(2).
Jones, F. and Brıght, J. (2001). Stress: Myth, Theory And Research, New York: Prentice Hall.
Kaba, İ. (5-6.2019) Stres, Ruh Sağlığı ve Stres Yönetimi: Güncel Bir Gözden Geçirme, Akademik Bakış Dergisi- Uluslararası Hakemli Sosyal Bilimler E-Dergisi, [Elektronic Journal], Erişim: [https://dergipark.org.tr/tr/download/article-file/1179625]. ISSN: 1694-528X.
Kan, İ. (2009). Gevşeme Egzersizleri. http://www.depam.com/depam/index.php?option=com_content&vie w=article&id=49&Itemid=57.
Karahan, T. F., Dicle, A. N. ve Epli Koç, H. (2007). Üniversite Öğrencilerinin Stresle Başa Çıkma Tarzlarının Sosyal Beceri Düzeylerine ve Mutluluk Algılarına Göre İncelenmesi. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 40(2).
Kaya M., Genç, M.; Kaya, B. ve Pehlivan, E. (2007). Tıp Fakültesi ve Sağlık Yüksekokulu Öğrencilerinde Depresif Belirti Yaygınlığı, Stresle Başaçıkma Tarzları ve Etkileyen Faktörler. Türk Psikiyatri Dergisi, 18(2).
Kraaıj, V.; Garnefskı, N. and Maes, S. (2002). The Joint Effects Of Stress, Coping And Coping Resources On Depressive Symptoms In The Elderly. Anxiety, Stress & Coping, 15(2).
Koçhan, A. (2019) Engelli Çocuğa Sahip Ebeveynlerin Stres Düzeyi, Stresle Başa Çıkma Tarzları, Hastalık Yükü Algıları ve Bilgece Farkındalık Düzeyleri Arasındaki İlişkinin İncelenmesi. Yüksek Lisans Tezi. Sosyal Bilimler Enstitüsü. T.C. Başkent Üniversitesi.

Leung, M; Liu, A. M. M. and Wong, M. Mei-Ki. (2006). Impact Of Stress-Coping Behaviour On Estimation Performance. Construction Management And Economics, 24(1).
Nyder, C. R. and Pulvers, K. M. (2001). Coping With Stress, (Ed. By. C.R. SNYDER), New York: Oxford University Press.
Onbaşıoğlu, M. (2004). Stresle Baş Etmede Zihinsel Yöntemler. Türk Psikoloji Bülteni, 10, 30-35.
Özkaya, Onay, M., Yakın, V., Ekinci, T. (2008) Stres Düzeylerinin Çalışanların İş Doyumu Üzerine Etkisi: Celal Bayar Üniversitesi Çalışanları Üzerine Ampirik Bir Çalışma, Yönetim ve Ekonomi, 15 (1): 163-179.
Pettınger, R. (2002). Stress Management, 1. Published, London: Capstone Publishing.
Rodoplu, D. (2001). Stratejik Yönetim Düzeyinde Zaman Yönetimi ve Yetki Devri. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Kocaeli Üniversitesi, Sosyal Bilimler Enstitüsü.
Roskıes, E. (1998). Kişisel Problemleri Çözme Üzerine İpuçları. (Çev.: Neslihan Ruganci), (Ed.: Nesrin Hisli Şahin), Stresle Başa Çıkma: Olumlu Bir Yaklaşım, 3. Basım, Ankara: Türk Psikologlar Derneği Yayınları.
Rowshan, A. (2003). Stres Yönetimi, (Çev: Şahin Cüceloğlu), 4. Basım, İstanbul: Sistem Yayıncılık.
Silahtaroğlu, F. (2004). Akademisyenlerde Zaman Yönetimi. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Gaziosmanpaşa Üniversitesi, Sosyal Bilimler Enstitüsü.
Şahin, N., Güler, M. ve Basım, N. (2009). A Tipi Kişilik Örüntüsünde Bilişsel ve Duygusal Zekanın Stresle Başa Çıkma ve Stres Belirtileri İle İlişkisi. Türk Psikiyatri Dergisi.
Şimşek, Ş., Akgemci, T. ve Çelik, A. (2003). Davranış Bilimlerine Giriş ve Örgütlerde Davranış, 3. Baskı, Konya: Adım Matbaacılık.
Telman, N. ve Ünsal, P. (2004). Çalışan Memnuniyeti, 1. Baskı, İstanbul: Epsilon Yayıncılık.
Timuroğlu, M.K. ve Yılmaz, B. (2019) Stres ve Girişimcilik Niyeti: Bir Uygulama, İktisadi ve İdari Bilimler Dergisi, 33 (3): 699-713.
Torun, A. (1997). Stres ve Tükenmişlik. (Ed.: Suna TEVRÜZ), Endüstri ve Örgüt Psikolojisi, 2. Baskı, Türk Psikologlar Derneği–Kalder Derneği, Ankara Şelale Matbaası.
Tuğrul D. (2000). Stres ve Depresyon. Türk Psikiyatri Dizini, Psikiyatri Dünyası Dergisi, 4(1).
Türk, K., Eroğlu, C., Türk, D. T.C. Devlet Hastanelerindeki Çalışma Koşullarının Stres Üzerine Etkilerini Ölçmeye Yönelik Bir Araştırma: Geyve Devlet Hastanesi Örneği, Uluslararası İnsan Bilimleri Dergisi, 5 (1): 1-17. ISSN: 1303-5134.
Weld, S. E. (1992). Stress Management Outcome: Prediction Of Differential Outcome By Personality Characteristics, Doctor Of Philosophy, University Of Ottowa, Canada.
Yazgan, S. (2007). Öfke Kontrolü İle Tolerans Düzeyi Arasındaki İlişki. (Yayımlanmamış Yüksek Lisans Tezi). T.C. Ondokuzmayıs Üniversitesi, Sosyal Bilimler Enstitüsü.
Yurtsever, H. (2009). Kişilik Özelliklerinin Stres Düzeyine Etkisi Ve Stresle Başa Çıkma Yolları: Üniversite Öğrencileri Üzerine Bir Araştırma Yüksek Lisans Tezi Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Çalışma Ekonomisi Ve Endüstri İlişkileri Anabilim Dalı

DIGITAL DESIGN IN EDUCATION

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ABSTRACT
In the rapidly evolving and transforming world of the digital age, the power of communication and visual expression has become more important than ever. Within this context, the concept of digital design addresses the needs of the modern world by combining aesthetic values with functionality and user experience. As technology advances, digital design has emerged as a dynamic and constantly evolving discipline, encompassing a wide range of fields. In this article, the broad scope of digital design is examined. Digital design is a discipline that aims to create interactive and engaging experiences on digital platforms by integrating visual and functional elements. The purpose of this study is to provide readers with a comprehensive overview by addressing the fundamental concepts, principles, and techniques of digital design. Additionally, the importance and impact of digital design in education are emphasized. The study is based on an extensive literature review and expert opinions. Various sources and research methods were employed to understand the different aspects of digital design and identify current trends. The study focuses on the use of digital design in education. It highlights the effectiveness of digital design as a tool for enhancing students' creativity and problem-solving skills. Furthermore, it is noted that digital design helps students develop digital competencies and gain a competitive advantage in the job market.

Key Words: design, digital design, educational design, design principles

INTRODUCTION
In the rapidly evolving and transforming world of the digital age, the power of communication and visual storytelling has become more important than ever. In this context, the concept of digital design responds to the requirements of the modern world by combining aesthetic values with functionality and user experience. Digital design is a dynamic discipline that encompasses many different fields and continuously renews itself with the development of technology. Digital design is the process of creating visual communication across various digital mediums. This process includes graphic design, web design, user interface design, and many other sub-disciplines. Digital design is executed using computers and digital tools, and it typically aims to achieve a balance between aesthetic appeal and usability and functionality.
Today, the importance of digital design is increasing. With the proliferation of the Internet, there has been a significant increase in the needs of companies and individuals regarding their digital presence. Digital platforms such as websites, mobile applications, digital advertising materials, and social media content are among the primary ways brands and individuals express themselves and reach their target audiences. At this point, utilizing effective digital design is crucial for strengthening brand image, capturing users' attention, and enhancing their experience. The scope of digital design is quite broad and continually expanding. As new technologies emerge daily and

the digital world becomes increasingly complex, digital designers are constantly seeking to renew and develop themselves. This scope includes many different disciplines ranging from graphic design to web design, from user experience design to animation and 3D modeling. Digital designers are constantly looking for new ways to create creative and effective solutions by making the best use of the opportunities presented by technology.

This study serves as a guide addressing a wide range of topics from fundamental concepts to advanced techniques in digital design. Its aim is to explain the importance of digital design and its applications in various fields, clarify fundamental concepts, and provide an overview of advanced techniques. Additionally, by discussing the industrial applications, future perspectives, and trends of digital design, it aims to increase readers' knowledge in the field and guide those who are interested.

I. FUNDAMENTAL CONCEPTS and PRINCIPLES

A. Basic Principles of Graphic Design

- **Balance and Asymmetry**

Balance and asymmetry are among the fundamental principles of graphic design and determine whether a composition is visually balanced or unbalanced. These principles are important for capturing the viewer's attention and effectively conveying the intended message. Balance refers to the situation where the visual weight of a design is evenly distributed. A balanced design evokes a sense of comfort and stability in the viewer’s eyes. Balance can be symmetrical or asymmetrical. The symmetrical balance of a design indicates that when reflected along a central axis, there is equal weight on both sides. This design approach evokes a traditional, static, and formal feel. Asymmetrical balance refers to an approach where the design does not have the same weight on the central axis but where different elements are harmoniously balanced. Asymmetrical balance can evoke a more dynamic, engaging, and modern feel. Asymmetry means arranging a design in an unbalanced way. Asymmetrical designs can attract visual interest and focus the viewer's attention on a particular point. Asymmetry is often used in modern and creative designs, but it must be applied carefully. When creating an asymmetrical arrangement, the size, color, shape, and position of different elements should be thoughtfully considered. Asymmetry plays a significant role in creating eye-catching and impactful designs. An asymmetrical design can evoke a sense of dynamism and movement in the viewer's eyes. The imbalance between different elements makes the design interesting and engaging. Proper use of balance and asymmetry can enhance the effective communication and visual appeal of a design. Designers carefully apply these principles to achieve visual balance and enhance the impact of the design (Güngör, 2005).

- **Movement and Rhythm**

Movement and rhythm are important concepts in graphic design that create a sense of visual flow or motion for the viewer. They involve elements that guide and direct the viewer through a specific direction or pattern when determining the dynamism and flow of a design. Movement is achieved through the arrangement of elements that draw the viewer toward a particular direction. This can be done using various techniques, such as linear guidance, curves, or the flow of patterns. For example, an arrow in a design can direct or move the viewer in a particular direction. Rhythm is a sense of pattern or flow created by the arrangement of repeating elements. These repetitions can guide the viewer from one element to another or create a rhythm or cycle within the design. Rhythm can enhance the liveliness and dynamism of the design, increasing visual interest. These fundamental concepts assist designers in directing the viewer's attention and ensuring effective communication in design. Movement and rhythm make a design dynamic and engaging, encouraging viewers to explore and interact with it (Öztuna, 2007).

- **Contrast and Harmony**

Contrast and harmony play significant roles in ensuring visual diversity and balance in graphic design. Contrast indicates differences and expresses how elements in a design are distinct from

one another. Differences between elements such as color, size, shape, or text capture the viewer's attention and make the design more effective. For instance, the contrast between black and white is the simplest example of contrast between two opposing colors. However, differences in color, size, or style can also be used to create contrast. Harmony expresses the coherent relationships between different elements. It ensures that the design appears balanced and consistent as a whole. Having elements such as color palettes, typography choices, or arrangements in harmony makes the design visually pleasing and understandable. A harmonious design provides a comfortable experience for the viewer and contributes more effectively to the design's purpose. Contrast and harmony can be used together to enhance the impact and effectiveness of a design. Correct contrasts and harmonies can attract the viewer's attention while maintaining the integrity of the design and ensuring that the message is conveyed clearly (Becer, 2002, pp. 66-67). In education, the use of these principles makes learning materials clearer and more engaging. By learning about balance and asymmetry, students grasp how to achieve visual balance in educational materials and projects. The use of movement and rhythm is important for capturing students' attention and presenting information more effectively. For example, these principles can be applied in educational videos and interactive lesson materials to make the learning process more engaging and memorable. In educational materials, contrast is used to highlight and emphasize important information, while harmony enhances the integrity and understandability of the material. By learning these principles, students can achieve more effective and aesthetically satisfying results in their educational projects and presentations.

B. Color Theory and Usage

- **RGB, CMYK, and Pantone Color Models**

Color is a fundamental element of graphic design and a means of communication. Different color models are used for specific applications and are essential for color management in digital or print projects. The RGB color model is used in digital screens and consists of three primary colors: red, green, and blue. Each color is determined by the density of pixels. The combination of these colors creates a wide color spectrum on screens. The RGB model is commonly used in digital media projects such as web design, digital graphics, and photography. The CMYK color model is used in printing processes and consists of black, cyan, magenta, and yellow. These colors are combined with ink mixtures in printing machines to obtain a wide color spectrum. The CMYK model is commonly used in projects such as brochures, magazines, posters, and other print media. Pantone is an industry-standard color matching system. The Pantone Color Chart expresses specific colors with a wide color palette. Each Pantone color is identified by a unique number and is widely used to ensure color consistency in printing. Pantone Colors are particularly used for specific color needs, such as brand identities and corporate colors. These color models help designers manage colors accurately in their projects and achieve a consistent appearance. Each model has different characteristics and areas of use, and it is essential to select the right model depending on the design's objectives (Özdemir, 2005).

- **Color Psychology and Meaning**

Colors have a powerful impact on human psychology and emotional responses. Each color can trigger specific feelings, thoughts, and reactions in people. Therefore, understanding the psychological effects of colors and using them correctly becomes an essential element of graphic design.

- **Red**: Associated with energy, passion, power, and warmth. It is also seen as a symbol of danger, passion, and love. In digital designs, red is often used in attention-grabbing elements, such as call-to-action buttons or discount labels.
- **Blue**: Associated with tranquility, trust, simplicity, and professionalism. It also conveys a sense of coolness and security. In digital designs, blue is often used to create a strong and reliable brand image, such as on the websites of banks or technology companies.

- **Green**: Associated with nature, freshness, growth, and health. It also conveys a sense of peace and balance. In digital designs, green can be used for brands related to sustainability, eco-friendly products, or the healthcare sector.
- **Yellow**: Associated with happiness, energy, joy, and optimism. In digital designs, yellow is often used to grab attention and engage the viewer, particularly in campaign announcements or promotions.
- **Purple**: Associated with luxury, mystery, wealth, and creativity. In digital designs, purple is often used for luxury brands or artistic content. These psychological effects of colors help designers consciously choose colors to convey specific emotions or messages. Understanding the psychological effects of colors can help designs leave a more significant impression on the targeted audience (Özdemir, 2005). Color theory is used in educational materials to emphasize information and guide emotional responses. By learning and applying color psychology, students can create more effective and engaging projects. This knowledge enhances the understandability and aesthetic appeal of lesson materials, improving the learning experience.

II. User Experience Design (UX Design)

A. Importance of User-Centered Design

User-Centered Design (UCD) refers to an approach that prioritizes users' needs, expectations, and skills during the product or service design process. The goal of user-centered design is to enhance user experiences and ensure that the product or service best meets their requirements. This approach is characterized by placing the user at the center of the product development process, where the user's perspective is continuously considered (Krug, 2014).

The importance of user-centered design is increasingly recognized because users' demands and expectations are changing rapidly. Users now value not only the functionality of products but also usability, emotional experience, and aesthetic value. Therefore, the success of a product or service is directly related to a design process that maximizes user experiences. This design model relies on user research to understand users' needs and behaviors. Such research employs various methods to identify users' goals, motivations, challenges, and desires. The insights gained provide guidance at every stage of the design process and help in creating user-centered solutions.

B. User Research and Analysis

The user research and analysis process utilizes various research techniques to determine users' expectations, motivations, challenges, and preferences. User research typically employs methods such as user interviews, focus groups, observational studies, surveys, and user testing. These research methods are designed to better understand users' real-world experiences and expectations. The data obtained guides the design process at each stage and assists in developing user-centered solutions. User research and analysis are critically important for identifying the target audience of a product or service, determining user needs, and validating design decisions. This process is a fundamental step for the success of the product or service and places the improvement of user experiences at the center of the design process (Buley, 2013).

C. Prototyping and Testing Process

The prototyping and testing process is a method used to test design ideas in the real world and collect user feedback. This process is employed to test various aspects of the design, measure user reactions, and identify necessary changes for design improvement. During the prototyping phase, design ideas are typically quickly prototyped on paper or in digital environments. These prototypes represent the core features and functionalities of the design and aim to simulate users' real-world experiences. Prototypes are tested through interaction with users, and feedback is collected from them. The prototype testing process involves observing and evaluating users' interactions with the prototype. This process helps to understand how users use the product or service and to identify which areas of the design need improvement. The feedback obtained aids in enhancing the design and improving the user experience. The prototyping and testing process is a

critical tool for gathering user feedback, placing it at the center of the design process, and determining the necessary changes for the product or service to succeed (Warfel, 2009).

III. User Interface Design (UI Design)

A. Principles of Interface Design

User Interface Design (UI Design) refers to the process of designing the user interface of a digital product or application. This process includes organizing and designing the interface elements (buttons, menus, forms, etc.) that enable users to interact with a product or application. Interface design is essential for ensuring that users can effectively use the product and perform the tasks they wish to accomplish.

The principles of interface design express the fundamental rules and guidelines that must be considered during the design process of a product's user interface. These principles guide design decisions to ensure that users can effectively use the product and have a positive experience. For example, consistency in user interface design makes it easier for users to grasp the product and facilitates usability. Additionally, principles such as simplicity, intuitiveness, feedback, and accessibility are also important in user interface design (Tidwell, 2010). Interface design principles ensure that the user interface is tailored to users' needs and goals. These principles must be taken into account at every stage of the design process to enable users to use the product easily and accomplish their desired tasks seamlessly.

B. Graphic and Visual Design

Graphic and visual design refers to the design of graphics, colors, typography, and other visual elements used in the user interface. These elements define the appearance and feel of a product or application and affect how users interact with it. Graphic design encompasses the visual elements used to create an aesthetic appearance for a product or application. These elements include logos, icons, backgrounds, and other graphic components. Graphic design is important for expressing a product's brand identity and capturing users' attention.

Visual design involves designing the aesthetic and functional elements of a product's user interface. This includes elements such as color palettes, typography selection, layout, and balance. Visual design is crucial for enhancing users' visual experiences and facilitating their interactions with the product. Graphic and visual design contribute to achieving an impressive appearance for a product or application. These design elements encourage users to find the product more appealing and to use it for extended periods. Furthermore, graphic and visual design is vital for improving a product's user experience and enabling users to perform tasks more effectively (Williams, 2014).

C. Interactive Elements and Animations

Interactive elements and animations refer to components that enable a user interface to be interactive and dynamic. These elements are designed to facilitate users' interaction with a product or application and to help them accomplish tasks. Interactive elements include functional components that allow users to engage with a product or application, such as buttons, menus, form fields, and sliders. Interactive elements enable users to use the product effectively and facilitate their task completion. Animations refer to moving elements that make a user interface dynamic and engaging. These can include transition effects, animated icons, and animated visuals. Animations capture users' attention and encourage them to interact with the product. Interactive elements and animations are essential for enhancing the user experience of a product or application and ensuring that users can perform tasks more effectively. These components ensure that a user interface is engaging and user-friendly, allowing users to use the product easily and enjoyably (Scott & Neil, 2009).

IV. Digital Design Tools and Technologies

A. Adobe Creative Suite and Other Tools

Adobe Creative Suite (now also known as Adobe Creative Cloud) is one of the most well-known and widely used software packages in the field of digital design. Adobe Creative Suite includes a range of software that covers various design disciplines, including Photoshop (image editing),

Illustrator (vector graphics), InDesign (typography and page layout), Adobe XD (user interface design and prototyping), Adobe After Effects (motion graphics and animations), and many other applications. Adobe Creative Suite provides a powerful and comprehensive toolset for professional-level digital design projects. These software applications enable users to create, edit, and publish visual and interactive content. Advantages of Adobe Creative Suite include a wide feature set, high performance, ease of integration, and compatibility with industry-standard file formats. However, in addition to Adobe Creative Suite, there are many alternative digital design tools available. Tools like Sketch, Figma, and Adobe XD for user interface design and prototyping are particularly popular in web and mobile design projects. These tools allow users to quickly create prototypes, collaborate, and share designs in real-time. Furthermore, these tools are often lower in cost and offer cloud-based collaboration features (Smith & Osborn, 2013).

B. Sketch, Figma, and Design Tools

Sketch, Figma, and other similar design tools are software specifically developed for user interface design and prototyping. These tools allow users to create, edit, and share visual designs. Sketch is a vector graphic editor developed specifically for macOS, while Figma is a cloud-based design tool that can be used on any platform. These tools enable users to create professional-quality user interface designs. They are equipped with features such as vector drawing tools, component libraries, collaboration features, and prototyping capabilities. These tools provide designers the opportunity to work more efficiently and productively while facilitating collaboration within teams and obtaining real-time feedback. Sketch, Figma, and similar tools offer a powerful and flexible platform for professional-level user interface design. They are widely used in web and mobile design projects and are continuously updated and improved (Kholmatova, 2017).

C. Front-End Development Tools and Frameworks

Front-End Development Tools and Frameworks are software tools and frameworks used to develop the user interface layer of websites and web applications. These tools and frameworks facilitate the creation of interactive and responsive user interfaces using web technologies such as HTML, CSS, and JavaScript. Commonly used Front-End Development Tools include text editors like Visual Studio Code, Sublime Text, and Atom; CSS preprocessors like SASS and LESS; and package managers like gulp and webpack. These tools accelerate the coding process for web developers and provide automation. Front-End Frameworks offer ready-made components, templates, and style libraries, enabling web developers to work faster and more consistently. For instance, frameworks like Bootstrap, Foundation, and React allow web developers to create responsive and modern websites. These tools and frameworks simplify the user interface development process for web developers and raise the standards. This leads to more effective, user-friendly, and reliable websites and applications (Robbins, 2018).

V. Mobile and Web Design

A. Principles of Responsive Design

Responsive design is an approach that allows websites and mobile applications to adapt and display correctly across different devices and screen sizes. This approach is employed to optimize user experience and provide users with a consistent experience across any device. Principles of responsive design should be considered when determining how a website or mobile application should be designed.

A website or mobile application must be compatible with various screen sizes and devices. This can be achieved through flexible grids, fluid images, and media queries. Flexible grids allow the layout to adjust automatically, ensuring that content is displayed properly on all devices. Fluid images allow images to scale correctly according to screen sizes. Media queries enable specific style rules to be applied based on the device being used. These principles ensure that users can

access and use the product seamlessly, regardless of the device they are using. The responsive design approach improves user experiences and enhances usability (Marcotte, 2010).

B. Mobile Application Design

Mobile application design is the process of designing the user interface and user experience for mobile devices. Mobile application design is essential for ensuring that users can interact with the application easily and effectively. This process involves considering mobile users' unique needs, preferences, and behaviors. In mobile application design, simplicity, speed, and usability are crucial factors. Users often use mobile devices on the go, so applications must provide quick access to essential features and content. Additionally, the design should be intuitive, allowing users to navigate the application effortlessly. Touch gestures and user-friendly controls should be prioritized. Mobile application design also involves optimizing the application for different operating systems, screen sizes, and devices (Nielsen, 2012). Ensuring that the application performs optimally on various platforms enhances user experiences and increases user satisfaction.

C. Design for Various Platforms and Devices

Designing for various platforms and devices refers to the necessity of adapting designs for different operating systems (such as iOS and Android) and device types (such as smartphones and tablets). Each platform has its own design guidelines and conventions, and successful designs must adhere to these standards. Design for various platforms involves understanding platform-specific design principles and guidelines. For example, iOS design typically emphasizes minimalism and intuitive navigation, while Android design often utilizes Material Design principles that emphasize depth and layering. Designers must also consider differences in screen sizes, orientations, and user interactions. A design must provide a consistent and seamless experience for users across all devices and platforms. This approach ensures that users have positive experiences regardless of the device they use (Katz, 2015). Adapting designs to various platforms and devices contributes to creating user-friendly products that cater to different users' needs and preferences.

VI. Digital Design in Education

A. E-Learning Tools and User Experience

E-learning tools are increasingly playing a vital role in modern educational methodologies. These tools enable students to learn and interact online while providing educators with the means to deliver and manage teaching materials. However, for e-learning tools to be effective, user experience must be carefully designed. User experience encompasses the process by which students interact with e-learning platforms and the experiences they have while using them. Elements such as user-friendly interfaces, easy navigation, clear buttons and menus, informative content, and quick access positively impact the user experience of e-learning tools. The design of user experience in e-learning tools aims to facilitate easy access to learning materials, encourage effective interaction, and maintain high motivation among students. To achieve this, user research should be conducted to understand students' needs and preferences, and this information should be integrated into the design of e-learning platforms. Additionally, ensuring that e-learning tools are compatible with mobile devices is crucial. Easy access to learning materials from different devices at any time and place enhances the flexibility and accessibility of the e-learning experience. Therefore, responsive design principles should be considered in the development of e-learning tools (Demirbaş & İnal, 2018).

B. Digitization of Educational Materials and Visual Design

The digitization of traditional educational materials is an important way to offer students a more effective and engaging learning experience. Digital educational materials combine text, visuals, videos, and audio content to cater to various learning styles. Visual design is critical for the effective communication of digital educational materials. Choosing the right color palette, typography, visual hierarchy, and layout is essential for capturing students' attention and

facilitating their understanding of information. Moreover, effective visual design enhances students' focus on the materials and increases their motivation.

Visual hierarchy involves using different visual elements to highlight important information and draw students' attention. Color and contrast should be adjusted to ensure readability and clarity by selecting the appropriate color palette. The harmony of visual elements ensures that text, visuals, and other media elements are coherent and contribute to an integrated design. The visual design of digital educational materials serves as a tool that effectively supports and motivates the learning process. Educational materials created with user-centered and effective visual design principles positively influence students' learning experiences and lead to more effective learning outcomes (Uzunboylu, 2016).

C. Interactive Digital Tools to Enhance Student Engagement

Increasing student engagement is an essential part of providing an effective learning experience. In this context, interactive digital tools are used to allow students to interact with course materials and encourage them to take an active role in the learning process. Interactive digital tools can take various forms, such as online discussion forums, interactive quizzes, virtual labs, simulations, games, and social media integration, which enable students to engage with course materials. These tools contribute to students actively participating in the learning process and enhancing their motivation. They also promote collaboration and interaction among students, facilitating group work and allowing students to learn from each other. Interactive digital tools make educational materials more engaging and interesting, helping students connect more deeply with the learning process. By increasing student engagement, these tools provide a more effective learning experience and enhance the impact of education (Tüzün & Karahoca, 2019).

CONCLUSION

The results of this study emphasize the broad scope and importance of digital design. It is evident that effective communication on digital platforms is a crucial tool for enhancing interactions between brands and users. Digital design can increase user satisfaction and loyalty by providing a delicate balance between visual aesthetics and usability. The proposed digital design principles and techniques are essential for improving user experience and better responding to users' needs. A user-centered design approach should be the focal point in the development of products and services. User research and analysis should be conducted at the beginning of the design process and continuously updated.

Digital marketing strategies allow brands to reach and engage their target audiences. Social media design helps brands establish a strong presence on social media platforms. Digital advertising design enables brands to create eye-catching and effective advertising campaigns. Current digital design trends and future projections can guide designers and brands in shaping their future strategies. These trends are based on technological advancements, user behaviors, and market demands. In the future, more personalized and interactive experiences are expected to take center stage.

The use of digital design in education plays a significant role in enhancing students' creativity and problem-solving skills. Digital design tools and technologies can boost learning motivation by providing students with interactive and engaging learning environments. Additionally, they can help students develop digital skills and effectively compete in the job market. By considering students' multiple intelligences and different learning styles, learning can be made more effective. Integrating visual, auditory, and tactile learning methods can enable students to participate more actively in their learning. This supports deep internalization of the learning process and the formation of lasting knowledge.

Teachers can provide students with a variety of teaching materials and content. They can enrich learning experiences with interactive course materials, virtual labs, and simulations, allowing students to understand topics more deeply and create original projects using supportive materials. The use of digital design in education can promote collaboration among students and enhance

communication skills. Students can work together on group projects and exchange ideas through online platforms and digital collaboration tools, helping them develop teamwork skills and evaluate different perspectives.

To increase the use of digital design in education, it is important for teachers and educational institutions to enhance their digital skills. By organizing training on digital design tools and technologies, teachers can be encouraged to use these tools effectively. It is also essential to educate students about digital ethics and the security of their data. Students should be made aware of ethical behaviors in the digital world and the importance of protecting their personal data.

In conclusion, the use of digital design in education can enrich students' learning experiences and help develop their creative thinking skills and digital competencies. Therefore, educational institutions and teachers can fully harness the potential of digital design to contribute to students' future success.

REFERENCES

Becer, E. (2002). İletişim ve Grafik Tasarım. Ankara: Dost Kitabevi.

Bringhurst, Robert. The Elements of Typographic Style. Hartley & Marks, 2004.

Buley, Leah. The User Experience Team of One: A Research and Design Survival Guide. Rosenfeld Media, 2013.

Demirbaş, İ., & İnal, F. Ş. (2018). Dijitalleşen Eğitim Ortamlarında Tasarım ve Yönetim. Pegem Akadem

Dündar, E. (2010). Tipografi: Kitabın Tasarımı. İstanbul: Grafiker Yayınları.

Güngör, İ. H. (2005). Temel Tasar. (Basic Design). İstanbul: Afa Matbaacılık.

Kocaman, S. (2018). Mobil Uyumlu Web Tasarımı ve Responsive Design. İstanbul: Bilge Adam Yayınevi.

Kholmatova, A. (2017). Design Systems: A practical guide to creating design languages for digital products. Smashing Magazine.

Krug, Steve. Don't Make Me Think: A Common Sense Approach to Web Usability. New Riders, 2014.

Robbins, J. (2018). Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics. O'Reilly Media.

Scott, B., & Neil, T. (2009). Designing Web Interfaces: Principles and Patterns for Rich Interactions. O'Reilly Media.

Smith, J., & Osborn, J. (2013). Adobe Creative Cloud Design Tools Digital Classroom. Wiley.

Tidwell, J. (2010). Designing Interfaces: Patterns for Effective Interaction Design. O'Reilly Media.

Tüzün, H., & Karahoca, A. (2019). Dijital Medya Tasarımı ve Uygulamaları. Anı Yayıncılık.

Uzunboylu, H. (2016). Dijital Öğrenme Tasarımı. Pegem Akademi.

Warfel, Todd Zaki. Prototyping: A Practitioner's Guide. Rosenfeld Media, 2009.

Williams, R. (2014). The Non-Designer's Design Book. Peachpit Press.

Yıldırım, S. (2019). Mobil Uygulama Tasarımı: Kullanıcı Merkezli Yaklaşım. Ankara: Detay Yayıncılık.

Yücedağ, M. (2020). Web Tasarımı: Başlangıçtan İleri Seviyeye. İstanbul: Pusula Yayıncılık.

A REAL-TIME SECURE-BASED OIL AND GAS SUPPLY CHAIN MANAGEMENT USING BLOCKCHAIN

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ABSTRACT

The petroleum industry is the number one global source of energy for both commercial and household or personal use. However its supply chain is ravaged with security challenges such as theft, adultration and diversion of the products both from the officials and the personnels incharge of transporting the products. This ill practices can lead to loss of revenue of the investors, loss of brand integrity and even damages to the consumer's machines or vehicles.

The security of petroleum product supply chains information is essential to mitigate issues such as theft, diversion, hijacking, confidentiality, and privacy breach during the supply chain processes.

The existing IoT and Blockchain solutions employed to mitigate this problems lacks high accuracy and a roboust Blockchin solution, therefore this study presents a real-time secure-bases oil and gas supply chain management for tracking information during the supply chain processes using blockchain technology. By integrating telematics with Ethereum blockchain will ensure adequate tracking, secure the product distribution information, enhancing transparency, and operational efficiency. Key features include smart contracts for automated transaction logging, secure data transmission, and immutable ledger entries. The system's performance was rigorously validated through simulations, demonstrating its effectiveness in real-time data acquisition, and secure data management. This integration of blockchain technology and IoT ensures data confidentiality and immutability, fostering trust among stakeholders.

Keywords: Blockchain Technology, Telematics, Petroleum Product Tracking, Supply Chain Optimization, Smart Contracts, Data Security

GÖÇ VE SUÇ İLİŞKİSİ: KENTSEL UYUM SORUNLARI

MIGRATON AND CRIME RELATIONSHIP: URBAN ADAPTATION PROBLEMS

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ÖZET

Göç ve suç ilişkisi, kentsel yaşam içinde ortaya çıkar. Kentler, merkez banliyö, çöküntü bölgesi, terk edilmiş alan, sanayi, imalathaneler ve fabrika bölgeleri, kentsel dönüşüm alanları, gecekondu bölgeleri ve çember yerleşim bölgelerini içerir.
Özellikle çöküntü bölgeleri, suç açısından asıl yoğunluğun yaşandığı bölgelerdir. Kentleşme ile suç arasındaki ilişki de beş özel değişkeni, özellikle çöküntü bölgeleri ile ilişkilendirebiliriz. Bu beş değişkeni, kişinin kendi dünyasını oluşturamaması olarak iktidarsızlık, davranışlarını yorumlayacak inanç sisteminin olmaması nedeniyle yaşadığı anlam kayması ve anlamsızlık, kişinin davranışları üzerindeki toplumsal normların gücünün bozulması, etkisizleşme, kontrol dışı alan ve normsuzluk, kişinin yüksek değerlerinden, koruyucu siperden ayrışması, yalnızlaşması, yalıtılmışlık ve kişinin iç anlamsızlıklardan çok, dışa ait beklentiler konusundaki davranış bağımlılığı olarak yabancılaşma olarak sayabiliriz. Bu unsurların hepsi, negatif kimlik denilen yabancılaşma sürecini hızlandırır.
Suçun ekolojik bir kavrayış olarak, kent-suç ilişkisi, yoksulluk düzeyi, nüfus hareketliliği, yerleşim yerinin özelliği, toplumsal eşitsizlik ve gecekondulaşma gibi değişkenler açısından göç olgusunun irdelenmesini gerektirmektedir. Çevre-suç ilişkisi olarak ekolojik yaklaşım, suçu, çevrenin değişimi ile birlikte ortaya çıkan toplumsal değişmenin bir fonksiyonu olarak açıklamaktadır.
Kente yeni göçenlerle birlikte, her türlü yeni arayış içinde olan bireyler, bohemler gibi karmaşık bir toplumsal yapılanma içinde hem bir arada olma imkanı hem de tecrit olanağı tanıyan bölgeleri tercih etmektedir. Böylesi bir dokunun, genellikle suç yoluyla yaşamını kazananları da bölgeye çekeceği aşikardır. Göç ile suç arasındaki ilişkinin en büyük nedenlerinden biri de göçülen yere bağlı olarak yaşanan uyum sorunlarıdır. Toplumsal kontrol mekanizmasının zayıflaması ve aile bağlarının bozulması uyum problemlerini ortaya çıkarır.
Göç olgusunda, sağlıksız kentleşme ve aşırı liberal politikalar da göçmenlerin kentle bütünleşmesine engelleyerek, özellikle çöküntü bölgelerinde suçluluğu arttırmaktadır.

Anahtar Kelimeler, Göç, Sağlıksız Kentleşme, Göç Suçluluğu, Negatif Kimlik, Çöküntü Bölgeleri.

ABSTRACT
The relationship between migration and crime emerges in urban life. The city includes the central suburb, depression zone, abandoned area, industry, mills and factories zones, urban regeneration areas, slums and circle settlements.
Especially the depressed areas are the areas where the main density is experienced in terms of crime. We can associate the relationship between urbanization and crime with five special

variables, especially depression zones. We can count these five variables as impotence as the inability to create one's own world, meaning shift and meaninglessness experienced due to the lack of a belief system to interpret one's behavior, deterioration of the power of social norms on one's behavior, inactivation, uncontrolled space and normlessness, separation from one's high values, protective shield, isolation, isolation and alienation as behavioral dependence on external expectations rather than internal insignificance. All of these elements accelerate the process of alienation called negative identity.
We see that certain regional areas in the city are shaped as slum districts with the pattern of citizenship. As an ecological understanding of crime, it requires examining the phenomenon of migration in terms of variables such as city-crime relationship, poverty level, population mobility, characteristics of the settlement, social inequality and squatting. The ecological approach as an environmental-crime relationship explains crime as a function of social change that occurs with the change of the environment.
Social distance, anonymous relationships and intense mobility, which are typical of migration, can be clearly observed in transition zones. With the new immigrants to the city, individuals in all kinds of new searches prefer regions that allow both the opportunity to be together and the possibility of isolation in a complex social structure such as bohemians. It is obvious that such a texture will also attract those who usually earn their living through crime to the region. One of the biggest reasons for the relationship between migration and crime is the adaptation problems experienced depending on the place of migration. The weakening of the social control mechanism and the deterioration of family ties reveal adaptation problems.
In the case of migration, unhealthy urbanization and extreme liberal policies also prevent immigrants from integrating with the city, increasing guilt, especially in depressed areas.

Keywords, Migration, Unhealthy Urbanization, Migration Guilt, Negative Identity, Depression Regions.

GİRİŞ

Göçsel hareket ve dinamiklerin araştırılması, incelenmesi, göç sosyolojisi alanının doğmasına neden olmuştur. Göç sosyolojisiyle ilgili araştırmalarda, göçün başlıca sebebi, gelişmemiş toplumdan gelişmiş topluma geçişle bağlantılı olduğu görülmektedir. Bu gelişmişlik, aynı zamanda endüstrileşmeyle sanayiyle ve kentleşme olgusunun gelişimiyle doğrudan bağlantılıdır.

Bir kentin gelişmişliği ve ilgi merkezi olması, göç alma potansiyelini arttırmaktadır. Göç olgusunun mekan zaman ve karşılığının, etkileşim ilişkileri üzerinde durulduğunda ve göçün etkenlerine bakıldığında, her türlü göç olgusunun dinamikliği ve yarattığı uyum sorunları dikkat çekmektedir.

Göç olgusu gelişmemiş bölgelerden daha gelişmiş bölgelere doğru yapılan yer değiştirme hareketleri sonucunda, göçmenlerin, yeni yerleşilen gelişmiş kentlerde yaşadığı uyum sorunları, zamanla suç olgusuna dönüşmektedir. Çalışmamızda, bu nedenlerle, suç ve göç kavramlarını inceleyerek, kentsel uyum sorunlarına odaklanmak istedik.

GÖÇ KAVRAMI VE GÖÇ OLGUSU

Göç insanların bulundukları yerden başka bir yere giderek yerleşmeleridir. Bu hareketin nedenleri, herkes için farklı olsa da göç etme nedenlerini, toplumsal, ekonomik, kültürel ya da siyasi nedenler olarak belirleyebiliriz koloş 296 Uluslararası Göç Örgütü'ne göre de, göç, insanların ülkelerinde bulundukları yerden başka bir yere ya da başka ülkelere gitmek üzere yer

değiştirmesidir (Karabıyık, 2022:59). Göç, aynı zamanda coğrafik, bir taşınma hareketidir (Yalçın, 2004: 13).

Politik, çevresel ve iktisadi istikrarsızlıklar yüzünden insanlar göç etmek zorunda kalmışlar ve ülkelerdeki göçmen sayısı hızla artmıştır (Nail, 2022: 11). Savaşlar ve ekonomik koşullar, insanları ister istemez göçe zorlamaktadır. Göç, insanların yaşadıkları yerden uzağa gidip, gittikleri yerlere yerleşmeleridir. Coğrafi bir olgu olarak göç, insanlığın var oluşundan beri gerçekleşen bir deneyimdir (Karabıyık, 2022:56). Göçün yarattığı değişiklik, isteğe bağlı olup olmamasına, göç edilen yere ve zamana kadar çeşitli kıstaslara bağlıdır. Göç, çok katmanlı ve çok boyutludur (Ela Özcan, 2017: 186).

Göç, insanların yaşadıkları yerleri belirli bir nedenle mekan değişikliği yaparak, kısa veya uzun zaman için değiştirmesidir (Akış ve Akkuş, 2003: 531). Bir başka yaklaşımda Göç kavramı, köy, kent gibi iskân yerlerine yerleşmek üzere yapılan nüfus hareketleridir (Başol, 1995).

Göç, insanların belli bir yerden, başka bir yere geçmeleridir. Göçün temel nedenleri arasında, toplumsal, ekonomik, kültürel ve siyasal nedenler olabilir. Göç, bir hareketlilik halidir, göç alınır veya göç verilir. Çeşitli faktörlerin etkisiyle gerçekleşen göçleri, iç göçler, dış göçler, gönüllü göçler, zorunlu göçler gibi türlere ayırabiliriz. Ayrıca ulusların, mübadeleyle yapılan göçleri de bu kapsamda sayabiliriz.

Göç eden kişiye göçmen ya da muhacir adı verilir. Göçmenler, ülkeler arasında göç eden kişidir. Hukuksal bağlamda göçmenler, bırakılan ve yerleşilen ülke olmak üzere en az iki ülkeyi ilgilendirmektedir. Göçlerin en fazla ve en yoğun olduğu zamanlar, sanayileşme dönemleridir. Sanayileşme hareketleriyle, kırsal kesimlerde yaşayan insanların iş imkânlarına doğru yönelişi ortaya çıkar.

Göçleri teşvik eden nedenlerle, göçe zorlayan şartlar son derece farklı nedenlere dayanmaktadır. Genellikle ekonomik sebeplere dayanan göçler, göçmenleri zorunlu göçlere yöneltmektedir. Aynı şekilde, bulunulan yerlerdeki savaşlar veya hayatı tehlike durumları da zorunlu göçe neden olabilir. İstekle yapılan göçlerin sebepleri ise, iş ve gelir imkanları, barınma ve eğitim olanaklarıdır.

Dış göçler, günümüzde en geniş anlamıyla ülkeler arası göçlerdir. Nüfusun ağırlıklı olarak yerleştiği gelişmemiş bölgelerden, gelişmiş ülkelere doğru gerçekleşir. Ülke içindeki iç göçlerde benzer nedenler göstermekte ve göçün yönü, büyük oranda kırsal kesimden kente doğru olmaktadır. Bir yer değiştirme hareketi olan göç, toplumsal yapının hareketliliğini gösterir (Gürkan, 2006 :10).

Tarih boyunca yaşanan toplumsal göçleri, ilkel göçler, zorlama-sürülme göçleri, serbest ve kitlesel göçler olarak dört şekilde sınıflandırabilir (Nas, 2022:75). Göç, çok çeşitli sebeplerle yapılabilir. Ekonomik amaçlar, siyasa nedenler, ekolojik sorunlar ya da kişisel sebeplerle yapılan, coğrafik, yer değiştirmelere göç adını veriyoruz. Başka yerlere kısa vadeli taşınma hareketleriyle başlayan göçler yanında uzun süreli bazen geriye dönüşlü, bazen geriye dönüşsüz olan bu yerleşme hareketi, özünde toplumsal bir olgudur (Yalçın, 2004: 13).

Göç, yerleşim yerinde yapılan değişiklikler dışında da çevreyi etkileyen çok boyutlu, çeşitli kıstasları ve farklılıkları bulunan kompleks bir olgudur (Özcan, 2017: 186). Göçler yeni dünyanın en temel hareketleri arasında sayılmaya başlanmış, artık gündelik yaşantımızın içinde yer

almaktadır. Konuşmalarımızdaki, göçmen, muhacir, dışarlıklı, mülteci, sığınmacı gibi kavramlar, göçün yaşantılarımıza nasıl dahil olduğunu göstermektedir (Adıgüzel, 2016: 22).

Göç, toplumsal yaşam içinde her alanda etkisini gösterir. Göçten en fazla aileler etkilenir. Özellikle aile göçü yaşanmışsa, yerleşilen yerlerin koşullarına ve yaşamsal zorluk durumlarına göre başta yoksunluk olmak üzere, bireylerin aşırı zorlanmasıyla, aile içi şiddet ve eğitimsel sorunları ortaya çıkar (Ünsal, 2022, 84).

Göçe sebep olan çok yönlü nüfus hareketlerinin, gerçek sebebi, ekonomiktir. Öte yandan, teknolojik ilerlemeler, iletişim tekniklerindeki gelişmeler, eğitim, savaş ve terör gibi sosyal ve kültürel faktörler de göç hareketlerini yaratabilirler (Sevinç, Kantar Davran, Sevinç, 2018:74). Göç hareketinin başladığı ve sonlandığı yerlere göre göçler, farklı isimlerle anılırlar. Başka ülkelere yapılan göçlere dış göç ve ülke içinde yapılan göçlere iç göç adı verilir. Zaman açısından göçün çerçevesi çizilmeye çalışıldığında, kesin bir zaman aralığı verilemese bile, bu sürenin bir yıl veya daha fazla olduğu kabul edilmektedir.

Türkiye'deki iç göçlerde, köyden büyük kentlere göçülür ve göçlerin büyük bir kısmı, yoksulluk nedeniyle yapılan ekonomik sebeplere bağlıdır. Çoğunlukla çevresel ve yöresel dayanışmayla gerçekleştirilirken, bu dayanışma da hemşerilik kavramı büyük rol oynar.

Cumhuriyet'in kuruluşuyla birlikte mübadele göçlerine tanık olan Türkiye'de çok uzun süre iç ve dış göçler yaşanmıştır. Son zamanlarda yaşanan savaşlar yüzünden, çok kısa sürede milyonlarla ifade edilen kitlesel bir göçe maruz kalınmıştır. Üstelik kısa süreli olduğu düşünülen bu göçler, Suriye'de ve bölgede devam eden siyasal ve toplumsal kargaşadan dolayı kronik bir hal almıştır (Canatan, 2020: 7).

SUÇ VE SUÇUN UNSURLARI

Suç Kavramı ve Suçun Teorik Yapısı

Suç evrensel bir olaydır. Tarihin en eski devirlerinden beri var olan suç eylemi, evrenseldir. Hep var olmuş ve hep de var olacaktır (Dönmezer, 1984:62). Durkheim'e göre, suç normal bir sosyoloji olayıdır, normaldir. Suçun, meydana gelişi zorunlu ve faydalıdır.

Suç kavramı, suçla mücadele modern ceza hukukunun temel kavramlarından biridir. Hukuksal yapıda ortaya çıkan ve kriminoloji bilimi tarafından araştırılan suç olgusu, sosyal bir kavram olarak, sosyolojik niteliklere sahiptir. Suç kavramını bütün boyutlarıyla ve bu nitelikleriyle birlikte tanımlayabiliriz (İçel, 1999:15). Ancak suçun ceza hukukundaki tanımı, çok daha değerlidir. Suç, toplumsal yaşamın içinde yer alırken, bu toplumun çoğunluğu tarafından tehlikeli olarak kabul edilen ihmal ve icrai nitelikteki hareketler olarak da tanımlanabilir (Dönmezer, 1984:60).

Suç teşkil eden eyleme karşı, kolektif yaptırımın zorunlu kılınmasının sebebi, suçun ortaya koyduğu tehlikedir. Suç, Ceza Kanununun yasakladığı, toplumsal yaşam için zararlı olan bir eylemdir (Dönmezer, 1984:60). Kriminoloji bilimi, suç olayını incelemektedir. Kriminoloji biliminin çalışmaları, polise, mahkemelere ve suç ile savaşanlara yardımcı olmayı amaçlar. Tüm çalışmalarda araştırılan kişiler suçlular ve suçlu kişiliklerdir. Bu kişiler, yasaları ihlal eden suçlulardır (Dönmezer, 1984:61).

Suçun Genel ve Özel Unsurları

Genel suç olgusunda bulunan yapısal özellikler, suçların ortak unsurlarıdır. Bu nitelikleri nedeniyle, tipe uygun eylem, hukuka aykırılık ve kusurluluk unsurlarına, suçun genel unsurları veya suçun asli unsurları adı verilir. Suç normuna bakıldığında, genel unsurlardan bazılarının, kanun koyucu tarafından hukuken tanımlandığı görülür. Suçu düzenleyen maddelerde "hukuka aykırı", "haksız", "gayrı meşru" kavramlarıyla hukuka aykırılık unsuruna özel olarak değinilmiştir. Aynı şekilde, "Kasten", "taksirle" suçun işlenmesi gerektiğini gösteren kavramlara da suç tanımlarında rastlanabilir. Suç tanımlarında, o suçun oluşabilmesi için, gerekli olan diğer bazı özelliklerde öngörülebilir. Suç tanımında, o suç için belirtilen unsurlara, suçun özel unsurları adı verilir (İçel, 1999:19).

Belirli bir suç için, özel olarak suç tanımında yer alan bir unsur, suç kavramı olarak, uygun eylem, hukuka aykırılık, kusurluluk içinde kalması durumunda, bile genel unsur vasfını ortadan kalkmaz. Bu nedenle, suç tanımında özel olarak gösterilmiş bir genel unsurun analizinin, yine suçun yapısal unsurları teorisinin, yani suç teorisinin verilerine göre yapılması gerekir. Suçun genel unsurunun suç tanımındaki özel durumu, suç teorisine ilişkin kural ve ilkelerin oluşturulmasına yön verebilir. Hukuka özel aykırılık ve özel kast kavramları, bu duruma örnek olarak sunulabilir.

Suçu düzenleyen maddelerde, suçun genel ve özel unsurlarının kapsamına girmeyen diğer bazı olgulara da rastlanabilir. Bu olgular, suçun yapısını oluşturmayan, suçun anatomik bünyesinin bir parçası olmayan ve bunun içinde suçun yapısal unsurlarının dışında kalan kavramlardır. Objektif cezalandırılabilirlik koşulları, ön koşullar ve kovuşturma koşulları olarak da isimlendirilen bu kavramların, suçun unsurlarından özenle ayrılmaları zorunluluğu bulunmaktadır. Zira, bu koşullar, gerçekleşmeseler bile, suç varlığını korumaya devam eder (İçel, 1999:19).

KENT GÖÇ VE SUÇ İLİŞKİSİ

Kent ve Kentleşme Olgusu

Kent kavramını, "Kent, tarımsal olarak üretim yapılan ve tüm üretimin denetlendiği, dağıtımın kontrol edildiği, belirli teknolojilerin beraberinde getirdiği büyüklük, yoğunluk, heterojenlik ve bütünleşme düzeylerine varmış yerleşme türüdür." şeklinde tanımlayabiliriz. (Gölbaşı, 2008:70).

Gelişmiş şehirlerde, büyük ve tarımsal olmayan işyerlerinin çoğalması, ihtisaslaşma ve örgütlenme, göçü arttırmaktadır. Bu büyümeyle birlikte, göçmenlere düzenli yaşama ve çalışma koşulları yaratılmaktadır. Kentlere göçenler, çalışma yerlerine yakın ve en az masrafla ulaşım sağlayabilecekleri, kentlerin geçiş bölgelerine konumlanırlar.

Bir şehrin gelişmesi, iç bölgelerinin gelişmesinden anlaşılabilir. Modern kentin mimari tasarımı, genellikle iç bölge terimi ile anılan bir merkez, etrafını kuşatan iş yeri ve konutların arada bulunduğu geçiş bölgesi ve bu bölgeyi çevreleyen ucuz konut bölgesi, sonra orta sınıf konut bölgesi, en dışta da ağır sanayi bölgesi ile zengin konutlar bölgesi şeklinde sıralandığı görülmektedir.

Geçiş bölgelerinde belirsizlik, karışıklık ve düzensizlik hakimdir. Geçiş bölgelerinin en belirgin sosyal karakteri, şehrin en az gelir sağladığı (örneğin vergi açısından) ancak en fazla masrafı gerektiren yerler olmasıdır. Buralar aynı zamanda kentteki çöküntü alanlarının arttığını bölgeler olarak karşımıza çıkarlar. Bu durum arada kalmışlığı ve suç eğilimlerini ortaya çıkarır.

KENT VE SUÇ İLİŞKİSİ

Göç ve kent ilişkisinde ortaya çıkan suç olgusunun en büyük nedeni göçenlerin kentsel uyum problemleridir. Göçenler, kentsel yaşamın toplumsal kontrol mekanizmalarına yabancıdırlar. Oralarda nasıl yaşanılacağını bilemezler, bilseler de kente uyum sağlamayı başaramazlar. Üzerlerindeki toplumsal kontrol zayıflamıştır. Aile bireyleri arasındaki bağlılık zayıflamaya ve bozulmaya başlamıştır (Işıktaç ve Koloş, 2022:300).

İlk göçenler arasında suç oranlarının düşüktür. Ancak göçmen çocuklarında suç işleme eğilimleri artış gösterir. Disiplin suçları artarken, aynı zamanda bu durumlarda, madde bağımlılığının da arttığı gözlenmektedir. Göçmen çocuklarının suça eğilimleri, genellikle arada kalmışlıkla açıklanmaktadır (Işıktaç ve Koloş, 2022:301).

Suç olgusu, ekolojik olarak kentleşmeyle birlikte incelendiğinde, kent suç ilişkisi, çoklu bir yapı ortaya koyar. Yoksulluk, nüfus, göçülen yerin özellikleri, toplumsal davranış kalıpları, kentsel yerleşim alanları ve gecekondulardan oluşan değişkenler, toplumsal eşitsizlikler yaratır, kentsel uyum sorunlarına neden olurlar (Işıktaç ve Koloş, 2022:300).

Kentleşme ile suç arasında ortaya çıkan değişkenleri, özellikle çöküntü bölgeleri ile ilişkilendirebiliriz. Kentsel yaşama uyum sorunları yaratan, değişkenlerin başında göçenlerin yaşadığı anlam kayması ve anlamsızlıkla ortaya çıkan iktidarsızlık, kişinin davranışları üzerindeki, toplumsal normların gücünün bozularak etkisizleşmesi ve kuralsızlık, yüksek yaşam değerlerinden ve koruyucu değerlerden kopuş, yalnızlaşma, yalıtılmışlık duyguları gelir. Kentsel uyum sorunlarında ortaya çıkan çok önemli bir değişken de yabancılaşmadır.

SONUÇ

Göç ve suç ilişkisi, kentsel yaşam içinde ortaya çıkar. Kentsel yerleşim alanlarında geçiş bölgeleriyle birlikte ortaya çıkan çöküntü bölgeleri, suç oranlarının arttığı bölgelerdir. Kentleşme ile suç arasında sorun yaratan değişkenleri, özellikle çöküntü bölgeleri ile ilişkilendirebiliriz.

Kentsel yaşama uyum sorunları yaratan değişkenlerin başında, göçenlerin yaşadığı anlam kayması ve anlamsızlıkla ortaya çıkan iktidarsızlık, kişinin davranışları üzerindeki toplumsal normların gücünün bozularak etkisizleşmesi, kuralsızlık, yüksek yaşam değerlerinden ve koruyucu değerlerden kopuş, yalnızlaşma, ve yalıtılmışlık duyguları sayılabilir. Bir diğer önemli değişken, yabancılaşmadır.

Göçün tipik özellikleri ve uyum sorunları en fazla geçiş bölgelerinde gözlemlenebilir. Geçiş bölgelerinde, göç suç ilişkinin yapılandırıldığı ve bu nedenle, bu bölgelerdeki kentsel uyum problemlerinin suça dönüştüğü görülmektedir. Göç olgusunda ortaya çıkan sağlıksız kentleşme, suça eğilimi arttırmakta, göçmenlere uygulanan yanlış politikalar, onların kentle bütünleşmesine engel olarak, özellikle çöküntü bölgelerinde suçluluğu arttırmaktadır.

KAYNAKLAR

Adıgüzel, Y., (2016). Göçmenlerin Kültürel Entegrasyonu, https://www.academia.edu/30509638/Go_c_menlerin_Ku_ltu_rel_Entegrasyonu_pdf.
Akış, A. ve Akkuş, A. (2003). "Güneydoğu Anadolu Projesi'nin Şanlıurfa'daki Göçe Etkisi", Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10: 529 – 542.
Akyüz, V., (2019). Hukuk Sosyolojisi Ders Notları, İstanbul.
Başol, K. (1995). Demografi, Anadolu Matbaası, İzmir.
Canatan, K., (2000). GÖÇ Sosyolojisi, Ankara.
Davran, M. K., Sevinç, M. R. ve Sevinç, G. (2011). "Kırdan Kente Yapılan İç Göçler ve Toplumsal Cinsiyet", Göç ve Mimarlık Dergisi,İstanbul.
Durkheim, E., (1995). Toplumbilimsel Yöntemin Kurallar, İstanbul.
Dönmezer, S., (1984). Kriminoloji, İstanbul.
Özcan, E. D. (2017). Çağdaş göç teorileri üzerine bir değerlendirme. İş ve Hayat, 2(4): 183-215.
Gürkan, M., (2006), Sosyolojik Açıdan Göç ve Yasadışı Göç Hareketleri, Kırıkkale.
Gölbaşı,S., (2008). Kentleşme ve Suç, On İki Levha Yayıncılık, İstanbul.
Karabıyık, M.S., (2022). Göç Sosyolojisi Çalışmalarına Dair Eleştirel Sosyolojik Bir Yaklaşım, /https://tezkiredergisi.org/wp-content/uploads/2023/01/tezkire-81.sayi_toprak-4-2-55-74.pdf.
Işıktaç, Y. Ve Koloş, U., (2022). Hukuk Sosyolojisi, İstanbul.
İçel, K., (1999). Suç Teorisi, İstanbul.
Nas, F., Göç ve Göçün Yol Açtığı Sorunlar, Göç Sosyolojisi, https://acikerisim.bartin.edu.tr/bitstream/handle/11772/16161/GVEGNYOLATIISORUNLAR.pdf?sequence=1&isAllowed=y.
Sevinç, G., Kantar Davran, M., Sevinç, M.R., (2018). Türkiye'de Kırdan Kente Göç ve Göçün Aile Üzerindeki Etkileri, İktisadi İdari ve Siyasal Araştırmalar Dergisi.
Ünsal, H., (2022). Göç ve Aile: Göçün Aile Üzerindeki Etkileri, Uluslararası Psiko-Sosyal Eğitim Araştırmaları Dergisi / e-ISSN: 2822-4574 Yıl: 2022, Cilt: 2, Sayı: 3.

SUÇ SOSYOLOJİSİNDE UYMA UYMAMA DAVRANIŞLARI VE SUÇ KAVRAMI

COMPLIANCE AND NON-COMPLIANCE BEHAVIORS IN SOCIOLOGY OF CRIME AND THE CONCEPT OF CRIME

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ÖZET

Hukukun normatif karakteri, hukukun zorlayıcılık ve emredicilik özelliklerini de gösterir, hukukun biçimsel yönünü ortaya koyar. Ancak normatiflik, hukuk dışında çeşitli değer yansımaları olarak din ahlak, örf ve adet kurallarında da kendini gösterir. Normlar ve kurallar, olması gerekenin yansımalarıdır. Toplumsal yapı da uygulanması gereken normlar, kültürden kültüre değiştiği kadar, aile kültürünün parçaları arasında ve aynı kültürün parçaları arasında da değişebilir. Suç ve suç olgusu, toplumsal düzeni sağlayan kurallara uymama ve sapma halidir. Hukuk sosyolojisinin suçu odağa alıp inceleyen bölümüne suç sosyolojisi adı verilir. Uyma-uymama davranışının incelenmesi, hukuk sosyolojisi ve kriminlojinin ortaklaşa çalışma alanı olarak görülebilir.

Dünyanın hiçbir yerinde bütünü ile düzenli bir topluma rastlanamaz. Uyma-uymama davranışları, rol ve statüler yanında toplumsal kontrol mekanizmalarıyla da biçimlenir. Toplumsal kontrol, toplumsallaşma süreci olarak öğrenme alanı içinde, bireyler için bir etkileşim ve kişilik özelliğine dönüştüğünde içselleştirilmiş olur. Uyum gösterme, takdir edilip onaylanan bir davranış iken, uymama halleri, en basitinden itaatsizlik ve saygısızlıktan başlayarak hukuksal açıdan cezalandırılmaya kadar geniş bir alana yayılır.

Suç ve suç olgusu, toplumsal düzeni sağlayan kurallara uymama ve sapma halidir. Hukuk sosyolojisi ve kriminolojide suçun ne olup ne olmadığı tartışılırken, suçla ilgili temel ölçü, pozitif hukuk kurallarınca ortaya konulmuş bir çerçeveye bağlıdır. Suç olarak uymama halleri, toplumsal kurallara ve normlara itaatsizliğin her türünü kapsar. Toplumun büyük çoğunluğunun değerlerine karşı yapılan uyumsuz olan davranışa, sapkın davranış adı verilir. Sapkın davranış suçtan daha geniştir.

Aynı şekilde suçtan daha büyük bir alanı kapsayan hukuka aykırılık, özel hukuk anlamındaki uyumsuzluklar ve sorumluluk hukukunda da sorunlar ortaya çıkarır. Yine de suçun ve suçla ilgili temel ölçütün, pozitif hukuk kurallarınca ortaya konulmuş bir çerçeveye bağlanan, ceza hukukunun ihlaliyle ortaya çıkan, devlet organlarınca belirlenip cezalandırılan fiiller olduğunu söylemek gerekir.

Anahtar Kelimeler: Suç Olgusu, Sapma, Sapkın Davranış, İhlal, Kriminoloji.

ABSTRACT
The normative character of the law also shows the coercive and imperative characteristics of the law and reveals the formal aspect of the law. However, normativity also manifests itself in the rules of religion, morality and custom as various value reflections other than law. Norms and rules are reflections of what should be. The norms that need to be applied in the social structure can vary from culture to culture, as well as between parts of the family culture and between parts of the same culture. Crime and the phenomenon of crime is a state of non-compliance and deviation from the rules that ensure social order. The part of the sociology of law that focuses on and examines crime is called the sociology of crime. The study of compliance-non-compliance behavior can be seen as a collaborative field of study of the sociology of law and criminology.
Nowhere in the world can a regular society be found with its entirety. Compliance and non-compliance behaviors are shaped by social control mechanisms as well as roles and statuses. Social control becomes internalized when it turns into an interaction and personality trait for individuals within the learning area as a process of socialization. While compliance is a behavior that is appreciated and approved, non-compliance extends from the simplest to disobedience and disrespect to legal attraction.
Crime and the phenomenon of crime is a state of non-compliance and deviation from the rules that ensure social order. In sociology of law and criminology, when discussing what crime is and is not, the basic measure of crime depends on a framework set forth by positive rules of law. Non-compliance, in its broadest form, encompasses all forms of disobedience to social norms. Behavior that is incompatible with the norms adopted by the vast majority of society is called deviant behavior. Deviant behavior covers a wider area than crime.
Likewise, unlawfulness covers a wider area than crime. Non-compliance in the sense of private law or problems arising in accordance with the law of liability are unlawfulness. Nevertheless, it should be said that the crime and the basic criterion related to the crime are the acts that are determined and punished by the state organs, which are bound to a framework set out by positive law rules, emerged by violation of criminal law.

Keywords: Crime Phenomenon, Deviation, Deviant Behavior, Violation, Criminology.

GİRİŞ

Toplumsal düzen kurallarına uymamak, suçu oluşturur. Suç ve suç davranışının öğrenilmesi de aynı şekilde, uyma davranışına benzer. Kalıtımsal anlamdaki etkileşimle birlikte, çevreyle kurulan etkileşim ve ilişki son derece belirleyicidir. İnsanı çevreleyen bu ilişki ortamındaki suç davranışı özünde bir uyma uymama davranışıdır. Çalışmamızda, bu nedenle, suç davranışının topluma etkilerini görmek üzere, toplumsal düzenin normatif yapısı içinde uyma uymama davranışları üzerine genel bir okuma yapmaya çalıştık.

SUÇ VE SUÇ KAVRAMI

Suç evrensel bir olaydır. Tarihin en eski devirlerinden beri var olan suç eylemi, evrenseldir. Hep var olmuş ve hep de var olacaktır (Dönmezer, 1984:62). Durkheim'e göre, suç normal bir sosyoloji olayıdır, normaldir. Suçun, meydana gelişi zorunlu ve faydalıdır.
Suç kavramı, suçla mücadele modern ceza hukukunun temel kavramlarından biridir. Hukuksal yapıda ortaya çıkan ve kriminoloji bilimi tarafından araştırılan suç olgusu, sosyal bir kavram olarak, sosyolojik niteliklere sahiptir. Suç kavramını bütün boyutlarıyla ve bu nitelikleriyle birlikte tanımlayabiliriz (İçel, 1999:15). Ancak suçun ceza hukukundaki tanımı, çok daha değerlidir. Suç, toplumsal yaşamın içinde yer alırken, bu toplumun çoğunluğu tarafından tehlikeli olarak kabul edilen ihmal ve icrai nitelikteki hareketler olarak da tanımlanabilir (Dönmezer, 1984:60).

Toplumsal yapıdaki değişim, bu değişimle birlikte bazı rolleri değişmesi, bazı rollerin kaybolarak ortadan kalkmasını, bazen de yeni rollerin ortaya çıkışına neden olur. İnsanın, çevresiyle olan iletişimi, karakterinde son derece belirleyici bir etki yaratır. Bu etki aynı zamanda toplumsal bir olgudur (Işıktaç ve Koloş, 2022:274).

Suçun, kültürel etkileşimin bir sonucu olarak, öğrenmeyle ortaya çıkması yüzünden, kültürel öğrenme teorisiyle, suçun ortaya çıkışı arasında bir bağlantı kurulmaya çalışılmaktadır. Suç, toplumsal yapı ve kurallara itaatsizlik ve bir uymama halidir. Bu itaatsizlik, toplumsal normlara itaatsizliğin, her biçim ve türünü kapsar(Işıktaç ve Koloş, 2022:266).

Suç davranışının öğrenilmesine ilişkin süreçler, toplumsal uyum süreçleriyle birlikte işler. (Akyüz: 276) Toplumsal yapı içinde ortaya çıkan suçların, birtakım kıstaslara göre sınıflandırması, daha iyi kavranmasını sağlayabilir. Suçların, yapılış biçimlerine, sayılarına ve sonuçlarına göre ayrı ayrı tanımlanması mümkündür (Akyüz: 276). Toplumsal yapı içinde bir kişinin bir eylemi yapma sorumluluğunun kaynağı, Kanunda, sözleşmeden veya önceden yaptığı tehlikeli bir eylemden doğabilir. Kanunun emrettiği eylemlerin yapılmaması, kanundan doğan sorumluluğun yerine getirilmemesi, ihmali bir suçtur (Akyüz: 276).

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Suçun, kültürel etkileşimin bir sonucu olarak, öğrenmeyle ortaya çıkması yüzünden, kültürel öğrenme teorisiyle, suçun ortaya çıkışı arasında bir bağlantı kurulmaya çalışılmaktadır. Suç, toplumsal yapı ve kurallara itaatsizlik ve bir uymama halidir. Bu itaatsizlik, toplumsal normlara itaatsizliğin, her biçim ve türünü kapsar (Işıktaç ve Koloş, 2022:266). Suç davranışının öğrenilmesine ilişkin süreçler, toplumsal uyum süreçleriyle birlikte işler (Akyüz, 2019: 276).

Toplumsal yapı içinde ortaya çıkan suçların, birtakım kıstaslara göre sınıflandırması, daha iyi kavranmasını sağlayabilir. Suçların, yapılış biçimlerine ve sayılarına göre suç eylemindeki hareketin sayısına göre, tek hareketli suçlar, birden fazla hareketli suçlar olarak ve seçimlik hareketli suçlar olarak tanımlanması mümkündür (Akyüz, 2019: 276).

Toplumsal yapı içinde bir kişinin bir eylemi yapma sorumluluğunun kaynağı, Kanunda, sözleşmeden veya önceden yaptığı tehlikeli bir eylemden doğabilir. Kanunun emrettiği eylemlerin yapılmaması, kanundan doğan sorumluluğun yerine getirilmemesi, ihmali bir suçtur (Akyüz, 2019: 276).

Suç sosyolojisinde suçluluğu açıklamaya çalışan teoriler, biyolojik, psikolojik ve sosyolojik teoriler olarak karşımıza çıkar. Biyolojik temelli suç analizleri, suçlunun bedensel yapısının, bir suçlu tipi yarattığını, anormal ve doğuştan dejenere olduğunu ileri sürerek bedensel yapı ile suçluluk arasında doğrudan bir bağlantı olduğunu söylemektedir (Işıktaç ve Koloş, 2022:269).

SUÇUN TEORİK YAPISI VE UNSURLARI

Suç teşkil eden eyleme karşı, kolektif yaptırımın zorunlu kılınmasının sebebi, suçun ortaya koyduğu tehlikedir. Suç, Ceza Kanununun yasakladığı, toplumsal yaşam için zararlı olan bir eylemdir (Dönmezer, 1984:60). Kriminoloji bilimi, suç olayını incelemektedir. Kriminoloji biliminin çalışmaları, polise, mahkemelere ve suç ile savaşanlara yardımcı olmayı amaçlar. Tüm çalışmalarda araştırılan kişiler suçlular ve suçlu kişiliklerdir. Bu kişiler, yasaları ihlal eden suçlulardır (Dönmezer, 1984:61).

Genel suç olgusunda bulunan yapısal özellikler, suçların ortak unsurlarıdır. Bu nitelikleri nedeniyle, tipe uygun eylem, hukuka aykırılık ve kusurluluk unsurlarına, suçun genel unsurları veya suçun asli unsurları adı verilir. Suç normuna bakıldığında, genel unsurlardan bazılarının, kanun koyucu tarafından hukuken tanımlandığı görülür. Suçu düzenleyen maddelerde "hukuka aykırı", "haksız", "gayrı meşru" kavramlarıyla hukuka aykırılık unsuruna özel olarak değinilmiştir. Aynı şekilde, "Kasten", "taksirle" suçun işlenmesi gerektiğini gösteren kavramlara da suç tanımlarında rastlanabilir. Suç tanımlarında, o suçun oluşabilmesi için, gerekli olan diğer bazı özelliklerde öngörülebilir. Suç tanımında, o suç için belirtilen unsurlara, suçun özel unsurları adı verilir (İçel, 1999:19).
Belirli bir suç için, özel olarak suç tanımında yer alan bir unsur, suç kavramı olarak, uygun eylem, hukuka aykırılık, kusurluluk içinde kalması durumunda, bile genel unsur vasfını ortadan kalkmaz. Bu nedenle, suç tanımında özel olarak gösterilmiş bir genel unsurun analizinin, yine suçun yapısal unsurları teorisinin, yani suç teorisinin verilerine göre yapılması gerekir. Suçun genel unsurunun suç tanımındaki özel durumu, suç teorisine ilişkin kural ve ilkelerin oluşturulmasına yön verebilir. Hukuka özel aykırılık ve özel kast kavramları, bu duruma örnek olarak sunulabilir.
Suçu düzenleyen maddelerde, suçun genel ve özel unsurlarının kapsamına girmeyen diğer bazı olgulara da rastlanabilir. Bu olgular, suçun yapısını oluşturmayan, suçun anatomik bünyesinin bir parçası olmayan ve bunun içinde suçun yapısal unsurlarının dışında kalan kavramlardır. Objektif cezalandırılabilirlik koşulları, ön koşullar ve kovuşturma koşulları olarak da isimlendirilen bu kavramların, suçun unsurlarından özenle ayrılmaları zorunluluğu bulunmaktadır. Zira, bu koşullar, gerçekleşmeseler bile, suç varlığını korumaya devam eder (İçel, 1999:19).

SUÇ SOSYOLOJİSİNDE UYMA UYMAMA DAVRANIŞLARI

Hukukun normatif karakteri, hukukun zorlayıcılık ve emredicilik özelliklerini de gösterir, hukukun biçimsel yönünü ortaya koyar. Ancak normatiflik, hukuk dışında çeşitli değer yansımaları olarak din ahlak, örf ve adet kurallarında da kendini gösterir. Normlar ve kurallar, olması gerekenin yansımalarıdır. Toplumsal yapı da uygulanması gereken normlar, kültürden kültüre değiştiği kadar, aile kültürünün parçaları arasında ve aynı kültürün parçaları arasında da değişebilir. Suç ve suç olgusu, toplumsal düzeni sağlayan kurallara uymama ve sapma halidir. Hukuk sosyolojisinin suçu odağa alıp inceleyen bölümüne suç sosyolojisi adı verilir. Uyma-uymama davranışının incelenmesi, hukuk sosyolojisi ve kriminolojinin ortaklaşa çalışma alanı olarak görülebilir.

Dünyanın hiçbir yerinde bütünü ile düzenli bir topluma rastlanamaz. Toplumsal düzene uyumsuzluk olarak uymama davranışları, ister istemez toplumsal kontrol mekanizmalarıyla düzenlenir ve denetlenir.

rol ve statüler yanında toplumsal kontrol mekanizmalarıyla da biçimlenir. Toplumsal kontrol, toplumsallaşma süreci olarak öğrenme alanı içinde, bireyler için bir etkileşim ve kişilik özelliğine dönüştüğünde içselleştirilmiş olur. Uyum gösterme, takdir edilip onaylanan bir davranış iken, uymama halleri, en basitinden itaatsizlik ve saygısızlıktan başlayarak hukuksal açıdan cezalandırılmaya kadar geniş bir alana yayılır (Işıktaç ve Koloş, 2022:265). Hukuksal düzenin normatif yapısı ve normatif karakteri, hukukun yaptırım gücüne, zorlayıcılığına ve emrediciliğine bağlı olarak ortaya çıkar. Normlar, bir olması gerekenin yansımasıdır. Toplumdaki herkese uygulanır.

Toplumsal düzene itaatsizlik olarak suç, bir uymama halini tanımlar. Bu uymama, toplumsal normlara itaatsizliğin her türünü kapsar. Toplumca benimsenen kurallara aykırı ve uyumsuz davranış toplumsal normlara karşı olan davranış, sapkın davranış olarak adlandırılır.

Ceza hukuku açısından suçun nitelendirilmesine bakıldığında, bazı görüşlerce suç kavramı, hukuksal çerçeve içinde yapılması yasaklanmış iradi bir eylem bağlamı içinde sunulurken, bazılarında ise suç eylemi, psikolojik esaslı bir eylem olarak kabul edilir. Öte yandan, bilme ve isteme ile suç arasında kurulan bağlantı, suç sonuçlarının, doğrudan değerlendirilmesine olanak yaratır. Suç teorilerinin bazılarında ise, cezanın, toplumu korumak amacıyla suçlunun iyileştirilmesi için, bir araç olduğu savunulmaktadır.

SONUÇ

Suç ve suç olgusu, toplumsal düzeni sağlayan kurallara uymama ve sapma halidir. Hukuk sosyolojisi ve kriminolojisinde suçun ne olup ne olmadığı tartışılırken, suçla ilgili temel ölçü, pozitif hukuk kurallarınca ortaya konulmuş bir çerçeveye bağlıdır. Toplumsal normlara itaatsizliğin her türünü kapsayan uymama hallerinde, özellikle toplumsal çoğunluğun benimsediği normlara karşı itaatsizlik yapılması, sapkınlıktır, sapkın davranıştır. Toplumun büyük çoğunluğunca benimsenen normlara karşı uyumsuz olan davranış, sapkın davranış olarak isimlendirilir. Yine de suçun ve suçla ilgili temel ölçütün, pozitif hukuk kurallarınca ortaya konulmuş bir çerçeveye bağlanan, ceza hukukunun ihlaliyle ortaya çıkan, devlet organlarınca belirlenip cezalandırılan fiiller olduğunu söylemek gerekir.

KAYNAKLAR

Dönmezer, S., (1984). Kriminoloji, İstanbul.

(İçel, K., (1999). Suç Teorisi, İstanbul.
Akyüz, V., (2019). Hukuk Sosyolojisi Ders Notları, İstanbul.
Durkheim, E., (1995). Toplumbilimsel Yöntemin Kurallar, İstanbul.

Işıktaç, Y., (2008). Hukuk Sosyolojisi, İstanbul.

Işıktaç, Y. Ve Koloş, U., (2022). Hukuk Sosyolojisi, İstanbul.

GUARDIAN: A REAL-TIME DATA ANALYTICS AND MONITORING SOLUTION FOR DISTRIBUTED POS NETWORKS

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ABSTRACT
In today's rapidly evolving digital landscape, the ability to monitor and analyze vast amounts of data in real-time is crucial for maintaining operational efficiency and ensuring seamless service delivery. Distributed systems, such as those utilized by Point of Sale (POS) networks, generate an immense volume of data that must be effectively managed to avoid disruptions and optimize performance. The proposed Guardian system presents an advanced framework designed for real-time monitoring and analysis of distributed POS systems. This system is built to address the critical need for managing and analyzing data generated by approximately 800,000+ POS devices. By integrating key technologies such as Logstash, Elasticsearch, and Redis, the Guardian system enables efficient data collection, processing, and visualization. The architecture is designed to provide instant insights into the performance of POS devices across various regions, allowing for timely intervention and optimization. The paper details the technical components and system architecture, and demonstrates how the Guardian system enhances data-driven decision-making and ensures uninterrupted service delivery in a complex, distributed environment. Future directions for expanding the system’s capabilities are also discussed.

Keywords: Real-Time Monitoring, Distributed Systems, Point of Sale (POS), System Architecture, Data Visualization, Data Analysis, Data-Driven Decision Making.

INTRODUCTION
In the current era of digital transformation, businesses are increasingly reliant on data-driven insights to maintain and enhance operational efficiency. The ability to harness, process, and analyze vast amounts of data in real-time is becoming a critical determinant of success, especially in industries where distributed networks are essential (McAfee & Brynjolfsson, 2017). Retail and banking sectors, in particular, depend heavily on Point of Sale (POS) systems, which are the backbone of transaction processing and customer interactions. These systems facilitate millions of transactions daily and also generate substantial data that can offer valuable insights into customer behavior, operational efficiency, and market trends (Coskun et al., 2023; Ozdenizci Kose et al.,

2023; Kaur & Singh, 2021). However, the challenge lies in effectively managing and analyzing this data, especially when dealing with a large number of POS devices spread across various geographic locations.

The complexity of monitoring and managing distributed POS networks increases exponentially as businesses expand their operations. With thousands of POS devices operating simultaneously across different regions, ensuring their optimal performance becomes a daunting task. Traditional data management strategies often fall short, unable to keep pace with the growing need for real-time insights and rapid response capabilities (Garcia & Santos, 2019). This gap in data management and analysis can lead to operational inefficiencies, missed opportunities for optimization, and, ultimately, a decline in service quality. Consequently, there is a pressing demand for innovative solutions that can provide continuous, detailed, and actionable insights, allowing businesses to monitor, analyze, and optimize their POS networks with greater precision and agility (Zhang & Zhou, 2019).

This research introduces an innovative framework called the Guardian system, specifically designed to meet the challenges of real-time monitoring and analysis of distributed POS systems. The proposed Guardian system provides a comprehensive solution by leveraging advanced technologies such as Logstash, Elasticsearch, and Redis (Gormley & Tong, 2015; Carlson & Fernandez, 2019). This framework is capable of processing and visualizing data from approximately 800,000+ POS devices deployed across various locations, offering users a detailed and real-time view of the network's performance. By enabling the continuous monitoring of POS devices, the Guardian system helps businesses enhance their data management strategies, optimize system performance, and respond swiftly to any emerging issues.

METHOD

In the development of the Guardian system, several advanced technologies were employed to create a robust and scalable framework capable of real-time data monitoring and analysis. This section details the core technologies that form the backbone of the Guardian system, providing insights into their roles, functionalities, and the ways in which they interact within the system.

Logstash is a powerful, open-source data processing pipeline that is integral to the Guardian system's ability to handle vast amounts of data in real-time (Gormley & Tong, 2015; Oprea, 2017). It is responsible for collecting, processing, and forwarding data from various sources to Elasticsearch, where it can be indexed and analyzed. In the context of the Guardian system, Logstash plays a critical role in transforming raw data from POS devices into structured and meaningful information. By leveraging a variety of input, filter, and output plugins, Logstash can ingest data from multiple sources, filter and enrich it, and then forward it to the appropriate storage or analysis platform.

Elasticsearch is a distributed, RESTful search and analytics engine built on Apache Lucene. It is designed to handle large volumes of data quickly and efficiently, making it an ideal choice for the Guardian system’s real-time data analysis needs (Gormley & Tong, 2015; Kononenko & Sommers, 2018). In the Guardian system, Elasticsearch is used to index and store the processed data received from Logstash, and enable fast and flexible search capabilities. Its powerful querying and aggregation features allow for the creation of detailed insights and visualizations, and help users monitor the performance of their POS networks with precision.

Redis is an open-source, in-memory data structure store that serves as a critical component in the Guardian system for managing fast data operations (Carlson & Fernandez, 2019; Rojas & Li, 2018). Known for its high performance and low latency, Redis is utilized to handle real-time data lookups and caching, and ensures that the system can respond rapidly to queries. It plays a key role in enhancing the overall performance of the system, particularly in scenarios where speed and efficiency are significant. Specifically, Redis is used to store frequently accessed data in memory, and provides quick access to necessary information such as POS device status and configurations

to support real-time analysis. Additionally, Redis manages user sessions and maintains stateful connections for ongoing data interactions, further contributing to the system's efficiency (Carlson & Fernandez, 2019; Kleppmann, 2017).

The integration of these core technologies within the Guardian system creates a seamless pipeline for data collection, processing, storage, and analysis. Data from POS devices is first gathered and filtered by Logstash, which then sends the structured data to Elasticsearch for indexing. Elasticsearch's powerful search and aggregation capabilities are leveraged to analyze the data and generate insights (Gormley & Tong, 2015; Kononenko & Sommers, 2018). Meanwhile, Redis provides the necessary support for high-speed data operations, ensuring that the system remains responsive and efficient even under heavy loads (Carlson & Fernandez, 2019; Kleppmann, 2017).

Together, these technologies enable the Guardian system to deliver real-time monitoring and analysis capabilities, and provide businesses with the tools they need to manage and optimize their distributed POS networks effectively.

RESULTS

The Guardian system is built on a robust and scalable architecture designed to manage the complex needs of real-time data monitoring and analysis for distributed POS networks as depicted in Figure 1. The architecture integrates several key components, each responsible for a specific aspect of data processing, from collection to analysis and visualization. This section outlines the architecture of the Guardian system, and details the flow of data through its various stages and the roles of the core technologies within this process.

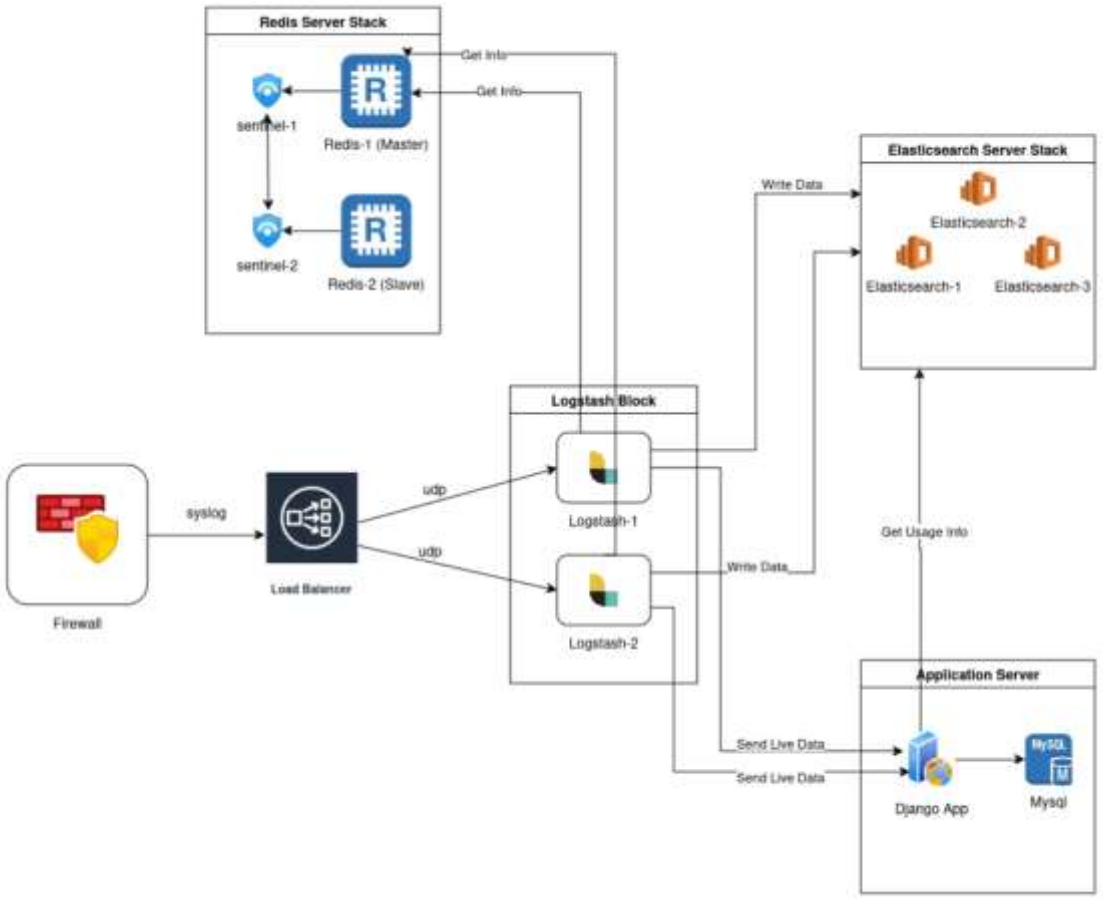


Figure 1. System Architecture

Data Collection and Processing

The data collection process in the Guardian system is primarily handled by Logstash, an open-source data processing pipeline. Given the large number of POS devices (approximately

800,000+) distributed across multiple locations, Logstash is tasked with gathering, processing, and routing vast amounts of data generated by these devices. The system captures data such as transaction logs, system events, and performance metrics, which are then processed to extract meaningful insights. Logstash operates by collecting raw data from various sources, such as syslogs from POS devices, and applying a series of filters to transform and enrich the data. These filters include parsing information, translating codes to identify transaction outcomes, and enriching data with additional contextual information, such as geographical location and device type, retrieved from Redis. This pre-processed data is then forwarded to Elasticsearch for indexing and further analysis.

Data Storage and Indexing

Processed data from Logstash is sent to Elasticsearch, the core component for data storage and indexing within the Guardian system. Elasticsearch is built on Apache Lucene and is optimized for handling large-scale data with high efficiency. It stores data in a structured format, allowing for fast and flexible retrieval. Elasticsearch organizes data into indices, which are created based on various parameters such as time, location, and device type. This indexing process is crucial for enabling the rapid querying of data, and ensure that users can retrieve and analyze information quickly. The system's distributed nature allows Elasticsearch to scale horizontally, and handles increasing data loads while maintaining performance and reliability.

Real-Time Data Analysis and Aggregation

The Guardian system leverages Elasticsearch’s powerful search and aggregation capabilities to perform real-time data analysis. This functionality is essential for monitoring the performance of the POS network across different regions and devices. Aggregations in Elasticsearch allow the system to summarize data, and enable detailed analysis of trends, success rates, and other key performance indicators (KPIs). For example, Elasticsearch can be queried to determine the success rates of transactions in specific regions or to analyze the usage patterns of different banking applications across the network. These real-time insights are critical for making informed decisions and ensuring the optimal performance of the POS system.

Data Caching and Fast Access

Redis plays a crucial role in the Guardian system by providing a high-speed caching layer. Redis, an in-memory data structure store, is used to cache frequently accessed data, such as POS device configurations and real-time status updates, which significantly reduces latency and improves system responsiveness. This is particularly important for real-time data lookups and session management, where speed is crucial. The use of Redis ensures that the Guardian system can quickly access the data needed for ongoing operations, and allow for smooth and efficient real-time analysis and decision-making.

Visualization and Reporting

The final component of the Guardian system's architecture is the visualization and reporting layer, built using the Django Web App integrated with Elasticsearch. This layer provides an intuitive interface for users to interact with the system, visualize data, and generate reports. Through the web application, users can apply filters, view real-time statistics, and monitor performance metrics across the POS network. Django's integration with Elasticsearch enables dynamic data visualizations that reflect the most current data. Users can create customized reports, analyzing specific time periods, regions, or device types. Additionally, the system supports real-time alerts, ensuring that any issues detected during monitoring are promptly communicated to the appropriate personnel.

The integration of these technologies within the Guardian system creates a cohesive and efficient workflow. Data is continuously collected and processed by Logstash, indexed and stored by Elasticsearch, and made available for real-time analysis and visualization. Redis ensures quick

access to critical data, and maintains the system's responsiveness under heavy loads. This modular architecture not only supports the current operational demands but also allows for future scalability and the integration of additional data sources or functionalities.

CONCLUSION

In this study, the proposed Guardian system was presented as a robust and scalable solution for real-time data monitoring and analysis of distributed POS networks. By integrating advanced technologies such as Logstash, Elasticsearch, and Redis, the system effectively manages and processes large volumes of data generated by thousands of POS devices. This approach allows businesses to gain critical insights into network performance, optimize their operations, and respond proactively to potential issues. The Guardian system’s modular architecture and comprehensive real-time capabilities make it an essential tool for ensuring the seamless operation of POS networks.

Further studies could explore the integration of machine learning algorithms into the Guardian system to enhance predictive analytics and support automated decision-making processes. Additionally, expanding the system's alerting and reporting features could provide even greater benefits for businesses in managing their networks. As the Guardian system continues to evolve, it will remain a cutting-edge solution tailored to the dynamic needs of distributed data environments.

REFERENCES

Carlson, E., & Fernandez, E. (2019). Redis in Action. Manning Publications.

Coskun, V., Kose, B. O., & Capa, M. O. (2023, November). TokenX: A Digital Sales Platform for B2C Payment and Finance Solutions. In 2023 7th International Symposium on Innovative Approaches in Smart Technologies (ISAS) (pp. 1-5). IEEE.

Gormley, C., & Tong, Z. (2015). Elasticsearch: The Definitive Guide. O'Reilly Media.

Garcia, S., & Santos, P. (2019). Scalable data management in distributed systems: Techniques and tools. International Journal of Distributed Systems and Technologies, 10(2), 23-38.

Kaur, H., & Singh, G. (2021). Leveraging Logstash and Elasticsearch for big data analytics in cloud environments. Journal of Cloud Computing: Advances, Systems, and Applications, 10(1), 1-15.

Kleppmann, M. (2017). Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems. O'Reilly Media.

Kononenko, I., & Sommers, J. (2018). Practical Elasticsearch for Analytics and Monitoring. Apress.

McAfee, A., & Brynjolfsson, E. (2017). Machine learning for predictive analytics: Enhancing operational efficiency. Harvard Business Review, 95(6), 56-64.

Oprea, A. (2017). Learning Logstash: A beginner's guide to shipping, transforming, and storing your data. Packt Publishing.

Ozdenizci Kose, B., Coşkun, V., Dikici, H., & Marangoz, S. (2023). Evaluating the performance of a secure and real-time communication protocol for IoT devices. 5th Baskent International Conference on Multidisciplinary Studies. Ankara, Türkiye.

Rojas, M., & Li, J. (2018). Performance optimization of POS systems using Redis and real-time data caching. ACM Transactions on Internet Technology (TOIT), 18(3), 1-20.

Zhang, Y., & Zhou, W. (2019). Design and implementation of a real-time monitoring system for distributed networks. IEEE Transactions on Network and Service Management, 16(4), 1342-1354.

KARS YÖRESİNDE OYNANAN OYUN HAVALARININ KARAKTERİSTİK ÖZELLİKLERİ

THE CHARACTERISTIC FEATURES OF THE TRADITIONAL DANCE TUNES PLAYED IN THE KARS REGION

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Özet

Türkiye'nin Doğu Anadolu bölgesinde yer alan Kars, tarihi, kültürel ve doğal güzellikleriyle tanınır. Tarih boyunca farklı medeniyetlere ev sahipliği yapmış Kars'ın somut ve somut olmayan kültürel mirası çok zengindir.

Bu çalışmada Kars yöresine özgü oyun havaları müzikal ve teorik açıdan incelenmektedir. Çalışmanın amacı Kars düğünlerinde oynanan halk danslarını derlemek, notaya almak ve onların karakteristik özelliklerini tespit etmektir. Bu bölgenin müzik folkloru yeterince araştırılıp kayıt altına alınmadığından pek çok müzik folkloru örneği unutulmuştur. Yaptığımız araştırmalar zamanı bir kaç oyun havası örneğini notaya aktarmayı başardık. Makalede yer alan "Tokkalı", "Gagguri", "Kentvari" oyun havaları kayıtlardan, "Kıskanç" ve "Sarı Seyran" oyun havaları ise Kars'ta yaşayan müzisyen, akkordeon icracısı Timuçin Uykur'un performansından notaya alındı. Notaya alınan ezgiler usul, ritim, makam, melodi ve müzik formları açısından incelenmiştir.

Araştırma modeli nitel araştırma yöntemlerine uygun olarak geliştirilmiş olup, makalede sunulan müzik örnekleri MuseScore Notation yazılımı kullanılarak notaya alınmıştır. Etnomüzikoloji alanında bilgiler veren bu makalenin yazılma sürecinde halk sanatına ilişkin yazılı kaynakların yanı sıra modern video materyaller ve internet verileri de analiz edilmiştir. Çalışmada bölgede yaşayan yaşlı kuşak temsilcilerinden, aynı zamanda Kars müzisyenlerinden alınan bilgiler de önem taşımaktadır.

Araştırma sonucunda görüyoruz ki, Kars yöresine özgü müzik ve danslar kültürel açıdan önemlidir. Özellikle ezgiler ve halk oyunları, geleneksel etkinliklerde ve festivallerde ön plana çıkar. Düğünlerde ve özel günlerde geleneksel kıyafetler giyilir, halk oyunları ve müzikler eşliğinde kutlamalar yapılır. Kars'ta tekli oyunlar yaygındır. Bunun yanı sıra yörede Azerbaycan Türkleri tarafından oynanan yallılar (bar) da önem taşımaktadır. Oyun havalarına enstrumanlardan klarnet, koltuk davulu (nağara), garmon veya akkordeon eşlik ediyor.

Anahtar Kelimeler: Kars, oyun havası, gelenek, "Tokkalı", "Kentvari", "Kıskanç"

Abstract

Kars, located in Turkey's Eastern Anatolia region, is known for its historical, cultural, and natural beauties. The tangible and intangible cultural heritage of Kars, which has hosted different civilisations throughout history, is very rich.

In this study, the dances specific to Kars region are analysed musically and theoretically. The aim of the study is to compile and notate the folk dances performed at Kars weddings and to identify their unique characteristics. Since the music folklore of this region has not been sufficiently researched and recorded, many examples of music folklore have been forgotten. In the course of our researches, we managed to notate a few examples of folk dances. "Tokkali", "Gagguri", "Kentvari" dances in the article were notated from the records, and "Kiskanch" and "Sari Seyran"

dances were notated from the performance of Timuchin Uykur, a musician and garmon (accordeon) performer living in Kars. The notated tunes were analysed in terms of measure, rhythm, makam, melody and music forms.
The research model was developed in accordance with qualitative research methods and the music samples presented in the article were notated using MuseScore Notation software. In the process of writing this article, which provides information in the field of ethnomusicology, written sources on folk art as well as modern video materials and internet data were analysed. The information received from the representatives of the older generation living in the region, as well as Kars musicians, is also important in the study.
As a result of the research, we see that music and dances specific to the Kars region are culturally important. Especially melodies and folk dances come to the fore in traditional events and festivals. Traditional clothes are worn at weddings and special occasions, and celebrations are held accompanied by folk dances and music. The rich civilisation of Azerbaijani Turks living here has contributed to the culture of other communities from time to time. Single dances are common in Kars. In addition to this, yalli (bar) played by Azerbaijani Turks in the region is also important. The folk dances are accompanied by clarinet, drum, garmon or accordion.

Keywords: Kars, dance, tradition, “Tokkali”, “Kentvari”, “Kiskanch”

EXAMINATION OF RETICULAR FIBERS IN THE SPLEEN OF THE PARTRIDGE (*Alectoris chukar*)

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ABSTRACT
The spleen is an organ located just near the stomach, above the right lobe of the liver. It is usually dark blue-brown in color. Although the spleen is spherical or egg-shaped in poultry, it is triangular in waterfowl. Structurally and functionally, the spleen is a blood-producing organ, but it is also an effective element of the immune system. This study aims to determine the presence of reticular fibers in the spleen of the partridge (*Alectoris chukar*). In this study, 8 partridges (*Alectoris chukar*) were used. Spleen tissues dissected from the partridges were fixed in 10% formaldehyde solution for 36 hours. The fixed tissues were subjected to dehydration and clearing procedures for histological examinations. Then, they were embedded in paraffin blocks and sections of 5 μm thickness were obtained. The Gordon-Sweet (GS) staining method was applied to identify reticular fibers in the obtained sections. Dense reticular fibers were observed in the capsule surrounding the spleen of the chukar partridge (*Alectoris chukar*). The reticular fibers were also identified around the blood vessels in both the red and white pulp areas. The presence of reticular fibers in the endothelial layer of the blood vessels in the white pulp areas was also noted.

Keywords: Partridge, Spleen, Histology, Reticular Fibers, *Alectoris chukar*

INTRODUCTION
The Red-legged Partridge (*Alectoris chukar*) has a wide natural habitat in Turkey. However, the number of partridges in the natural area has decreased in recent years due to overhunting, habitat destruction and unnecessary use of pesticides (Yamak, 2015; Karabag et al., 2010). Although the economic and ecological importance of these birds is known, we know less about the morphology of the bird.

The immune system consists of central and peripheral lymphoid organs. These immune system organs can produce and develop lymphocytes. The thymus and cloacal bursa are the central lymphoid organs of birds that produce, differentiate and mature T and B lymphocytes, respectively. These lymphoid organs can provide normal immunological defense and resistance against diseases (Nasu et al., 1992; Rautenfeld et al., 1982). The spleen is the primary organ of systemic immunity and its importance in disease resistance is probably emphasized by the paucity of avian lymph nodes (Kozlu et al., 2019). The avian spleen tissue is one of the lymphoid organs, consisting of white and red pulp. The white pulp contains small lymph nodes and the red pulp contains scattered lymphoid cells and blood-filled sinusoids (Powers, 2000).

The spleen is located near the right side of the junction between the proventriculus and the gizzard. It is pinkish brown in color in fresh specimens (Islam et al., 2017). The spleen is the largest peripheral lymphoid organ and the site of immune response generation in most organisms. It also has functions in hematogenesis, blood filtration, blood storage, and immune system response. Immunocompetent cells proliferate and differentiate in the spleen following antigenic stimulation, and there are interspecies differences in the morphology of the spleen. There are differences in size, morphology, and structure among animal immune organs (Liman and Bayram, 2011; Song et al., 2012).

This study aims to determine the presence of reticular fibers in the spleen of the partridge (*Alectoris chukar*).

MATERIAL and METHOD

Before starting the study, the approval was obtained from the Ethics Committee of Selcuk University, Faculty of Veterinary Medicine (SUVFEK, Ref No: 2014-11, Date: 03/2014). The spleens of 12 (6 male+6 female) partridges purchased from a private farm in Antalya were used in the study. The spleen samples were fixed in 10% formal saline for 36 hours. After fixation, histological tissue follow-up was performed and they were embedded in paraffin. Then, 5 µm thick sections were taken from the paraffin blocks. The Gordon-Sweet (GS) staining method was applied to identify reticular fibers in the obtained sections and photographed under a microscope.

RESULTS

The Gordon-Sweet (GS) staining method was applied to identify reticular fibers in the obtained sections. Dense reticular fibers were observed in the capsule surrounding the spleen of the chukar partridge (*Alectoris chukar*) (Figure 1). The reticular fibers were also identified around the blood vessels in both the red and white pulp areas (Figure 2). The presence of reticular fibers in the endothelial layer of the blood vessels in the red pulp areas was also noted (Figure 3).

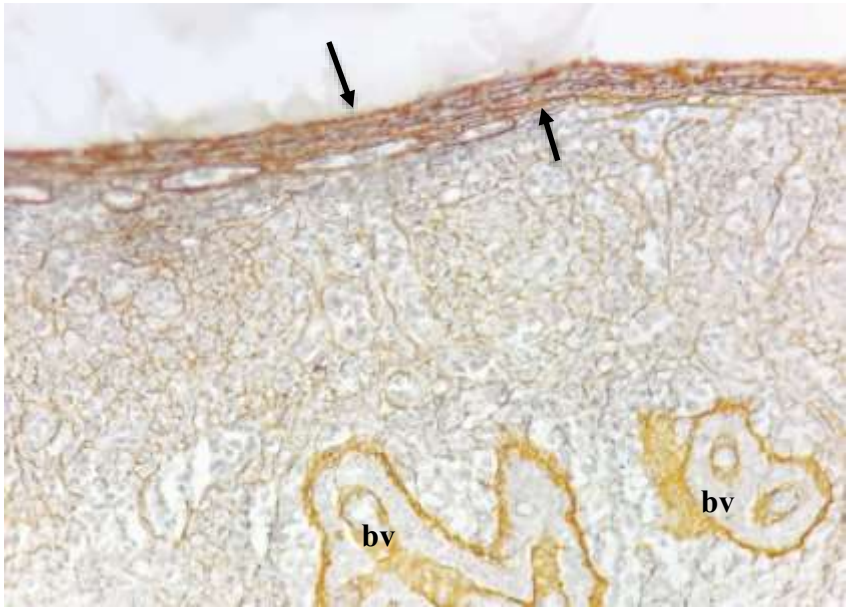


Figure 1: Partridge (*Alectoris chukar*) spleen. Externally enveloping capsule (arrows), blood vessel (bv). Gordon-Sweeth staining method. X40

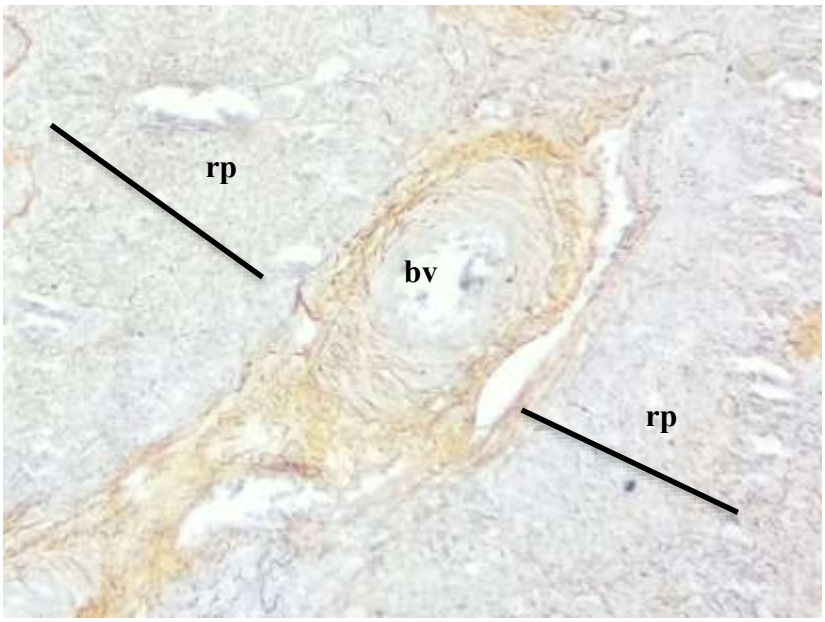


Figure 2: Partridge (*Alectoris chukar*) spleen. Blood vessel (bv) located in the red pulp (rp) areas. Gordon-Sweeth staining method. X40

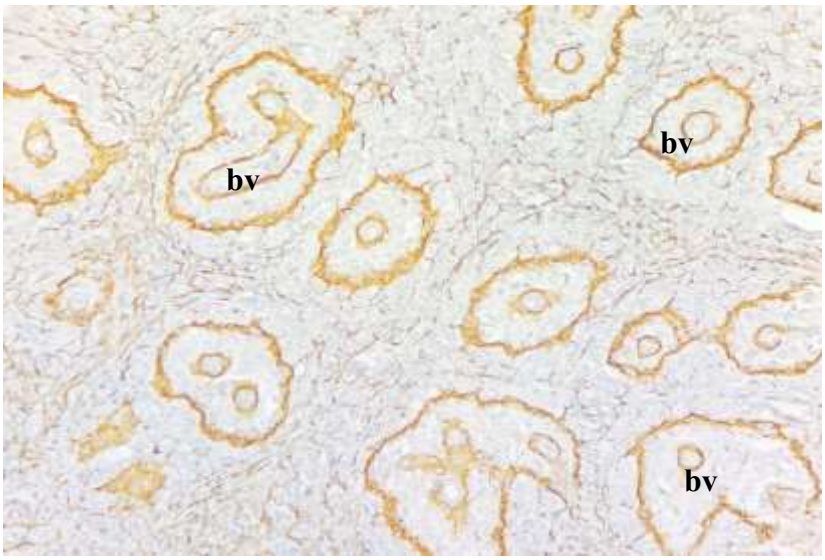


Figure 3: Partridge (*Alectoris chukar*) spleen. Blood vessels located in white pulp areas (bv). Gordon-Sweeth staining method. X40

DISCUSSION AND CONCLUSION

The spleen is the major secondary lymphatic organ that filters blood and provides immune responses against diseases and has an important role in the immune system of the organism. In addition, the spleen performs erythropoiesis during the fetal period of life (Liman and Bayram, 2011; Song et al., 2012).

The results of the study revealed that the red pulps of the spleen were less regional and the white pulps of the spleen contained reticular fibers and reticular cells and were covered with sheathed arteries and lymph nodes in red-legged partridges. Similar to our study, the same similar histological structure has been reported in Bangladeshi native duckling (Sultana et al., 2012), ostrich (Kozlu et al., 2019), hatched quail (Rautenfeld at al., 1982) and chicken (Khan et al., 2014).

The mesenchymal cell around the penicilliform capillary, known as the Schweigger-Seidel sheath, is well-developed ellipsoids in avian species. In the present study, ellipsoids were observed around

the penicilliform capillary in the spleen of red-legged partridge. Similar to chicken and guinea fowl, a Schweigger-Seidel sheath covered with two similar cell layers has been reported (Mast and Goddeeris, 1997; Olah et al., 1993).

KAYNAKLAR

Yamak, U.S. (2015). Artificial breeding of wild birds in Turkey: Partridge breeding case. Indian J Anim Res, 49, 258-261.

Karabag, K., Alkan, S., Mendes, M. (2010). Classification tree method for determining factors that affecting hatchability in chukar partridge (Alectoris chukar) eggs. Kafkas Univ Vet Fak Derg, 16, 723-727.

Nasu, T., Shimizu, K., Nakai, M. (1992). Morphological study of the dove spleen. Poultry Sci, 71, 1527-1530.

Rautenfeld, V., Berens, D., Budras, K.D. (1982). The bursa cloacae (Fabricii) of struthioniforms in comparison with the bursa of other birds. J Morphol, 172, 123-138.

Kozlu, T., Sari, E.K., Bozkurt, Y.A., Kurtdede, N. (2019). Immunohestochemical staaning of cd3, cd79αcy and s-100 on bursa fabricius, thymus and spleen of turkeys (Meleagris gallapavo). Indian J Anim Res, 53, 1450-1454.

Powers, L.V. (2000). The Avian Spleen: Anatomy, Physiology and Diagnostics Compendium on Continuing Education for the Practising. Veterinarian-North American Edition. 22, 838-843.

Islam, M.N., Khan, M.Z.I., Jahan, M.R. (2017). Shinoda K., Developmental trajectory of the prenatal lymphoid organs in native chickens: a macro anatomical study. Asian J Med Biol Res, 3, 432-436.

Liman, N., Bayram, G.K. (2011). Structure of the quail (Coturnix coturnix japonica) spleen during pre-and post-hatching periods. Rev Med Vet, 162, 25-33.

Song, H., Peng, K.S.M., Li, S.H., Wang, Y., Wei, L., Tang, L. (2012). Morphological characterization of the immune organs in ostrich chicks. Turk J Vet Anim Sci, 36, 89-100.

Sultana, N., Khan, M.Z.I., Wares, M.A., Masum, M.A. (2012). Histomorphological study of the major lymphoid tissues in indigenous ducklings of Bangladesh. Bangladesh J Vet Med, 9, 53-58.

Khan, M.Z.I., Masum, M., Khan, M.Z.I., Aziz, A.R., Nasrin, M., Siddique, M.N.H. (2014). Histomorphology of the lymphoid tissues of broiler chickens in Kelantan, Malaysia (Histomorfologi Tisu Limfa Ayam Pedaging di Kelantan, Malaysia). Sains Malays, 43, 1175-1179.

Mast, J., Goddeeris, B.M., (1997). CD57, a marker for B-cell activation and splenic ellipsoid-associated reticular cells of the chicken. Cell Tissue Res, 291, 107-115.

Olah, I., Kupper, A., Ducz, P. (1993). Schweigger-Seidel sheath or ellipsoid in the spleen of guinea hen. Acta Biol Hung, 45, 375-386.

Sultana, N., Khan, M.Z.I., Wares, M.A., Masum, M.A. (2012). Histomorphological study of the major lymphoid tissues in indigenous ducklings of Bangladesh. Bangladesh J Vet Med, 9, 53-58.

MCF-7 VE HEPG2 HÜCRE HATLARINDA KURKUMININ SITOTOKSIK ETKISI VE İNFLAMASYON BELIRTEÇLERI ÜZERINDEKI ETKISININ ARAŞTIRILMASI

INVESTIGATION OF CYTOTOXIC EFFECT OF CURCUMIN AND INFLAMMATION MARKERS IN MCF-7 AND HEPG2 CELL LINES

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Özet

Kurkumin, *Curcuma longa* bitkisinden eksrakte edilen diferuloilmetan olarak da bilinen polifenol bileşenidir. En etkili, güvenli, toksik olmayan ve ana biyoaktif bileşen olarak bilinmektedir. Halk arasında daha çok zerdeçal olarak bilinen, dünya çapında ve ülkemizde çeşitli hastalıklar için yaygın olarak kullanılan bir baharattır.

Bu çalışmada insan meme kanseri (MCF-7) ve insan karaciğer kanseri (HepG2) hücre hatlarında kurkuminin farklı konsantrasyonlarda hücre canlılığı üzerindeki etkileri belirlenmiştir. Bu doğrultuda, DMSO oranı %1'i geçmeyecek şekilde kurkumin ana stoğu hazırlanmış ardından üç farklı konsantrasyonda (100µM, 200µM, 400µM) sitotoksik aktivitesi araştırılmıştır. Bunun için MTT (3- (4,5-dimetiltiazol-2-il) -2,5 difeniltetrazolyum bromür) yöntemi ile hücre canlılığını ölçülmüştür ve pozitif kontrol olarak Doksorubisin kullanılmıştır. Yine aynı hücre hatlarında kurkuminin NF-κB, HIF-1α ve STAT3 genleri üzerindeki ekspresyon düzeylerindeki etkisi qRT-PCR ile gen ifade analizi ile belirlenmiştir.

MTT sonuçlarına baktığımızda her iki hücre hattında en düşük konsantrasyon olan 100 µM'da en iyi sitotoksik etkiyi gösterdiği belirlenmiştir. MCF-7'de kurkumin ile muamele edilen hücrelerde NF-κB, HIF-1α ve STAT3 genlerinin ifade düzeyleri, muamele edilmeyen gruba kıyasla önemli ölçüde daha az ifade edilmiştir. HepG2 hücre hattında ise bu genlerin benzer şekilde ifade edildiği tespit edilmiştir. İstatistiksel hesaplama sonuçlarına göre NF-κB ve STAT3 genlerinin azalmış ifade düzeyi $p < 0.0001$ oranında anlamlı bir farklılık gösterirken, HIF-1α geninde ifade düzeyi $p < 0.382$ olarak belirlenmiştir.

Anahtar Kelimeler: MCF-7, HepG2, Gen Ekspresyonu, Kurkumin

Abstract
Curcumin is a polyphenol component, also known as diferuloylmethane, extracted from the *Curcuma longa* plant. It is known as the most effective, safe, non-toxic and main bioactive component. Popularly known as turmeric, it is a spice widely used for various diseases worldwide and in our country.
In this study, the effects of curcumin at different concentrations on cell viability in human breast cancer (MCF-7) and human liver cancer (HepG2) cell lines were determined. In this direction, curcumin mother stock was prepared with DMSO content not exceeding 1% and then its cytotoxic activity was investigated at three different concentrations (100µM, 200µM, 400µM). For this purpose, cell viability was measured by MTT (3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide) method and Doxorubicin was used as positive control. In the same cell lines, the effect of curcumin on the expression levels of NF-κB, HIF-1α and STAT3 genes was determined by qRT-PCR gene expression analysis.
When we look at the MTT results, it was determined that both cell lines showed the best cytotoxic effect at the lowest concentration of 100 µM. In MCF-7, the expression levels of NF-κB, HIF-1α and STAT3 genes were significantly lower in the curcumin-treated cells compared to the untreated group. In HepG2 cell line, these genes were found to be expressed similarly. According to the results of statistical calculation, the decreased expression level of NF-κB and STAT3 genes showed a significant difference at $p < 0.0001$, while the expression level of HIF-1α gene was determined as $p < 0.382$.

Keywords: MCF-7, HepG2, Gene Expression, Curcumin

İRRİTABL BAĞIRSAK SENDROMU HASTALARINDA HTR3A (RS1062613) POLİMORFİZMİNİN ARAŞTIRILMASI

INVESTIGATION OF HTR3A (RS1062613) POLYMORPHISM IN IRRITABLE BOWEL SYNDROME PATIENTS

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Özet
İrritabl Bağırsak Sendromu (İBS), Roma IV kriterleri kullanılarak teşhis edilen, karın ağrısı ve bağırsak alışkanlıklarının değişmesiyle karakterize bir gastrointestinal bozukluktur. Serotonin (5-HT) hem gastrointestinal hem de sinir sistemi işlevlerinde önemli bir rol oynamaktadır ve HTR3A genindeki c.-42C>T SNP gibi 5-HT3 reseptörlerindeki genetik varyasyonlar, reseptör ekspresyonunu ve amigdala aktivitesini etkileyerek IBS ve anksiyete ile ilişkilendirilmiştir.
Bu çalışmada, Fırat Üniversitesi Araştırma Hastanesi'nden etik onayla alınan 100 İBS hastası ve 100 kontrol grubunda (kronik hastalığı olmayan bireyler) HTR3A genindeki rs1062613 polimorfizmi araştırılmıştır. DNA kan örneklerinden izole edilmiş ve SNP içeren 348 bp'lik bir bölgeyi hedeflemek için PCR amplifikasyonu gerçekleştirilmiştir. Genotipleme için restriksiyon enzim sindirimi kullanılmıştır. Genotip ve alel frekanslarını hesaplamak için SNPStat analiz yazılımı kullanılmış ve popülasyonun Hardy-Weinberg dengesi değerlendirilmiştir.
Elazığ popülasyonunda türünün ilk örneği olan çalışma, rs1062613 polimorfizminin hem IBS hastalarında hem de kontrollerde bulunmasına rağmen, IBS ile güçlü bir ilişki göstermediğini ortaya koymuştur. C/C genotipine sahip bireylerin sadece %24'ünde IBS görülürken, T/C genotipine sahip bireylerin %76'sında bu durum görülmüştür. Hesaplanan Odds Oranı (OR) 1 olup, rs1062613 SNP'nin IBS riskini önemli ölçüde etkilemediğini göstermektedir. Bu nedenle, bu polimorfizm bu popülasyonda IBS için güvenilir bir biyobelirteç değildir.

Anahtar Kelimeler: HTR3A, SNP, Polimorfizm, IBS.

Abstract
Irritable Bowel Syndrome (IBS) is a gastrointestinal disorder characterized by abdominal pain and altered bowel habits, diagnosed using the Rome IV criteria. Serotonin (5-HT) plays a key role in both gastrointestinal and nervous system functions, and genetic variations in the 5-HT3 receptors, such as the c.-42C>T SNP in the HTR3A gene, have been linked to IBS and anxiety by influencing receptor expression and amygdala activity.
In this study, we investigated the rs1062613 polymorphism of the HTR3A gene in 100 IBS patients and 100 controls (individuals with no chronic diseases), recruited from Fırat University Research Hospital with ethical approval. DNA was isolated from blood samples, and PCR amplification was performed to target a 348 bp region containing the SNP. Restriction enzyme digestion was used for genotyping. SNPStat analysis software was employed to calculate genotype and allele frequencies, and the population's Hardy-Weinberg equilibrium was assessed.
The study, the first of its kind in the Elazig population, found that although the rs1062613 polymorphism was present in both IBS patients and controls, it did not show a strong association with IBS. Only 24% of individuals with the C/C genotype had IBS, while 76% of individuals with the T/C genotype had the condition. The calculated Odds Ratio (OR) was 1, suggesting that the rs1062613 SNP does not significantly influence IBS risk. Therefore, this polymorphism is not a reliable biomarker for IBS in this population.

Keywords: HTR3A, SNP, Polymorphism, IBS.

EFFECT OF LOCATION UNDER DIFFERENT RAINY SEASON INTERPHASE ON UDDER MORPHOMETRY, MILK YIELD AND COMPOSITION OF BUNAJİ COWS IN SOUTHERN GUINEA SAVANNA, NIGERIA

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ABSTRACT

This study investigated the effect of location under different rainy season interphase on udder morphometry, milk yield and composition of Bunaji cows in Southern Guinea Savanna, Nigeria. Milk yield, composition of milk as well as physico-chemical properties of milk produced by Bunaji cows under interphase of rainy season and the udder morphometry was determined. The study was conducted in Niger state between the months of May to October 2023. Three experimental sites: Minna, Lambata and Tafa were selected. The experimental design used was Completely Randomized Design (CRD) with three treatments (Minna, Lambata and Tafa), three replicates (early, mid and late rainy season) and ten (10) animals per replicate. This gave the total of ninety (90) lactating Bunaji (White Fulani) cows as experimental animals. Milk sample collection was done in three phases namely: early, mid and late rainy seasons which were analyzed for Crude Protein (CP), Ash, Moisture, Fat, Nitrogen Free Extract (NFE), mineral composition, physico-chemical properties and Udder morphometry according to the standard procedure of Association of Official Analytical Chemist AOAC (2000). Results showed that there were significant ($P < 0.05$) differences in milk yield across all observed parameters, namely, early, mid, and late rainy seasons. Also, there was a significant ($P < 0.05$) difference in moisture composition, whereas there were no significant ($P > 0.05$) differences in crude protein, ash, fat, and NFE. In addition, phosphorus, iron and zinc did not exhibit a significant difference among the treatment groups ($P > 0.05$), while calcium displayed a noteworthy difference among the treatment groups ($P < 0.05$), None of the physiochemical parameters considered Total Solid(TS),Total Titratable Acid (TTA), viscosity, density and Total Soluble Solid (TSS) was significantly different ($P < 0.05$) among treatment groups except pH which was found to be significantly different also there was a significant difference ($P < 0.05$) in udder circumference, while no significant differences ($P > 0.05$) were observed in udder depth, udder length and udder width. The study concluded that milk yield, moisture composition, calcium composition, pH and Udder circumference of milk produced by Bunaji cows in the study areas were affected by rainy season interphase. It was therefore recommended that dairy farming programs focusing on cows from Lambata and Tafa, which consistently produced higher milk yields across all interphases, should be explored; nutritional interventions aimed at optimizing moisture levels in the diet of cows in other locations aside Tafa will go a long way in improving milk quality, calcium supplementation strategies should be adopted to address variations in calcium composition in milk and pH levels in cow milk should be constantly monitored and managed by adjusting feeding practices.

SUÇ DRAM HUKUK ve ADALET: ALABAMA'NIN SUÇSUZ, GÜNAHSIZ, MASUM BÜLBÜLLERİ

CRIME DRAMA LAW and JUSTICE: ALABAMA'S INNOCENT, GUILTNESS MOCKINGBIRDS

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Özet
Avukat Bryan Stevenson tarafından yazılan ve 2014 yılında yayımlanan "Merhamet: Adalet ve Kefaretin Hikâyesi" isimli kitap genç ve yetenekli bir avukatın yoksulları, haksız hüküm giymişleri, kadın ve çocukları savunmak için kurduğu ve kar amacı gütmeyen Eşit Adalet İnisiyatifi (EJI) hukuk bürosunu ve bu süreçte gerçekte müvekkili olan Afro-Amerikan kökenli, işlemediği bir suçtan dolayı fakat salt siyahi olduğu için idam cezası çarptırılan Walter McMillian için verdiği mücadeleyi daha da ötesinde adil yargı ve hukukta eşitlik ilkesinin önemini anlatır. Kitap aynı isimle yönetmen Destin Daniel Cretton tarafından beyazperdeye uyarlanır, birçok ödüle aday gösterilen ve kazanan yapıt, 2019 yılında, Ulusal İnceleme Kurumu (National Board Review) tarafından "İfade Özgürlüğü Ödülü" nü kazanmıştır. Amerika'da ırkçılığın yoğun olarak görüldüğü Güney eyaletlerinden Alabama'da yasal savunmaları yeterince yapılmayan ve önyargıyla yaklaşılan Afro-Amerikanlar için yaşamın her aşaması tehdit edici, haksız ve insanlık dışıdır, siyahların doğuştan suçlu/günahkâr oldukları algısı hiç yıkılmamıştır ve bu yüzden ötekileştirilen siyahiler ekonomik olarak pasiftirler/güçsüzdürler, toplum dışına itilmişlerdir ve mahkeme salonunda en arkada oturmayı hak ederler. Bu insanların sözcüsü/adalet savaşçısı olmaya çalışan avukat 140 idam mahkumuna ücretsiz ve yasal savunma desteği vermiştir ve 1993 yılında ise İdam Cezası Duruşmasında; "Fakirliğin karşıtı zenginlik değildir. Fakirliğin karşıtı adalettir. Ulusumuzun karakterini, zengin ve ayrıcalıklara karşı davranışımız değil, fakir ve hükümlülere karşı davranışımız yansıtıyor. Bu masum adamanın izinden gidersek eğer, dünyayı daha iyi bir yere çevirebiliriz. Hepimize adalet lazım. Hepimize merhamet lazım ve belki de hepimize beklenmeyen bir lütuf lazım," sözleriyle hukukun üstünlüğü ilkesini öne çıkarır. *Merhamet* filminin birçok karesinde Haper Lee tarafından yazılan Pultizer ödüllü *Bülbülü Öldürmek* kitabına atıfta bulunur, yer ve mekân aynıdır, Alabama şehrinde 1930 yılında tecavüzle suçlanan siyah bir adamın duruşması sahnelenir, görüntüler siyah beyazdır, aradan 84 yıl geçmiştir, değişmeyen tek şey her iki yapıtta da önyargının maskelediği/gölgelediği inançlardır.

Anahtar Kelimeler: Adil Yargı, Hukukta Eşitlik İlkesi, İdam Cezası, İfade Özgürlüğü

Abstract
Written by attorney Bryan Stevenson and published in 2014, "Just Mercy: A Story of Justice and Redemption" tells the story of a young and talented lawyer who founded the non-profit law firm Equal Justice Initiative (EJI) to fight for the poor, the wrongfully convicted, women and children, and his struggle for his client Walter McMillian, an African-American man who was sentenced to death for a crime he did not commit, but solely for being black, and the significance of the principle of fair justice and equality in law. The book was adapted to the big screen by director Destin Daniel Cretton with the same title, and the work, which was nominated for and won many awards, received the "Freedom of Expression Award" from the National Board Review in 2019.

For African Americans in Alabama, one of the Southern states where racism is prevalent in the US, every stage of life is threatening, unfair and inhumane; the perception that blacks are inherently guilty/sinners has never been shattered and therefore marginalized blacks are economically passive/weak, ostracized from society and entitled to sit at the back of the courtroom. Trying to be a spokesperson/justice fighter for these people, he provided free legal defense for 140 death row inmates and in 1993, at the Death Penalty Trial, he said: “The opposite of poverty is not wealth. The opposite of poverty is justice. The character of our nation is reflected not in our treatment of the rich and privileged, but in our treatment of the poor and convicted. If we follow in the footsteps of this innocent man, we can make the world a better place. We all need justice. We all need mercy, and perhaps we all need unexpected grace,” he said, emphasizing the rule of law. Many frames in *Just Mercy* refer to the Pulitzer Prize-winning book *To Kill a Mockingbird* by Haper Lee, the location and setting are the same, the trial of a black man accused of rape in Alabama in 1930 is staged, the images are in black and white, 84 years have passed, the only thing that has not changed is the beliefs masked/shadowed by prejudice in both works.

Key Words: Fair Judgment**,** Principle of Equality in Law, Death Penalty, Freedom of Expression

İMPARATOR AUGUSTUS DÖNEMİ DİNSEL REFORMLAR

RELIGIOUS REFORMS DURING THE PERIOD OF EMPEROR AUGUSTUS

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Özet

Roma Cumhuriyeti'ni tamir etmek sloganıyla reformist siyasetini icra etmeye başlayan Augustus (Caesar Octavianus), İÖ 29 yılından itibaren 45 yıl aralıksız Roma'nın tek adamı olarak Roma İmparatorluğu'na hükmetmek suretiyle Roma Tarihinin İmparatorluk Dönemi'nin yaratıcısı oldu. İÖ 27 tarihinde, *Augustus* unvanını alan Princeps, kendisini evlat edinen Iulius Caesar'dan sonra ilahi bir sıfat bahşedilen ikinci Romalı oldu.

Augustus tek başına üstlendiği imparatorluğun yönetiminde, canlandırmak ve yeniden yapılanmasını sağlamak istediği olgulardan bir tanesi de Roma diniydi. Ona göre, uzun süren savaşlar, iç çekişmeler sebebi ile topumda yaşanan ayrışmalar, Roma'nın geleneksel aile yapısını dejenere ettiği gibi, toplumun dini ritüellerinden uzaklaşmasına da sebep olmuştu. Bu nedenle toplumsal birliği yeniden sağlamak, bozulduğunu düşündüğü aile yapısını tekrardan canlandırmak adına dinsel reformlar yaptı. Din konusunda üç yöntem uyguladı. İlki, özellikle gençler üzerinde, Roma İmparatorluğu'nun tanrılarını ihmal etmenin, Roma'nın başına birçok felaketin gelmesine davetiye çıkarmak olduğu benimsetilmeye çalışıldı. Bu konuda, kendi politik yaşamında desteğini aldığı edebiyat adamlarını kullanmayı da ihmal etmedi. İkincisi, İÖ 28 yılında onarılması gereken ne kadar tapınak varsa onarılması için Senato'ya imtiyaz verdi ve böylelikle 82 tapınak onarıldı. Üçüncüsü ise yaptığı ya da yapacağı işleri, Romalıların deyimiyle, onun "Res Gestae"sı, kendisini ilahi bir güç olarak sembolize etmek istemesinden kaynaklanan ve Roma halkı için akıllıca alınmış bir önlemi gibiydi. Bunu "*İmparator Kültü*" ile başardı. Zira Romalılar, Doğu'da yaşayan halklarla kurdukları siyasal ve ticari ilişkiler sonucunda, bu halkların yüzyıllardır krallarına tanrı olarak taptıklarına tanık olmuşlar ve bundan etkilenip, kendi yöneticilerine de birer tanrı olarak hitap etmenin uygun olacağı görüşünü benimseyecek konuma gelmişlerdi. Böylelikle Tanrıça Roma kültünden sonra İmparator Kültü Roma dünyasında yerini aldı.

Çalışmamızda, İmparator Augustus'un Roma idari ve sosyal yapısını düzenlemek adına başlattığı dinsel reformları inceleyip, söz konusu reformların amaçlarına dair başarılı olup olmadığı konusunda sonuca varmaktır.

Anahtar Kelimeler: Augustus, Roma, Din, Reformlar.

Abstract

Augustus (Caesar Octavianus), who began to implement his reformist politics with the slogan of repairing the Roman Republic, became the creator of the Imperial Period of Roman History by ruling the Roman Empire as the sole man of Rome for 45 years continuously starting from 29 BC. In 27 BC, the Princeps, who received the title of Augustus, became the second Roman to be granted a divine title after Julius Caesar, who adopted him.

One of the issues that Augustus wanted to revive and restructure during the administration of the empire he undertook alone was the Roman religion. According to him, the divisions in society due to long-lasting wars and internal conflicts had degenerated the traditional family structure of Rome and caused the society to move away from its religious rituals. For this reason, he made religious reforms in order to reestablish social unity and revive the family structure that he thought had been

damaged. He applied three methods regarding religion. The first was to try to convince especially the youth that neglecting the gods of the Roman Empire would invite many disasters to happen to Rome. In this regard, he did not neglect to use the literary men he received support from in his own political life. Secondly, in 28 BC, he granted the Senate a privilege to repair all the temples that needed to be repaired, and thus 82 temples were repaired. Thirdly, the works he did or would do, as the Romans called them, were like his “Res Gestae”, a wise precaution taken for the Roman people, stemming from his desire to symbolize himself as a divine power. He achieved this with the “Emperor Cult”. Because, as a result of the political and commercial relations they established with the peoples living in the East, the Romans witnessed that these peoples had worshipped their kings as gods for centuries, and they were influenced by this and came to the point of adopting the view that it would be appropriate to address their own rulers as gods. Thus, after the Goddess Roman Cult, the Emperor Cult took its place in the Roman world.
Our study examines the religious reforms initiated by Emperor Augustus in order to organize the administrative and social structure of Rome, and reaches a conclusion as to whether these reforms were successful in terms of their aims.

Keywords: Augustus, Rome, Religion, Reforms.

KADININ ONTOLOJİK VARLIĞI

WOMEN'S ONTOLOGICAL EXISTENCE

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ÖZET

Tarih boyunca kadın varlığı, değeri, rolleri, sosyal ve siyasal hakları ile her zaman tartışma konusu olmuş ve gündemde kalmıştır. Bu da onun değerini ve önemini yitirmeyen bir problem alanı olduğu anlamına gelmektedir. Bu problemin en önemli kısmı ise kadının varlığı ya da ontolojisidir; onun sahip olduğu değeri, rolleri, sosyal-siyasal-ekonomik hakları gibi başlıkların üstünde kadının ontolojik varlığı ile ilgili düşünceler ve inançlar vardır. Yani kadının ontolojik bakımdan hangi varlık alanına dahil edildiği sorusu onunla ilgili diğer tartışma alanlarının hem içeriğini hem de derecesini belirleyici niteliktedir. Kadının ontolojik varlığı ile ilgili yaklaşımlar ve tartışmaların kaynağında ise hem ilahiyat hem de felsefe vardır. Felsefi bakış açısı içinde de kadının varlık ve değerine hem negatif hem de objektif teori ve yaklaşımlar olmakla birlikte ilahiyatın kadınla ile ilgili görüşleri, ilahiyata dayalı bilimlerin kadınla ilgili yorumları daha fazla dikkat çekmektedir. Ontolojik olarak var olmak demek, kendi varlığının bilincinde olmayı ve varlığının ortaya çıkardığı, gerektirdiği şeyleri yapmayı içerir. Diğer bir ifadeyle Descartes'in "Düşünüyorum öyleyse varım" ve değerliyim ifadesini öncelikle kadının kendisi için söyleyebilmesidir. Dünyada ve Türkiye'de kadına yönelik şiddet eylemlerinin artması; birtakım hak ihlalleri onun ontolojik bir varlık olduğu gerçeğini kabul veya ret noktasında önemli ipuçları vermektedir. 21. Yüzyılda hala kızların okuyup okumamasının tartışılır olması, evlilik oranlarının azalmasının doğrudan kızların okuyup iş hayatına girmeleri sonucunda kimseyi beğenmemeleri gibi bir gerekçeyle açıklanması, boşanma isteği veya aşamasında olan kadınların can güvenliklerinin olmaması gibi pek çok sosyal ve ahlaki problem kadının ontolojisi üzerinde düşünmeyi zorunlu kılmaktadır. Tarih boyunca ve günümüzde şiddete veya hak ihlaline maruz kalan tek cins elbette sadece kadınlar olmamıştır. Ancak Latif Tokat'ın da belirttiği gibi "Toplum ve devirlere göre farklılıklar gösterse de kadın erkek ilişkilerinde neredeyse tümüyle kadın aleyhine bir dengesizliğin, baskı veya sınırlamanın var olduğu inkar edilemez."[41]

Anahtar kelimeler: Felsefe, Ontoloji, Kadın Ontolojisi.

ABSTRACT

Throughout history, women's existence, value, roles, social and political rights have always been a matter of debate and remained relevant. This means that it is a problem area that does not lose its value and importance. The most important part of this problem is the existence or ontology of women; On topics such as her value, roles, social-political-economic rights, there are thoughts and beliefs about the ontological existence of women. In other words, the question of which area of existence women are ontologically included in determines both the content and degree of other areas of discussion about her. The sources of approaches and discussions regarding the ontological existence of women are theology and philosophy. From a philosophical perspective, although there are both negative and objectivizing theories and approaches to the existence and value of women, theology's views on women and the interpretations of theology-based sciences on women attract more attention. To exist ontologically means being aware of one's own existence and doing

[41] Latif Tokat, "Kültür Kaynaklarımız Açısından İlk İnsandan Günümüze Kadın Problemi", *İslami Araştırmalar Dergisi,* 15/4, 2002, 477. (477-483)

what one's existence reveals and requires. In other words, it is the woman's ability to say like Descartes' "I think, therefore I am" and "I am valuable" expressions primarily for herself. Increasing acts of violence against women in the world and in Turkey; Some violations of rights give important clues about accepting or rejecting the fact that women are ontological beings. Many social and moral problems, such as the fact that it is still debatable whether girls should study or not in the 21st century, the reason why the decrease in marriage rates are explained as the fact that girls do not like anyone as a result of studying and entering business life, and the lack of life security of women who want or are at the stage of divorce, make it necessary to think about the ontology of women.Of course, women have not been the only gender exposed to violence or rights violation throughout history and today. However, as Latif Tokat stated, "Although it varies according to society and era, it cannot be denied that there is an imbalance, pressure or limitation in the relations between men and women, almost entirely to the detriment of women."

Key words: Philosophy, Ontology, Women's Ontology.

GİRİŞ

Kadının ontolojik varlığı gibi bir konunun ele alınmasındaki en önemli sebep dünyada ve Türkiye'de yaşanan kadınlara yönelik şiddet eylemlerinin ve hak ihlallerinin artmasıdır. 21. Yüzyılda halâ kızların okuyup okumamasının tartışılır olması, evlilik oranlarının azalmasının doğrudan kızların okuyup iş hayatına girmeleri sonucunda kimseyi beğenmemeleri gibi bir gerekçeyle açıklanması, boşanma isteği veya aşamasında olan kadınların can güvenliklerinin olmaması gibi pek çok sosyal ve ahlaki problem kadının varlığı, kadının nasıl bir varlık olarak algılandığı üzerinde düşünmeyi zorunlu kılmaktadır. Diğer bir ifadeyle kadının ontolojik bakımdan hangi varlık alanına dahil edildiği sorusu onunla ilgili diğer tartışma alanlarının hem içeriğini hem de derecesini belirleyici niteliktedir.

Tarih boyunca ve günümüzde şiddete veya hak ihlaline maruz kalan tek cins elbette sadece kadınlar olmamıştır. Ancak "Toplum ve devirlere göre farklılıklar gösterse de kadın erkek ilişkilerinde neredeyse tümüyle kadın aleyhine bir dengesizliğin, baskı veya sınırlamanın var olduğu inkâr edilemez."[42] Bununla birlikte daha çok batı felsefesinden hareketle ele alınan bu konuyla ilgili dini düşünceye sadece sonuç kısmında atıf yapılmıştır. Bunun sebebi felsefi düşüncenin dinlerin ortaya çıkışından yüzyıllar sonra yeni dönem ve teorilerle devam ediyor olmasıdır. Bir başka ifadeyle rasyonel aklın her şeye çare olabileceğine yönelik düşünce halâ kuvvetli bir şekilde devam ederken modern ve aydınlanma dönemi bazı filozoflar antik dönemden çok da farklı olmayacak şekilde kadınla ilgili olumsuz anlayışı sürdürmektedir. Bu da kadınla ilgili negatif tavır ve tutumlar söz konusu olunca ilk hedef olarak gösterilen dinlere yönelik anlayışın tek taraflı ve kasıtlı bir tavır olduğunu göstermektedir. Kadın meselesi ne sadece dinlerin ne de felsefi düşüncenin bir problemi olmayıp bu konuda felsefi, dini ve sosyolojik anlayışların birlikte değerlendirilmesi gerekmektedir. Elbette insanın varlığı, anlamı gibi konular üzerinde söz söyleyen sadece felsefe olmamıştır. Dinler de genelde insan özelde ise erkek ve kadınların varlığı, amacı gibi hususlarda görüş ortaya koymuştur. Fakat kadın ontolojisi hakkındaki felsefi görüşler, filozofların bununla ilgili düşünceleri, tartışmalar yeni bağlamlar, yeni teoriler ve bakış açılarıyla halâ devam etmektedir. Yeniçağda, bilim ve teknoloji çağında dolayısıyla dinlerden yüzyıllar sonra dahi kadının değerini düşüren, ontolojik anlamda onu erkeğin oldukça aşağısında tanımlayan düşüncelerin olması felsefi düşünce üzerine dikkati çekmektedir. Buna bağlı olarak bu çalışmanın konusu kadın aleyhindeki mevcut pratikler ve haksızlıkların kaynağı olmak bakımından Batı felsefesinde kadının ontolojik varlığına nasıl yer verildiği olarak belirlenmiştir.

[42] Latif Tokat, "Kültür Kaynaklarımız Açısından İlk İnsandan Günümüze Kadın Problemi", *İslami Araştırmalar Dergisi,* 15/4, 2002, 477.

FELSEFİ DÜŞÜNCEDE KADIN ONTOLOJİSİ

Türkiye'de ve dünyada kadın her dönem özellikle rol ve görevleri, sosyal ve siyasal hakları noktasında konuşulan, tartışılan bir varlık olmuştur. Bu açılardan tartışılan bir konu olmasının gerisinde ise onun ontolojik varlığına dair düşüncelerin olduğu çok rahatlıkla söylenebilir. Yine kadının varlığına bağlı olarak tartışılan haklar, görevler, eşitsizlikler onun varlık felsefesi içinde ele alınmasını da zaruri kılmaktadır. Bir diğer ifadeyle onun değeri, rolleri, sosyal-siyasal-ekonomik hakları gibi başlıkların üstünde kadının ontolojik varlığı ile ilgili düşünceler yer almaktadır. Yani kadının ontolojik bakımdan hangi varlık düzeyine dahil edildiği sorusu onunla ilgili diğer tartışma alanlarının hem içeriğini hem de derecesini belirleyici niteliktedir.

Kadının ontolojik bakımdan erkekten farklı olduğuna yönelik kabul ve düşüncelerin tarihi Antik çağ Yunan felsefesine kadar geri götürülür. O dönemin meşhur filozoflarının felsefi ve bilimsel düşüncenin ilerlemesine önemli katkılar sunmuş birer isim olmalarına rağmen kadının varlığı noktasında bir ilerleme veya onu gerçek varlıksal konumuna yerleştirmede başarısız oldukları söylenebilir.[43]

Filozoflardan verilebilecek örnek isimlerden birisi ilk çağ filozofu Pythogoras'dır. Pythogoras (MÖ. 495) iyi ve kötü olanı belirleyen iki ilkeden söz etmiştir. İyi olan, düzen, erkek ve aydınlanmayı yaratmış iken kötü olan kaos, kadın ve karanlığı yaratmıştır. Buna göre kadın karanlık ve kaosun yanında ve onun parçalarından biridir. Bununla birlikte kadın ontolojik bakımdan ikincil bir değere sahiptir ve kötüdür. Kadının temsil ettiği şey kötülük, kaos, yokluk; erkek ise iyiyi, uyumu ve düzeni temsil etmektedir.[44]

Benzer düşünceler Antik çağın iki en önemli filozofu olan Platon ve Aristoteles'te de görülmektedir. Kadının akli melekesi gelişmemiş "eksik insan' veya "düşük ruh' olduğuna inanılmıştır. Her iki filozofa göre de "kadın kendi doğasından kaynaklı yetkin bir ussallıktan yoksun, insan ve hayvan arasında kalmış bir eksik varlık, hatta yetkin ussallığa ulaşmak isteyen erkeği düzensizliğiyle yoldan çıkaran, engel olan özelliklerin taşıyıcısı" dır.[45]

Platon'un kadınla ilgili görüşleri çok net değildir. Ona sosyal hayat içerisinde ve bazı devlet görevlerinde yer vermekle beraber Yunan toplumunun geleneksel anlayışından da tam olarak uzak düştüğü söylenemez. Dolayısıyla filozofun düşüncesi, kadına toplumun kabul ettiği değer ve anlamdan ne kadar farklı ve bunun üstünde bir yer verdiği konusunda bazı tereddütler barındırmaktadır.[46] Aristoteles'in kadın hakkındaki düşüncesi de hocası Platon'dan farklı değildir. Felsefe tarihi bakımından olduğu gibi günümüz kadın anlayışları bakımından da önemli olan kadının ontolojik varlığı hususunda Aristoteles'in düşüncesine göre erkek ile kadın doğaları itibariyle farklı oldukları için aralarında üstünlük aşağılık ilişkisi vardır ve bu ortadan kaldırılabilir veya değiştirilebilir bir özellik değildir. Filozof kadınlar ile çocukların düşünme ve ahlaki yetenekleri açısından aynı seviyede olduklarını ileri sürmüş; buna bağlı olarak da kadının eksik bir varlık olduğunu düşünmüştür. Yine ona göre yönetimde söz sahibi olması gereken cins erkek olmalıdır çünkü yönetime erkekler daha yatkın ve bu konuda daha beceriklidir.[47]

Modern ve aydınlanma döneme gelindiğinde de benzer düşüncelere sahip filozofların halâ var olduğu görülmektedir. Aradan geçen zaman içinde meydana gelen büyük kültür ve medeniyet dönüşümlerine, aklın merkeze alındığı düşünce dönemlere rağmen kadın ontolojik olarak eksik ve kusurlu bir varlık olarak düşünülmeye devam etmiştir.

Nitekim modern felsefenin kurucusu Francis Bacon'ın (öl. 1626) aklın doğaya hakim olmasına yönelik düşüncesi, erkeğin kadına hakim olması veya tahakkümü olarak yorumlanmıştır. Şöyle ki

[43] Sara Aktaş, "Felsefi Dünyadan Sürgün Edilen Kadınlık", *Demokratik Modernite,* 2013.

[44] Aktaş, "Felsefi Dünyadan Sürgün Edilen Kadınlık".
[45] Aktaş, "Felsefi Dünyadan Sürgün Edilen Kadınlık".
[46] Nihal Petek Boyacı, "Platon'da Kadın Sorunu Üzerine Bir Tartışma", *Felsefe ve Sosyal Bilimler Dergisi,* 18, Güz 2018, 206-207.
[47] https://sophosakademi.org/aristoteles-ve-ibn-i-sinaya-gore-kadin/

akıl doğayı düzenleme ve yönetme gücü olarak doğanın üstünde yer aldığı gibi doğanın dişil bir karakteri, erkeğin ise aklı temsil ettiği yönündeki modern düşünce, aklın doğaya tahakkümü fikrinin aslında erkeğin kadına tahakkümü ve bunun da doğaya uygun bir davranış olduğu yönündeki inancı destekleyici bir anlama sahiptir. Bu yönüyle de modern felsefe ve Bacon erkek egemen bir düşüncenin savunuculuğunu yaptığı için eleştirilmiştir.[48]

Modern felsefede kadınlara dair olumsuz ve oldukça aşağı seviyede düşüncenin savunuculuğunu yapan isimlerden birisi J.J. Rousseau'dur (öl. 1778). Rousseau *Emile* isimli eserinde kadınların varlığının mahiyeti yani ontolojisine dair görüşlerini ve bu ontolojik yapının layık olduğu eğitimin niteliklerini ortaya koymaktadır. İngiliz feminist yazar Mary Wollstonecraft tarafından eleştirilen görüşlerinde Rousseau, kadınların erkekler olmadan yaşayamayacağını, hem arzularını tatmin etmek hem de ihtiyaçlarını karşılayabilmek açısından onlara bağımlı olduğunu, bu sebeple de her iki cinsin eğitiminin birbirinden farklı olması gerektiğini yazar. Kadınların bu arzu ve ihtiyaçlarını karşılamak için muhtaç oldukları erkeklerin hoşuna gidecek, onların beğenisini kazanacak içerikte bir eğitim almalarının zorunluluğu üzerinde durur ki kadınların tabiatında da zaten bu özelliklerin olduğunu vurgular. Kadınların görevi olarak tayin ettiği şeyler ise küçükken büyütmek, büyüyünce onlara bakmak, nasihat vermek, teselli etmek, hayatı zevkli ve sevimli bir hale koymaktır.[49]

Rousseau burada dolaylı olarak genç bir kadının zihnine, anlayış gücüne değil, yalnızca haz verici yönüne, bedensel yeteneklerin geliştirilmesine vurgu yapıyor; kadınların anlayış güçlerinin geliştirilmesi ihmal ediyor. Bununla birlikte kadına biçilen amaç ve görevleri de doğanın bir vergisi gibi sunarak asla değiştirilemez bir özellik olarak kabul etmiştir.

Kadının erkekten ontolojik olarak farklı olduğunu söyleyen Aydınlanma filozofu Arthur Schopenhauer (öl. 1860) kadının içgüdülerine göre hareket eden bir varlık olduğunu ileri sürmüştür. Ancak o ontolojik farklılığı daha çok kadın ile erkeğin yaratılışlarındaki farklı duygu ve düşüncelere sahip olmalarıyla ilişkilendirmektedir. Örneğin erkeğin vefasız kadının ise itaatkâr olduğunu; erkeğin doğası gereği çok eşliliğe yatkın olduğunu ve bu sebeple erkek tarafından yapılan aldatmaların da doğal karşılandığını; buna karşılık kadının tabiatındaki itaat etme ve bir erkeğe bağlı olma eğilimi kadın tarafından yapılan aldatmaların doğaya aykırı bir eylem olduğunu, tabiatına aykırı bir eylemde bulunması sebebiyle kadının aldatmasının hiçbir zaman kabul edilmediğini iddia etmektedir.[50]

Bir başka Aydınlanma filozofu Kant'ta (öl. 1804) da kadına bakış ilkçağ filozoflarından ve selefi Bacon'dan farklı değildir. "Aklını kullanma cesaretini göster" diyerek akıl merkezli bir bilgi-ahlak düzeni isteyen Kant, bu güçlü tavsiyeyi erkeklere yapmış görünmektedir; ya da yalnızca erkek cinsinin bu cesareti gösterebilecek donanıma sahip olduğunu düşünmüştür. Nitekim Kant'a göre kadın ile erkek arasında tabii bir ayrım vardır ve bu ayrımda kadın güzelliğiyle erkek ise yüceliğiyle öne çıkmaktadır. Yani bir anlamda doğa kadına güzellik erkeğe ise yücelik bahşetmiştir. Buradan hareketle kadının aklı ve zihni daha çok görünüşle ilgili güzellikle meşgul olurken erkeğin zihni daha derin, felsefi, bilgi merkezli konularla meşgul olur ve bu alanlara yatkındır.[51]

Aristoteles, Platon ve bu çalışmada ismi geçen diğer filozofların kadınların toplumsal hayat içindeki rol ve önemlerine dair düşüncelerinin, içinde bulundukları toplumun genel kabulleriyle de ilişkili olduğunun göz ardı edilmemesi gerekir. Bundan dolayı bu filozoflar hakkında toptancı bir

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[48] Tuğba Torun, *Tanrı Krallığından İnsan Krallığına: Francis Bacon'ın Felsefe Bilim Tasavvuru* (Konya: Çizgi Kitabevi, 2021, 181-182.

[49] Mary Wollstonecraft, *Kadın Haklarının Gerekçelendirilmesi,* çev. Deniz Hakyemez (İstanbul: İş Bankası Kültür Yayınları, 2007), 122.

[50] Zeynep Baktemur, "Aydınlanma Çağı Filozoflarına Göre Kadın: Schopenhauer, Kant ve Rousseau Örneği", *İstanbul Üniversitesi Kadın Araştırmaları Merkezi,* I, 2019, 4-5.

[51] Immanuel Kant, *Güzellik ve Yücelik Duyguları Üzerine Gözlemler*, çev. Ahmet Fethi (İstanbul: Hil Yay., 2010), 33, 34.

bakışla olumsuz değerlendirmelerde bulunmak çok doğru ve hakkaniyetli olmayacaktır. Fakat kadın ve erkeğin yaratılış veya tabiatları /biyolojik cinsiyet bakımından karşılaştırıldığında kadının eksik, düşünme kabiliyeti az bir varlık olarak tanımlanması veya bu bakışın kadının özüne ait olduğuna yönelik anlayış öncelikle üzerinde durulması gereken problemlerdir.[52]

SONUÇ

Bu çalışma sonucunda kadınla ilgili olumsuz tavır ve düşüncelerin gerisinde daha çok dinlerin olduğuna yönelik kabulün ve din eleştirisinin önyargılı ve dogmatik bir tavır olduğu anlaşılmaktadır. Bazı dini yorumların da gerek ontolojik gerekse pratik bakımdan kadınların yaşadığı hak ihlallerinde rolü olduğu da inkâr edilemez. Fakat son din İslam'ın ortaya çıktığı dönemden çok sonra dahi felsefi düşünce devam etmiş ve etmektedir. Din ise ilkeleri aynı kalmakla birlikte insan yorumları üzerinden varlığını sürdürmektedir. Dolayısıyla kadın konusu ele alırken var olan problemlerin tek bir alan ile sınırlandırılmasının hatalı bir yaklaşım olduğunu bize bu çalışma göstermektedir.

Kadın meselesi ne sadece dinlerin ne de felsefi düşüncenin bir problemi olmayıp bu konuda felsefi, dini ve sosyolojik anlayışların birlikte değerlendirilmesi gerekmektedir. Kadın hakkındaki tartışmaların günümüz bilim ve teknoloji çağında halâ devam ettiği dikkate alınacak olursa kadının değerini düşüren, ontolojik anlamda onu erkeğin oldukça aşağısında tanımlayan bakış açılarının bilinmesi ve üzerinde düşünülmesi bugünkü kadınlara yönelik şiddet, ölüm ve tecavüzlerin sebebini anlamada daha doğru bir bakış sunacaktır.

KAYNAKÇA

Aktaş Sara. "Felsefi Dünyadan Sürgün Edilen Kadınlık". *Demokratik Modernite.* 2013. https://demokratikmodernite.org/felsefi-dunyadan-surgun-edilen-kadinlik

Baktemur Zeynep. "Aydınlanma Çağı Filozoflarına Göre Kadın: Schopenhauer, Kant ve Rousseau Örneği". *İstanbul Üniversitesi Kadın Araştırmaları Merkezi* I, 2019. 1-12.

Boyacı Nihal Petek. "Platon'da Kadın Sorunu Üzerine Bir Tartışma". *Felsefe ve Sosyal Bilimler Dergisi,* 18, Güz 2018. 205-230.

Çağıl Abdullah. "Aristoteles'in Felsefesinde Biyolojik ve Toplumsal Cinsiyet Anlayışı". *Ağrı İslami İlimler Dergisi (AGİİD)* 10, Haziran 2022. 62-68.

Kant Immanuel. *Güzellik ve Yücelik Duyguları Üzerine Gözlemler*. Çev. Ahmet Fethi. İstanbul: Hil Yayınları, 2010.

Platon, *Timaios*, 136

Tokat Latif. "Kültür Kaynaklarımız Açısından İlk İnsandan Günümüze Kadın Problemi". *İslami Araştırmalar Dergisi* 15/4, 2002. 477-483.

Torun Tuğba. *Tanrı Krallığından İnsan Krallığına: Francis Bacon'ın Felsefe Bilim Tasavvuru.* Konya: Çizgi Kitabevi, 2021.

Wollstonecraft Mary. *Kadın Haklarının Gerekçelendirilmesi.* Çev. Deniz Hakyemez. İstanbul: İş Bankası Kültür Yayınları, 2007.

https://sophosakademi.org/aristoteles-ve-ibn-i-sinaya-gore-kadin/

[52] Abdullah Çağıl, "Aristoteles'in Felsefesinde Biyolojik ve Toplumsal Cinsiyet Anlayışı", *Ağrı İslami İlimler Dergisi (AGİİD),* 10, Haziran 2022, 63.

İN VİTRO KOŞULLARDA FARKLI DOZLARDA PEG'İN HAVUÇ (*Daucus carota* L.) BİTKİSİ ÜZERİNE ETKİLERİNİN BELİRLENMESİ

DETERMINATION OF THE EFFECTS OF DIFFERENT DOSES OF PEG *IN VITRO* CONDITIONS ON CARROT (*Daucus carota* L.) PLANTS

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ÖZET

Havuç dünya çapında yetiştirilen önemli bir sebze türüdür. Abiyotik stres koşullarından biri olan kuraklık stresinden diğer tüm bitkiler gibi havuç da etkilenmektedir. Tarımsal üretimimin devamlılığının sağlanabilmesi için, kuraklığın bitkiler üzerindeki etkilerinin boyutu ve tolerans düzeylerinin belirlenmesi gerekmektedir. Bu çalışmada, farklı dozlardaki kuraklık koşulları altında havuç tohumlarının çimlenme ve gelişim durumlarının belirlenmesi amaçlanmıştır. *In vitro* koşullarda yapılan bu çalışmada besin ortamı olarak %0 (HVA), %1 (HVB), %2 (HVC), %4 (HVD) ve %6 (HVE) dozlarında PEG'in MS ortamına eklenmesiyle oluşturulan ortamlar kullanılmıştır. Farklı dozlardaki kuraklığın bitki gelişimine etkilerinin belirlenmesi amacıyla tohumların çimlenme yüzdesi (%) ve bitkilerin gövde yaş ağırlığı (g), gövde kuru ağırlığı (g), kök yaş ağırlığı (g), kök kuru ağırlığı (g), gövde uzunluğu (cm) ile kök uzunluğu (cm) incelenmiştir. İstatistiksel analizler sonucunda, farklı dozların tohum çimlenmesi, gövde yaş ağırlığı, gövde kuru ağırlığı, gövde uzunluğu ve kök uzunluğu üzerine etkilerinin önemli olduğu, kök yaş ve kuru ağırlıkları üzerine ise etkilerinin önemsiz olduğu belirlenmiştir. Çalışma sonucunda çimlenme yüzdesi en yüksek HVA (%78.00) ortamından elde edilirken, en düşük HVE (%44.00) ortamından elde edilmiştir. Bitkilerin gövde yaş ağırlığı farklı kuraklık dozlarında değiştiği gözlenmiş ve en yüksek değerin HVA (0.0273 g) ortamında, en düşük değerin ise HVE (0.108 g) ortamında olduğu tespit edilmiştir. Gövde kuru ağırlığının değişimi incelendiğinde en yüksek ağırlığa sahip bitkilerin HVA (0.0050 g) ortamında olduğu, en düşük ağırlığa sahip bitkilerin ise HVE (0.0007 g) ortamında olduğu belirlenmiştir. Farklı kuraklık dozlarının bitkinin gövde ve kök uzunlukları üzerine etkisi incelendiğinde ise en yüksek değerlerin sırasıyla 2.4000 g ve 3.6200 g ile HVA ortamında olduğu dikkat çekmiştir. Çalışmada, kuraklık stresinin havuçta çimlenme ve bitki gelişimi üzerine olumsuz etkilerinin yükseksek olduğu sonucuna ulaşılmıştır.

Anahtar kelimeler: Kuraklık stresi, Havuç, *in vitro*

ABSTRACT
Carrot is an important vegetable grown worldwide. Like all other plants, carrots are also affected by drought stress, which is one of the abiotic stress conditions. In order to ensure the continuity of agricultural production, it is necessary to determine the extent of the effects of drought on plants and their tolerance levels. In this study, it was aimed to determine the germination and development of carrot seeds under drought conditions at different doses. *In* this*in vitro* study, 0% (HVA), 1% (HVB), 2% (HVC), 4% (HVD) and 6% (HVE) doses of PEG added to MS medium were used as nutrient media. Germination percentage of seeds (%) and stem wet weight (g), stem dry weight (g), root wet weight (g), root dry weight (g), stem length (cm) and root length (cm) of plants were analyzed to determine the effects of different doses of drought on plant growth. As a result of statistical analyses, it was determined that the effects of different doses on seed germination, stem wet weight, stem dry weight, stem length and root length were significant, while the effects on root wet and dry weights were insignificant. As a result of the study, the highest germination percentage was obtained from HVA (78.00%) medium, while the lowest was obtained from HVE (44.00%) medium. Stem wet weight of the plants was observed to vary in different drought doses and the highest value was obtained in HVA (0.0273 g) and the lowest value was obtained in HVE (0.108 g). When the change in stem dry weight was examined, it was determined that the plants with the highest weight were in HVA (0.0050 g) and the plants with the lowest weight were in HVE (0.0007 g). When the effects of different drought doses on stem and root lengths of the plants were examined, it was noted that the highest values were 2.4000 g and 3.6200 g, respectively, in HVA medium. In the study, it was concluded that the negative effects of drought stress on carrot germination and plant growth were high.

Key words: Drought Stress, Carrot, *in vitro*

GİRİŞ

Sebzeler, tüketimleriyle ilişkili sağlık yararları ve faydalı bileşiklerin varlığı nedeniyle insan yemeklerinin bir parçası olmuştur. Ancak sebze üretimi, bitki gelişimini engelleyen ısı ve kuraklık gibi çok çeşitli çevresel streslerle karşılaşmaktadır. Dünya genelinde tarım arazilerinde sık görülen iklim değişikliği sonucunda, ısı ve kuraklığın ortaya çıkmasıyla ilişkili sorunların devam etmesi ve daha da kötüleşmesi, verim kaybına yol açacaktır (Oyebamiji ve ark., 2024). Sebze üretiminin karşı karşıya olduğu önemli zorluklardan biri de kuraklıktır. Kuraklık, tarımsal faaliyetler sırasında toprak nem içeriğinin miktarında azalmaya neden olan ve böylece bitki büyümesini ve verimliliğini azaltan sınırlı su kaynağı veya yağışın olduğu bir dönem olarak tanımlanabilir. Tatlı suyun ortadan kalkması nedeniyle gelecekte kuraklık stresinin şiddetli ve yoğun hale gelmesi beklenmekte olup, bu durum sebze endüstrisini önemli ölçüde etkileyecektir. 2050 yılına kadar dünyadaki tarım alanlarının %50'sinden fazlası kuraklıktan etkileneceği ön görülmektedir. Kuraklık en şiddetli abiyotik streslerden biri olup, genel bitki metabolizmasını ve işlevselliğini etkileyerek bitkiden istenen verimin elde etmesini engeller. Fide aşamasında kuraklığın neden olduğu stres, fide oluşumunu ve hayatta kalma oranlarını bozar. Vejetatif gelişim aşamalarında su stresinin ortaya çıkması, yaprak oluşumunda ve kardeşlenmede azalmaya neden olarak verim kayıplarına neden olur (Oyebamiji ve ark. 2022; Badran, 2022; Abd El-Megeed ve Mohiy, 2022). Kuraklığın neden olduğu morfo-fizyolojik değişikliklerin yanı sıra, biyokimyasal düzeyde de değişiklikler meydana gelir ve bitkilerde oksidatif hasara neden olur (Hassan ve ark., 2021).
Havuç (*Daucus carota*) dünya çapında yetiştiriciliği yapılan ve eski zamanlardan beri popüler olan bir sebze türüdür. Kökeni güneybatı Asya'da Afganistan bölgesindedir (Koley ve ark., 2014). Havuç, dünyada ekonomik açıdan en önemli 10 sebze türünden birisidir. Birleşmiş Milletler Gıda ve Tarım Örgütü'ne (FAO) göre 2012 yılında dünya çapında insan tüketimi için yaklaşık 37 milyon ton havuç ve şalgam üretilmiştir (FAOSTAT, 2015). Havuç yaklaşık %88 su, %1 protein, %7

karbonhidrat, %0.2 yağ ve %3 liften oluşur (USDA, 2015). Karbonhidrat kısmı neredeyse tamamen basit şekerlerden, ağırlıklı olarak sükroz, glikoz ve fruktozdan ve az miktarda nişastadan oluşmaktadır (Arscott ve Tanumihardjo, 2010). Havuç iyi bir lif kaynağıdır; çözünmeyen lifler selüloz ve hemiselüloz, toplam diyet lifinin en büyük kısmını (%50 ile %92) oluşturur ve çok az miktarda lignin (%4) içerir. Çözünebilir lifler fermente edilebilir hemiselüloz ve pektinden oluşur ve toplam lifin %8 ile %50'sini oluşturur (Marlett, 1992; Char, 2017). Havuç, β-karotenin tek ana kaynağı olmasının yanı sıra lutein ve likopen gibi diğer çeşitli lipofilik antioksidanların iyi bir kaynağıdır (Arscott ve Tanumihardjo, 2010). Havuçların rengi, genel olarak, karotenoidlerin türünün ve sahip oldukları miktarın iyi bir göstergesidir. Örneğin, α- ve β-karotenler turuncu havuçta baskın karotenoidler iken, likopen (kırmızı) ve lutein (sarı) sırasıyla kırmızı ve sarı havuç çeşitlerinde baskın karotenoid türleridir (Singh ve ark., 2012). Havuç ayrıca antikanser, anti-aterojenik, anti-enflamatuar ve antimikrobiyal gibi çok çeşitli sağlığı geliştirici özellikleriyle bilinen hidrofilik fenolik antioksidanlar açısından da zengindir (Grassmann ve ark., 2007; Sun ve ark., 2009; Char, 2017).

Bitki doku kültürü, aseptik ve kontrollü bir ortamda tanımlanmış katı veya sıvı ortamlarda bitkilerin hücre, doku ve organlarının yetiştirilmesi ve çoğaltılmasına denir (Bhoite ve Palshikar 2014). Bitki doku kültürü teknikleri hastalıksız bitkilerin üretimi, nadir bitki genotiplerinin hızlı çoğaltılması, bitki genom transformasyonu ve önemli ticari değere sahip bitki türevi metabolitlerin üretimini amaçlar (Debnarh ve ark., 2006; Altpeter ve ark., 2016).

Bu çalışmada, *in vitro* koşullarda değişik kuraklık dozlarında havuç bitkisinin gelişimi üzerine etkileri belirlenmiştir.

MATERYAL VE METOT

Çalışma, Sivas Bilim ve Teknoloji Üniversitesi, Tarım Bilimleri ve Teknoloji Fakültesi bitki doku kültürü laboratuvarında gerçekleşmiştir. Denemede Scarlet Nantes havuç tohumları kullanılmıştır. Araştırmada MS (Murashige ve Skoog 1962) besin ortamına değişik dozlarda % (0, 1, 2, 4, 6) PEG eklenerek ortamlar hazırlanmıştır. Araştırmada kullanılan tohumlar 20 dakika boyunca %20'lik sodyum hipoklorit çözeltisinde bekletilerek steril hale getirilmiştir. Kullanılan ortamların adlandırması Çizelge 1'de sunulmuştur. Hazırlanan besin ortamları steril kabin içerisinde petrilere dökülüp soğuyup katılaşması sağlanmıştır. Katılaşan ortamlara ekimi yapılarak büyütme odasına alınmıştır.

Çizelge 1. Kullanılan besin ortamların doz ve adlandırılması

Konsantrasyon (%)	Adlandırma
0	HVA
1	HVB
2	HVC
4	HVD
6	HVE

Araştırmada; tohumların çimlenme yüzdesi (%) Kaya ve ark. 2006'a göre belirlenmiştir. Çimlenmesi gerçekleşip gelişen bitkilerin gövde yaş ve kuru ağırlığı (g), kök yaş ve kuru ağırlığı (g), gövde v e kök uzunlukları (cm) belirlenmiştir (Keleş, 2019). Çalışmada, JMP 8.1 istatistik paket programı kullanılmış ve veriler tesadüf parselleri deneme desenine göre değerlendirilişitir. Ortalamalar LSD testi ile karşılaştırılmış ve korelasyon analizi yapılmıştır.

BULGULAR VE TARTIŞMA

Çizelge 2'de havuç tohumlarının farklı kuraklık stresi seviyelerinde bitkisinin gelişimi üzerine etkileri sunulmuştur. Çimlenme yüzdesi, gövde yaş ve kuru ağırlıkları arasındaki farklılıklar istatistiki olarak önemli bulunmuştur. En fazla çimlenme yüzdesi HVA (%78.00) ortamında elde edilmiştir. En fazla gövde yaş ağırlığı HVA (0.0273 g), HVB (0.0243 g), HVC (0.0217 g) ve HVD (0.0192 g) ortamlarında bulunmuştur. En fazla gövde kuru ağırlığı HVA (0.0018 g), HVB (0.0016 g), HVC (0.0016 g) ve HVD (0.0014 g) ortamlarında, en az HVE (0.0007 g) ortamında görülmüştür. Kök yaş ve kuru ağırlıkları arasındaki farklılıklar istatistiki bakımdan önemli bulunmasa da kuraklık stresi arttıkça ağırlıklarda azalmalar olduğu dikkat çekmiştir.

Çanakçi (2008), bir haftalık turp fideleri kuraklık stresi altında yetiştirilmiş ve sonrasında kök yolu ile salisilik asit uygulaması gerçekleştirilmiş, bitkinin taze fide ağırlığı, protein ve klorofil içeriği 0.2 mM' lık konsantrasyonda bir etkiye sahip olmadığı, dozlar 1 ve 2 mM ise fideler osmotik stres ve toksik etki yaratarak protein, klorofil miktarı ve taze ağırlıklarda azalmalar saptanmıştır (Nasırcılar ve ark., 2020). Kıran ve ark. (2014), tuza tolerans seviyeleri belirlenmiş domates genotiplerinin fizyolojik ve morfolojik özelliklerin kuraklık stresi koşullarında, yeşil aksam yaş bitki ağırlıklarının tüm bitkilerde azaldığının ancak bu azalmanın derecesi kontrole göre genotiplere bağlı olarak farklılık gösterdiğini bildirmiştir. Benlioğlu (2017), *in vitro* ve *in vivo* yöntemlerle makarnalık buğday tarımında kullanılan 1'i yabani 11 kültür çeşidi kuraklık stresine olan tepkilerini belirlemiştir. Çalışmada kuraklık stresi oluşturmada % 0 (kontrol), % 5, %10, %15 ve %20 oranlarıyla PEG 6000 kullanılmıştır. *In vitro* koşullarda, olgun tohumlardan kallus oluşturulduktan sonra, değişik kuraklık stresleri uygulanarak, rejenerasyon kapasiteleri ve oluşan bitkicikler belirlenmiştir. *In vivo* koşullarda ise, çimlenme hızı ve gücü çimlendirme testi, sürgün ve kök yaş ve kuru ağırlık uzunlukları incelenmiştir. Araştırmada kuraklık dozunun artmasıyla incelenen tüm özellikler bakından önemli derecede azalmalar görülmüştür. Nasırcılar ve ark. (2020), kuraklık koşullarında çimlenme ve vejetatif büyüme parametrelerini belirledikleri çalışmada dört farklı turp çeşidine değişik PEG 6000 konsantrasyonları (%5, %10, %15, %20) uygulanmıştır. Çalışmada vejetatif büyüme parametrelerinde PEG6000'in beyaz, siyah ve kırmızı küçük turp çeşitlerinde %15, büyük kırmızı turp çeşidinde ise %20 oranında azaldığını ikinci aşamada, çeşitlerin kuraklığa toleransını artırmak amacıyla PEG6000 uygulamasına ek olarak salisilik asidin farklı dozları (0.25 mM, 0.50 mM, 0.75 mM, 1.00 mM) uygulamıştır. Salisilik asidin değişik konsantrasyonlarının kuraklık stresinde tohumların çimlenmesi ve vejetatif büyüme parametreleri üzerine etkisi çeşitlere bağlı olarak değiştiğini ve eşitlerin çimlenmesi üzerinde uyarıcı etki yaptığını belirlemiştir.

Çizelge 2. Farklı kuraklık seviyelerinin havuç bitkisinin gelişimi üzerine etkileri

Dozlar	Çimlenme yüzdesi (%)	Gövde yaş ağırlığı (g)	Gövde kuru ağırlığı (g)	Kök yaş ağırlığı (g)	Kök kuru ağırlığı (g)
HVA	78.00a	0.0273a	0.0018a	0.0050	0.0006
HVB	64.00b	0.0243a	0.0016a	0.0040	0.0003
HVC	60.00b	0.0217a	0.0016a	0.0038	0.0002
HVD	48.00c	0.0192a	0.0014a	0.0038	0.0002
HVE	44.00c	0.0108b	0.0007b	0.0032	0.0002
LSD	4.57^{***}	0.0082^{*}	0.0005^{*}	Ö.D.	Ö.D.

Farklı kuraklık seviyelerinin olduğu ortamlarda yetiştirilen havuç bitkisinin gövde ve kök uzunlukları arasındaki farklılıklar istatistiksel olarak önemli bulunmuştur (Çizelge 3). Gövde uzunluğu en fazla HVA (2.40 cm), en düşük HVE (1.56 cm) ortamlarında saptanmıştır. Kök uzunluğu en fazla HVA (3.62 cm), en düşük HVE (2.68 cm) ortamlarında elde edilmiştir.

Hasanuzzaman ve ark. (2017), 6 arpa çeşidinde kurak koşullara tepkilerini belirlenmesi amacıyla PEG 6000'in değişik dozlarını (%10, % 5, %18, %20 ve %25) çimlenme ve ön fide aşamasında bitkilere uygulamıştır. Denemede kök ve sürgün uzunluğu parametrelerini belirlenmiş ve kuraklık konsantrasyonlarının artmasıyla birlikte kök ve sürgün uzunlukların düştüğü görülmüştür. Dolgun ve Çiftçi (2018), makarnalık buğday çeşitlerinde (Maestrale, Meram, Levante) kontrol olarak distile su, PEG 6000'in değişik konsantrasyonlarında kuraklık stresinde çimlenme ve erken fide gelişimi üzerine etkilerini belirlemiştir. Çalışma kapsamında artan kuraklık stresi seviyelerinin tüm çeşitlerde incelenen parametreleri olumsuz yönde etkilendiğini bildirmiştir.

Çizelge 3. Farklı kuraklık seviyelerinin havuç bitkisinin gövde ve kök uzunlukları (cm) üzerine etkileri

Dozlar	Gövde uzunluğu (cm)	Kök uzunluğu (cm)
HVA	2.40a	3.62a
HVB	2.32a	3.56a
HVC	2.24a	3.32a
HVD	1.92b	3.26a
HVE	1.56c	2.68b
LSD	0.30^{***}	0.49^{*}

Çizelge 4'te değişik kuraklık seviyelerinin havuç bitkisinde incelenen özellikler arasındaki korelasyon analizi sunulmuştur. Bu kapsamda incelenen özellikler arasında pozitif ilişki olduğu görülmüştür. Çimlenme yüzdesiyle; kök kuru ağırlığı (0.6050) ve gövde uzunluğu (0.7107) arasında kuvvetli pozitif ilişki bulunmuştur. Gövde yaş ağırlığıyla; gövde kuru (0.6255) ve kök kuru ağırlıkları (0.6215) arasında kuvvetli pozitif ilişki bulunmuştur.

Çizelge 4. Farklı kuraklık seviyelerinin havuç bitkisinde incelenen özellikler arasındaki korelasyon analizi

	Çimlenme yüzdesi (%)	**Gövde yaş ağırlığı (g)**	**Gövde kuru ağırlığı (g)**	**Kök yaş ağırlığı (g)**	**Kök kuru ağırlığı (g)**	**Gövde uzunluğu (cm)**	**Kök uzunluğu (cm)**
Çimlenme yüzdesi (%)	1,0000	0,5524	0,5466	0,2813	0,6050	0,7107	0,5362
Gövde yaş ağırlığı (g)		1,0000	0,6255	0,4215	0,6215	0,4844	0,4586
Gövde kuru ağırlığı (g)			1,0000	0,4764	0,4103	0,4150	0,3823
Kök yaş ağırlığı (g)				1,0000	0,6887	0,2039	0,3395
Kök kuru ağırlığı (g)					1,0000	0,4623	0,4198
Gövde uzunluğu (cm)						1,0000	0,6476
Kök uzunluğu (cm)							1,0000

SONUÇ

Kuraklık abiyotik stres faktörlerinden bir tanesidir. Bitkilerin gelişimi bakımından oldukça önem arz etmektedir. Bu çalışmada farklı konsantrasyonlarda hazırlanan PEG (%0, 1, 2, 4, 6)'in havuç bitki gelişimi üzerine etkileri belirlenmiştir. Denemede çimlenme yüzdesi (%), gövde yaş ağırlığı (g) gövde kuru ağırlığı (g), kök yaş ağırlığı, kök kuru ağırlığı (g), gövde uzunluğu (cm) ve kök

uzunluğu (cm) incelenmiştir. Araştırma sonuçları dikkate alındığında bitki gelişimi en fazla kontrol ortamında görülmüştür. Kuraklık stres koşulları arttırıldığında bitkilerin gelişimi azaldığı görülmüştür.

KAYNAKLAR

Abd El-Megeed, F., Mohiy, M. (2022). Improving Productivity of Some Bread Wheat Cultivars under Water Deficit Stress Using Endophytic Bacillus sp. NGB-WhE3. Egyptian Journal of Botany, 62(1), 275-290. doi: 10.21608/ejbo.2021.102234.1814.

Altpeter, F., Springer, N.M., Bartley, L.E., Blechl, A.E., Brutnell, T.P., Citovsky, V., Conrad, L., Gelvin, S.B., Jackson, D., Kausch, A.P., Lemaux, P.G., Medford, J.I., Orozco-Cardenas, M., Tricoli, D., VanEck, J., Voytas, D.F., Walbot, V., Wang, K., Zhang, Z.J., Stewart, C.N. (2016). Advancing crop transformation in the era of genome editing. Plant Cell 28:1510–1520. https://doi.org/10.1105/tpc.16.00196

Arscott, S.A., Tanumihardjo, S.A. (2010). Carrots of many colors provide basic nutrition and bioavailable phytochemicals acting as a functional food. Comprehensive Reviews in Food Science and Food Safety, 9(2):223–239.

Badran, A. (2022). Assessment of Variation and Stability Parameters of Five Quinoa Genotypes under Drought Stress Conditions. Egyptian Journal of Botany, 62(1), 21-30. doi: 10.21608/ ejbo.2021.25026.1463.

Benlioğlu, B. (2017). Makarnalık Buğday *(Triticum durum Desf)*'da Kurağa Toleranslı Rejenerantların *in vitro* Seleksiyonu. Doktora Tezi, Ankara Üniversitesi, 146.

Bhoite, H.A., Palshikar, G.S. (2014). Plant tissue culture: A review. *World journal of pharmaceutical sciences*, 565-572.

Char, C.D. (2017). Carrots (*Daucus carota* L.). *Fruit and Vegetable Phytochemicals: Chemistry and Human Health, 2nd Edition*, 969-978.

Çanakçi, S. (2008). Effects of salicylic acid on fresh weight change, chlorophyll and protein amounts of radish (*Raphanus sativus* L.) seedlings.

Debnarh, M., Malik, C.P., Baisen, P.S. (2006). Micropropagation:a tool for the production of high quality plant based medicines. Curr Pharm Biotechnol 7:33–49

Dolgun, C., Çiftçi, E.A. (2018). Farklı kuraklık stresi seviyelerinin makarnalık buğday çeşitlerinde çimlenme ve erken fide gelişimi üzerine etkisi. *Bursa Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, *32*(2), 99-109.

FAOSTAT. (2015). Crops. Food and Agriculture Organization of the United Nations Statistics Division. http://faostat3.fao.org/browse/Q/QC/E, accessed February 21, 2017.

Grassmann, J., Schnitzler, W.H., Habegger, R. (2007). Evaluation of different colored carrot cultivars on antioxidant capacity based on their carotenoid and phenolic contents. International Journal of Food Sciences and Nutrition, 58:603–611.

Hasanuzzaman, M., Shabala, L., Brodribb, T.J., Zhou, M., Shabala, S. (2017). Assessing the suitability of various screening methods as a proxy for drought tolerance in barley. Functional Plant Biology, 44(2), 253-266.

Hassan, N., Budran, I., El-Bastawisy, Z., El-Harary, E., Nemat Alla, M. (2021). Stigmasterol Relieves the Negative Impact of Drought on Flax through Modulation of Redox Homeostasis. Egyptian Journal of Botany, 61(2), 623-635. doi: 10.21608/ ejbo.2021.57628.1607

Kaya, M.D., Okçu, G., Atak, M., Çıkılı, Y., Kolsarıcı, Ö. (2006). Seed Treatments to Overcome Salt and Drought Stress During Germination in Sunflower (*Helianthus annuus* L.). European Journal of Agronomy, 24(4): 291-295.

Keleş, B. (2019). İn Vitro kültür koşulları ve tuzluluk (NaCl) stresi altında çimlendirilen aspir (*Carthamus tinctorius* L.) bitkisinde meydana gelen morfolojik, fizyolojik ve biyokimyasal değişimler. Yüksek Lisans Tezi, Batman Üniversitesi Fen Bilimleri Enstitüsü, 61 s.

Koley, T.K., Singh, S., Khemariya, P. et al. (2014). Evaluation of bioactive properties of Indian carrot (*Daucus carota* L.): a chemometric approach. Food Research International, 60:76–85.
Kıran, S., Özkay, F., Kuşvuran, Ş., Ellialtıoğlu, Ş. Ş. (2014). Tuz stresine tolerans seviyesi farklı domates genotiplerinin kuraklık stresi koşullarında bazı özelliklerinde meydana gelen değişimler. *Journal of Agricultural Faculty of Gaziosmanpaşa University (JAFAG)*, *31*(3), 41-48.
Marlett, J.A. (1992). Content and composition of dietary fiber in 117 frequently consumed foods. Journal of the American Dietetic Association, 92:175–186.
Murashige, T., Skoog, F. (1962). A revised medium for rapid growth and bio assays with tobacco tissue cultures. Physiologia plantarum, 15(3), 473-497.
Nasırcılar, A. G., Ulukapı, K., & Kurt, Z. (2020). Kuraklık Stresi Koşullarında Dışarıdan Uygulanan Salisilik Asitin Turp (Raphanus sativus L.) Çeşitlerinin Çimlenme ve Vejetatif Büyüme Özellikleri Üzerine Etkisi. *Turkish Journal of Agriculture-Food Science and Technology*, *8*(11), 2293-2299.
Oyebamiji, Y.O., Shamsudin, N.A.A., Asmuni, M.I., Adebola, L.A. (2022). Drought Impacts and the Tolerance Mechanisms in Rice (*Oryza sativa* L.): A Review. Egyptian Journal of Agronomy, 44, 1-19
Oyebamiji, Y. O., Nahar, S., Shamsudin, N. A., Salisu, M. A., Akinola, S. A., Adebayo, I. A., Arsad, H. (2024). The Role of Arbuscular Mycorrhizal Fungi in Alleviating Heat and Drought Stress in Vegetables. *Egyptian Journal of Botany*, *64*(2), 497-505.
Singh, D.P., Beloy, J., McInerney J.K., Day, L. (2012). Impact of boron, calcium and genetic factors on vitamin C, carotenoids, phenolic acids, anthocyanins and antioxidant capacity of carrots (*Daucus carota*). Food Chemistry, 132:1161–1170.
Sun, T., Simon, P.W., Tanumihardjo, S.A. (2009). Antioxidant phytochemicals and antioxidant capacity of biofortified carrots (*Daucus carota* L.) of various colors.
USDA. (2015). National Nutrient Database for Standard Reference Release 28, Basic Report: 11124, carrots, raw. United States Department of Agriculture, Agricultural Research Service. http://ndb.nal.usda.gov/ndb/foods/ show/2901, accessed February 21, 2017

BEYAZ BAŞ LAHANA (*Brassica oleracea var. capitata.* L.) BİTKİSİNİN *IN VITRO* KOŞULLARDA KURAKLIK STRESİNİN BELİRLENMESİ

DETERMINATION OF DROUGHT STRESS OF WHITE HEAD CABBAGE (*Brassica oleracea* var. capitata. L.) *IN VITRO* CONDITIONS

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ÖZET
Kuraklık, dünya çapında tarımsal üretimi sınırlayan en büyük kısıtlamalardan biridir. Tarımsal üretim tahminleri, bu sorunun gelecekte daha şiddetli olacağını öngörmektedir. Bu nedenle tarım ürünlerinin kuraklığa karşı tolerans düzeyinin tespit edilmesi büyük önem taşımaktadır. Bu kapsamda bu çalışmada, ülkemizde ve dünyada sevilerek tüketilen beyaz lahananın kurak koşullara tolerans düzeyinin belirlenmesi amaçlanmıştır. Çalışmada beyaz baş lahana tohumlarının farklı PEG konsantrasyonları [BLA (0), BLB (%1), BLC (%2), BLD (%4) ve BLE (%6)] içeren MS ortamına ekimi sağlanmış ve gelişim durumları gözlenmiştir. Çalışma kapsamında kuraklık konsantrasyonlarının, tohumların çimlenme yüzdesi (%), gövde yaş ağırlığı (g), gövde kuru ağırlığı (g), kök yaş ağırlığı (g), kök kuru ağırlığı (g), gövde uzunluğu (cm) ve kök uzunluğu (cm) üzerine etkileri incelenmiştir. Çalışma sonuçlarına göre kuraklığın çimlenme yüzdesi (%), gövde yaş ağırlığı (g), gövde kuru ağırlığı (g), kök yaş ağırlığı (g) ve kök kuru ağırlığı (g) üzerine etkileri istatistiksel olarak önemli bulunmuştur. Çimlenme yüzdesi en yüksek BLA (%76.00), en düşük BLE (%58.00) ortamında gerçekleşmiştir. Gövde yaş ağırlığı ve kuru ağırlığı en yüksek olan bitkiler BLA (sırasıyla 0.1570 g, 0.0110 g) ortamından elde edilirken, en düşük olan bitkiler BLE (sırasıyla 0.0704 g, 0.0047) ortamından elde edilmiştir. Kuraklık konsantrasyonunun artmasıyla birlikte bitkilerin kök yaş ve kuru ağırlıkları arasında da önemli farklılıklar olduğu belirlenmiştir. En yüksek kök yaş ve kök kuru ağırlıkları BLA (0.0516 g, 0.0029 g) ortamında gelişen bitkilerden elde edilirken, en düşük değerler BLE (0.0256 g, 0.0015 g) ortamındaki bitkilerden elde edilmiştir.

Anahtar kelimeler: Kuraklık, Abiyotik stres, *In vitro*

ABSTRACT
Drought is one of the biggest constraints limiting agricultural production worldwide. Agricultural production forecasts predict that this problem will be more severe in the future. Therefore, it is of great importance to determine the drought tolerance level of agricultural crops. In this context, in this study, it was aimed to determine the tolerance level of white cabbage, which is popularly consumed in our country and in the world, to drought conditions. In the study, white head cabbage seeds were sown on MS medium containing different PEG concentrations [BLA (0%), BLB (1%),

BLC (2%), BLD (4%) and BLE (6%)] and their developmental status was observed. The effects of drought concentrations on germination percentage (%), stem wet weight (g), stem dry weight (g), root wet weight (g), root dry weight (g), stem length (cm) and root length (cm) were investigated. According to the results of the study, the effects of drought on germination percentage (%), stem wet weight (g), stem dry weight (g), root wet weight (g) and root dry weight (g) were found statistically significant. The highest germination percentage was realized in BLA (76.00%) and the lowest in BLE (58.00%). The plants with the highest stem wet weight and dry weight were obtained from BLA (0.1570 g, 0.0110 g, respectively), while the plants with the lowest stem wet weight and dry weight were obtained from BLE (0.0704 g, 0.0047 g, respectively). Significant differences were also observed between the root wet and dry weights of the plants with increasing drought concentration. The highest root wet and dry weights were obtained from plants grown in BLA (0.0516 g, 0.0029 g), while the lowest values were obtained from plants grown in BLE (0.0256 g, 0.0015 g).

Key words: Drought, Abiotic stress, *In vitro*

GİRİŞ

İklim değişikliğinin, özellikle gelişmekte olan ülkelerde, tarım sektörü ve tarımsal kalkınma unsurları üzerinde olumsuz bir etkiye sahip olacağı bilinmektedir. Bitkisel üretim, büyüme ve gelişmeleri üzerinde önemli bir stres oluşturacak olan iklim değişikliğinden etkilenecektir. İklim koşullarındaki herhangi bir değişikliğin küresel gıda üretimi ve güvenliğini tehdit etmesi muhtemeldir (IPCC, 2014; Dewedar ve ark., 2021). Avrupa, 2022 yılının yaz aylarında 500 yıldır görülen en sıra dışı kuraklığı yaşamıştır. Rekor kıran sıcaklık ve sınırlı yağış, nehirlerin kurumasına, orman yangınlarının şiddetlenmesine ve mahsul kıtlığına neden olmuştur. Amerika'nın Batısı, 1200 yıldır görülen en şiddetli kuraklığı yaşarken, Çin'in en büyük nehri olan Yangtze'nin bazı kısımları, sert sıcaklıklar ve ciddi yağış eksikliği nedeniyle en az 1865'ten bu yana en düşük seviyelerine ulaşmıştır (Coughlan ve ark., 2022; Iglesias ve ark., 2022). Daha da önemlisi, atmosferdeki karbondioksit seviyeleri (420,99 ppmv) şu anda Hawaii Ulusal Okyanus ve Atmosfer İdaresi (NOAA) dağ zirvesi gözlemevi tarafından kaydedilen en yüksek seviye olup, 2021'den bu yana 1,8 ppmv'lik bir artış göstermiştir. İnsan faaliyetleri her yıl doğal süreçlerin giderebileceğinden daha fazla karbondioksiti atmosfere saldığından, atmosferdeki karbondioksit konsantrasyonu artmaya devam edecektir. 2100 yılında, Hükümetler arası İklim Değişikliği Paneli (IPPC) modellerinden elde edilen projeksiyonlar, karbondioksit konsantrasyonlarının 800 ile 1200 ppmv aralığına düşebileceğini göstermektedir (IPCC, 2022). Bu tür bir davranış, 2 °C'den fazla küresel sıcaklık artışına, uzun süreli kuraklık dönemlerine ve aşırı iklim olaylarının yoğunlaşmasına neden olacaktır (Lupitu ve ark., 2023). Sıcaklıktaki beklenen artış ve değişen mevsimsel yağış düzeni, bazı ürünlerin üretimi üzerinde olumsuz bir etkiye sahip olacaktır. İklim değişikliğinin farklı ürünlerin üretimi üzerindeki öngörülen etkilerini anlamak, bu etkilere karşı koymak için tüm olası önlemleri uygulamaya koymak gelecekteki küresel gıda ve su güvenliğini incelemek için çok önemlidir (Kumar, 2016; Mall ve ark., 2017; Lipovac ve ark., 2018).

Kuraklık, tarımsal üretimde bitki büyümesini ve verimini baskılayan en yaygın çevresel faktörlerdir (Khan ve ark., 2017). Kuraklıktan etkilenen alan, dünyadaki mevcut arazinin yaklaşık %40'ını oluşturmaktadır. Buna ek olarak, aşırı sıcaklıklara yol açabilecek iklim değişikliğinin bazı bölgelerde şiddetli ve uzun süreli kuraklığa neden olacağı tahmin edilmektedir (Zhang ve ark., 2014). Kuraklık stresi bitkilerde bir dizi fizyolojik ve biyokimyasal reaksiyona neden olmakta ve çevredeki en karmaşık abiyotik stres faktörlerinden birisidir. (Khan ve ark., 2017). Bu koşullar altında, bitkiler gen düzenlemesi (Zhang ve ark., 2017), karbon metabolizması değişimi (Alves ve ark., 2021) ve stoma açılmasının düzenlenmesi (Satake ve ark., 2015; Haak ve ark., 2017; Agurla ve ark., 2018) gibi çevresel streslerle başa çıkmak için farklı stratejiler

benimsemektedir. Bitki yaprakları tarafından fotosentetik karbon fiksasyonunun artan oranı, daha yüksek atmosferik CO_2'nin bitkiler üzerindeki en tutarlı etkilerinden biridir (Lupitu ve ark., 2023). Brassicaceae familyasına ait Brassica cinsi, dünya çapında her yıl yetiştirilen *B. oleracea* ve *B. rapa*, brokoli, karnabahar ve Brüksel lahanası gibi ekonomik açıdan önemli birçok türü içermektedir. Brassicaceae, glukozinolatlar gibi ikincil metabolitler bakımından zengindir ve bunların yan ürünleri olan izotiyosiyanatlar, tiyosiyanatlar, nitriller, epitiyonitriller ile birlikte patojen saldırganlığına karşı bitki savunmasında rol oynadıkları kabul edilmiştir (Halkier ve Gershenzon, 2006). Özellikle izotiyosiyanatların kanserin önlenmesinde olumlu bir rol oynadığı (Keck ve Finley, 2004; Mokhtari ve ark., 2018) ve dejeneratif hastalıklarda nöroprotektif ve immünomodülatör etkileri olduğu çeşitli makalelerde bildirilmiştir (Traka ve Mithen, 2009; Giacoppo ve ark., 2013).

Beyaz baş lahana, su stresine orta derecede duyarlı olarak sınıflandırılmıştır ve baş oluşum dönemi daha hassastır (Shannon ve Grieve, 1998). Kuraklık tarafından uygulanan abiyotik stres, birçok bitkide ciddi büyüme geriliğine neden olmaktadır. Lahana (*Brassica oleracea* var. *capitata*) insan beslenmesinde yaygın olarak kullanılan önemli sebze ürünlerinden biridir ve kuraklık gibi abiyotik stres koşullarına karşı hassas veya orta derecede toleranslı olarak kabul edilebilir (Zhang ve ark., 2014). Kuraklık stresinin lahanada neden olduğu bitki büyümesi, biyokimyasal ve fizyolojik tepkiler hakkındaki veriler oldukça azdır.

Bitki doku kültürü ve bitki rejenerasyonu, çeşitli bilimsel ve endüstriyel alanları kapsayan bitki biyoteknolojisinin önemli yönlerini oluşturmaktadır. Son yıllarda, *in vitro* bitki rejenerasyonunu kontrol eden temel mekanizmaların anlaşılmasında önemli ilerlemeler görülmüş ve bu süreci geliştirmek için özel ekipman ve stratejilerin hızla gelişmiştir. Bununla birlikte, üstün genotipleri seçme ve rejenerasyon stratejilerini daha da geliştirmek ve protokolleri iyileştirmek için devam eden bir talep bulunmaktadır (Pasternak ve Steinmacher 2024). Bitki doku kültürü tekniği, hücrelerin, dokuların ve organların kontrollü fiziksel, kimyasal ve çevresel koşullar altında aseptik olarak yapay bir besin ortamında *in vitro* kültürünü içermektedir (Ahamad, 2024).

Bu hususlar göz önünde bulundurularak, çalışmanın amacı, *in vitro* koşullarda farklı kuraklık seviyelerinde beyaz baş lahana bitkisinin büyüme performansını belirlemektir.

MATERYAL VE METOT

Çalışma, Sivas Bilim ve Teknoloji Üniversitesi, Tarım Bilimleri ve Teknoloji Fakültesi bitki doku kültürü laboratuvarında yapılmıştır. Araştırmada Yalova Sarmalık beyaz baş lahana tohumları kullanılmıştır. Denemede MS (Murashige ve Skoog, 1962) besin ortamına değişik dozlarda % (0, 1, 2, 4, 6) PEG eklenerek ortamlar hazırlanmıştır. Beyaz baş lahana tohumları steril kabin içerisinde 20 dakika %20'lik sodyum hipoklorit çözeltisinde bekletilerek steril hale getirilmiştir. Kullanılan besin ortamları adlandırması ve ortam içerikleri Çizelge 1'de verilmiştir. Steril kabin içerisinde besin ortamları petrilere dökülüp soğuyup katılaşmaya bırakılmıştır. Katılaşan ortamlara ekimi yapılmış ve 25 ± 2°C sıcaklık 3.000 lüx' ışık altında 16 saat aydınlık 8 saat karanlık periyotta büyütme odasına alınmıştır.

Çizelge 1. Kullanılan besin ortamlarının içeriği ve adlandırılması

Adlandırma	Ortam İçeriği
BLA	4.4 g/l MS + 30 g/L sakkaroz + 7 g/L agar
BLB	4.4 g/l MS + %1 PEG + 30 g/L sakkaroz + 7 g/L agar
BLC	4.4 g/l MS + %2 PEG + 30 g/L sakkaroz + 7 g/L agar
BLD	4.4 g/l MS + %4 PEG + 30 g/L sakkaroz + 7 g/L agar
BLE	4.4 g/l MS + %6 PEG + 30 g/L sakkaroz + 7 g/L agar

Çalışmada kapsamında; çimlenme yüzdesi (%) (Kaya ve ark., 2006), gövde yaş ağırlığı (g), gövde kuru ağırlığı (g), kök yaş ağırlığı (g), kök kuru ağırlığı (g), gövde uzunluğu (cm) ve kök uzunluğu (cm) belirlenmiştir (Keleş, 2019). Çalışmada incelenen parametrelerden elde edilen verilere SAS temeli üzerine kurulu JMP 8.1 istatistik paket programında tesadüf parselleri deneme desenine

göre analiz edilmiş ve ortalamalar LSD testi ile karşılaştırılmıştır. İncelenen parametreler arasındaki ilişkinin boyutunu belirlemek amacıyla korelasyon analizi yapılmıştır.

BULGULAR

Beyaz baş lahana tohumlarının farklı kuraklık stresi seviyelerinde çimlenme yüzdelerinin (%) incelendiği çalışmada ortamlar arasındaki farklılıklar istatistiki olarak önemli bulunmuştur (Çizelge 2). Bu kapsamda en yüksek çimlenme %76.00 ile BLA ortamından elde edilmiş ve bunu %72.00 ile BLB ortamı takip etmiştir. Kuraklık seviyelerinin artmasıyla birlikte çimlenme oranlarında azalmalar olduğu dikkat çekmiştir. En düşük çimlenmenin %58.00 ile BLE ortamında olduğu belirlenmiştir.

Farklı tuz seviyelerine sahip ortamlarda gelişen bitkilerin gövde yaş ağırlıkları (g) belirlenmiş ve ortamlar arasındaki farklılıklar istatistiksel olarak önemli bulunmuştur. Çalışmada en yüksek gövde yaş ağırlığının olduğu ortam 0.1570 g ile BLA ortamı olarak belirlenmiş ve bunu 0.1400 g ile BLB ortamı takip etmiştir. Ortamlardaki tuz seviyesi yükseldikçe bitkilerin daha az gelişmesine bağlı olarak gövde yaş ağırlığında da azalmalar olduğu dikkat çekmiştir. Gövde yaş ağırlığı en düşük olan bitkiler 0.0704 g ile BLE ortamından elde edilmiştir.

Gelişen bitkilerin gövde kuru ağırlıkları (g) incelendiğinde kullanılan ortamlar arasındaki farklılıklar önemli bulunmuştur. Bu kapsamda gövde ağırlığı kuraklık stresinin olamadığı BLA ortamında 0.0110 g bulunurken, en yüksek kuraklık stresinin bulunduğu BLE ortamında 0.0047 g olduğu tespit edilmiştir. Kuraklık stresi arttıkça bitkilerin gövde kuru ağırlıklarında azalmalar meydana gelmiştir.

Farklı kuraklık seviyelerinin uygulandığı bu çalışmada elde edilen bitkilerin kök yaş (g) ve kuru (g) ağırlıkları incelendiğinde ortamlar arasında farklılıklar olduğu belirlenmiştir. Bitkilerin kök yaş ve kuru ağırlıkları en yüksek BLA (0.0516 g, 0.0029 g) ve BLB (0.0512 g, 0.0025 g) ortamından elde edilmiştir. Bu ortamlar istatistiksel olarak aynı grupta yer almıştır. Gelişen bitkilerden kök yaş ve kuru ağırlıkları en düşük olanlar BLE (0.0256 g, 0.0015 g) ortamından elde edilmiştir. Kuraklık seviyelerindeki artışa bağlı olarak kök yaş ve kuru ağırlıklarında önemli oranlarda düşüşler olmuştur.

Rahman ve ark., (2024) yaptıkları çalışmada, kurak koşulların, bitki büyümesini gözle görülür bir şekilde azalttığını bildirmişlerdir. Bu kapsamda lahana bitkisinin sürgün ve köklerinin taze ve kuru ağırlıkları arasında gözle görülür bir azalma meydana geldiğini bildirmişlerdir. Yapılan farklı çalışmalarda kuraklık stresi altında çeşitli bitki türlerinde de büyümenin sürekli olarak azaldığı bildirilmiştir. Bunlarında arasında maş fasulyesi (Sadiq ve ark., 2019), *Brassica oleracea* (Latif ve ark., 2016), Zea mays (Shafiq ve ark., 2019), *Helianthus annuus* (Kosar ve ark., 2018) ve kanola (Shafiq ve ark., 2014) yer almaktadır. Kuraklık stresi, toplam yaprak sayısı, toplam yaprak alanı, taze ve kuru ağırlıklar dahil olmak üzere Çin lahanasının büyüme özelliklerini önemli ölçüde azalttığı yapılan bir çalışmada bildirilmiştir (Shawon ve ark., 2020). Benzer şekilde Park ve ark. (2003) de su stresinin Çin lahanasının taze ağırlığını kontrole göre %65 oranında azalttığını bildirmiştir. Yapılan farklı çalışmalarda, tuz ve kuraklık koşullarının birleşik etkisinin, bitki büyümesi üzerinde bireysel etkilerinden daha fazla olumsuz etkiye sahip olduğunu bildirilmiştir (Manuchehri ve Salehi, 2014; Álvarez ve Sánchez-Blanco, 2015; Tavousi ve ark., 2015; Rahman ve ark., 2024). Bu durum, kuraklık stresinin farklı bitki türlerinde de büyüme ve gelişme üzerindeki yaygın etkisinin altını çizmektedir.

Çizelge 2. Farklı kuraklık seviyelerinin beyaz baş lahana çimlenmesi ve bitki gelişimi üzerine etkileri

Dozlar	Çimlenme yüzdesi (%)	Gövde yaş ağırlığı (g)	Gövde kuru ağırlığı (g)	Kök yaş ağırlığı (g)	Kök kuru ağırlığı (g)
BLA	76.00a	0.1570a	0.0110a	0.0516a	0.0029a
BLB	72.00b	0.1400ab	0.0079b	0.0512a	0.0025ab
BLC	68.00c	0.1110bc	0.0068bc	0.0446ab	0.0015c
BLD	64.00d	0.0816cd	0.0059cd	0.0390b	0.0019bc
BLE	58.00e	0.0704d	0.0047d	0.0256c	0.0015c
LSD	2.09^{***}	0.03^{***}	0.0019^{***}	0.0102^{**}	0.0008^{*}

Farklı kuraklık seviyelerinin olduğu ortamlarda yetiştirilen beyaz baş lahana bitkisinin gövde ve kök uzunlukları arasındaki farklılıklar istatistiksel olarak önemli bulunmamıştır (Çizelge 3). Buna rağmen gövde uzunluğu BLA ortamında 4.00 cm iken, BLE ortamında 2.92 cm olarak belirlenmiştir. İstatistiksel olarak önemli bulunmasa da kuraklık seviyelerindeki artışın bitkide gövde uzunluğunun baskılanmasına neden olduğu görülmektedir. Kök uzunluğu ise BLA ortamında 6.47 cm iken, bu değer BLE ortamında 5.47 cm'ye düşmüştür. Gövde uzunluğu kadar olmasa da kök uzunluğunun da kuraklık seviyesindeki artıştan olumsuz etkilenmiştir. Sahin ve ark. (2018) tarafından yapılan bir çalışmada farklı kuraklık seviyelerinin lahana bitkisi üzerindeki etkilerinin belirlenmesi amaçlanmıştır. Bitki boyu, gövde çapı, yaprak alanı, yaprak sayısı, taze-kuru sürgün ve kök ağırlıkları gibi tüm vejetatif büyüme parametreleri kontrol uygulamasında en yüksek bulunduğunu bildirmişleridir. Maggio ve ark. (2005), kuraklık stresinin lahananın toplam baş verimini hektar başına 50.5'ten 17.5 tona düşürdüğünü, süre veya uzunluğu belirtmeden bildirmiştir. *Brassica napus* çeşitlerinde, su stresi klorofil a + b içeriğini yeterli sulanan bitkilere kıyasla %38 oranında azaltmıştır (Paclik ve ark.,1996).

Çizelge 3. Farklı kuraklık seviyelerinin beyaz baş lahana bitkisinin gövde ve kök uzunlukları (cm) üzerine etkileri

Dozlar	Gövde uzunluğu (cm)	Kök uzunluğu (cm)
BLA	4.00	6.47
BLB	3.74	6.23
BLC	3.12	6.05
BLD	3.27	5.90
BLE	2.92	5.47
LSD	Ö.D.	Ö.D.

Farklı kuraklık seviyelerinin beyaz baş lahana bitkisinde incelenen özellikler arasındaki korelasyon analizi Çizelge 4'te verilmiştir. Bu kapsamda incelenen özellikler arasında pozitif ilişki olduğu dikkat çekmiştir. Çimlenme yüzdesiyle; gövde yaş ağırlığı (0.8263), gövde kuru ağırlığı (0.8061) ve kök yaş ağırlığı (0.7823) arasında kuvvetli pozitif ilişki bulunurken, gövde (0.40989) ve kök uzunluğu (0.2478) ile arasında zayıf pozitif ilişki olduğu belirlenmiştir. Gövde yaş ağırlığıyla gövde uzunluğu arasında zayıf pozitif ilişki (0.1838) olduğu tespit edilmiştir.

Çizelge 4. Farklı kuraklık seviyelerinin beyaz baş lahana bitkisinde incelenen özellikler arasındaki korelasyon analizi

	Çimlenme yüzdesi (%)	**Gövde yaş ağırlığı (g)**	**Gövde kuru ağırlığı (g)**	**Kök yaş ağırlığı (g)**	**Kök kuru ağırlığı (g)**	**Gövde uzunluğu (cm)**	**Kök uzunluğu (cm)**
Çimlenme yüzdesi (%)	1,0000	0,8263	0,8061	0,7823	0,5953	0,4098	0,2478
Gövde yaş ağırlığı (g)		1,0000	0,8416	0,5092	0,4835	0,1838	0,3707
Gövde kuru ağırlığı (g)			1,0000	0,4895	0,6182	0,1366	0,3281
Kök yaş ağırlığı (g)				1,0000	0,5959	0,3742	0,2091
Kök kuru ağırlığı (g)					1,0000	0,3663	0,0829
Gövde uzunluğu (cm)						1,0000	0,3184
Kök uzunluğu (cm)							1,0000

SONUÇ

Bitkiler yaşam döngüleri boyunca sürekli olarak çeşitli çevresel streslere maruz kalır ve bunlarla mücadele ederler. Bu çevresel stresler arasında bulunan kuraklık stresi bitkilerin gelişimi süresince olumsuz etki bırakmaktadır. Kuraklık önemli bir abiyotik stres faktördür. Kuraklık stresi bitkileri morfolojik ve fizyolojik açıdan olumsuz yönde etkilemektedir. Bu çalışmada *in vitro* koşullarda farklı dozlarda % (0, 1, 2, 4, 6) PEG içeren besin ortamlarında beyaz baş lahana bitkisinin gelişiminin etkileri belirlenmiştir. Çalışmada çimlenme yüzdesi (%), gövde yaş ve kuru ağırlığı (g), kök yaş ve kuru ağırlığı (g) bakımından en fazla gelişim kontrol ortamında görülmüştür. Kuraklık stresi besin ortamı içerisinde konsantrasyon arttıkça bitkilerde gelişmenin yavaşladı dikkat çekmiştir.

KAYNAKLAR

Agurla, S., Gahir, S., Munemasa, S., Murata, Y., Raghavendra, A.S. (2018). Mechanism of stomatal closure in plants exposed to drought and cold stress. *Adv. Exp. Med. Biol. 081*, 215–232.

Álvarez, S., Sánchez-Blanco, M. J. (2015). Comparison of individual and combined effects of salinity and deficit irrigation on physiological, nutritional and ornamental aspects of tolerance in Callistemon laevis plants. Journal of Plant Physiology, 185, 65-74.

Alves, H.L.S., Matiolli, C.C., Soares, R.C., Almadanim, M.C., Oliveira, M.M., Abreu, I.A. (2021). Carbon/nitrogen metabolism and stress response networks—Calcium-dependent protein kinases as the missing link? *J. Exp. Bot. 72*, 4190–4201.

Coughlan de Perez, E., Fuentes, I., Jack, C., Kruczkiewicz, A., Pinto, I., Stephens, E. (2022). Different types of drought under climate change or geoengineering: Systematic review of societal implications. *Front. Clim. , 4*, 959519.

Dewedar, O., Plauborg, F., El-Shafie, A., Marwa, A. (2021). Response of potato biomass and tuber yield under future climate change scenarios in Egypt. *J. Water Land Dev. , 49*, 139–150.

Field, C.B., Dokken, D.J., Mastrandrea, M.D., Mach, K.J., Bilir, T.E., White, L.L. (2014). Eds. Cambridge University Press: Cambridge, UK; New York, NY, USA,; p. 688.

Giacoppo S, Galuppo M, Iori R, De Nicola GR, Cassata G, Bramanti P et al., (2013). Protective role of (RS)-glucoraphanin bioactivated with myrosinase in an experimental model of multiple sclerosis. CNS Neurosci Ther 19: 577–584.
Haak, D.C., Fukao, T., Grene, R., Hua, Z., Ivanov, R., Perrella, G. (2017). Li, S. Multilevel regulation of abiotic stress responses in plants. *Front. Plant Sci. 8,* 1564.
Halkier, B.A., Gershenzon, J. (2006). Biology and biochemistry of glucosinolates. Annu Rev Plant Biol 57: 303–333.
Iglesias, V., Travis, W.R., Balch, J.K. (2022). Recent droughts in the United States are among the fastest-developing of the last seven decades. *Weather. Clim. Extrem. 37*, 100491.
IPCC (Intergovernmental Panel on Climate Change). Impacts, adaptation and vulnerability. Part A: Global and sectoral aspects. In *Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Barros, V.R.,
IPCC. *Climate Change* (2022). *Impacts, Adaptation, and Vulnerability*; Cambridge University Press: Cambridge, UK, p. 1132.
Kaya, M.D., Okçu, G., Atak, M., Çıkılı, Y., Kolsarıcı, Ö. (2006). Seed Treatments to Overcome Salt and Drought Stress During Germination in Sunflower (*Helianthus annuus* L.). European Journal of Agronomy, 24(4): 291-295.
Keck, A.S., Finley, J.W (2004). Cruciferous vegetables: cancer protective mechanisms of glucosinolate hydrolysis products and selenium. Integr Cancer Ther 3: 5–12.
Keleş, B. (2019). İn Vitro kültür koşulları ve tuzluluk (NaCl) stresi altında çimlendirilen aspir (*Carthamus tinctorius* L.) bitkisinde meydana gelen morfolojik, fizyolojik ve biyokimyasal değişimler. Yüksek Lisans Tezi, Batman Üniversitesi Fen Bilimleri Enstitüsü, 61 s.
Khan, A., Anwar, Y., Hasan, M. M., Iqbal, A., Ali, M., Alharby, H. F., Hakeem, K.R. Hasanuzzaman, M. (2017). Attenuation of drought stress in Brassica seedlings with exogenous application of Ca^{2+} and H2O2. *Plants, 6*(2), 20.
Kosar, F., Akram, N.A., Ashraf, M., Sadiq, M., Al-Qurainy, F. (2018). Trehalose-induced improvement in growth, photosynthetic characteristics and levels of some key osmoprotectants in sunflower (*Helianthus annuus* L.) under drought stress. Pak. J. Bot., 50(3): 955-961.
Kumar, M. (2016). Impact of climate change on crop yield and role of model for achieving food security. *Environ. Monit. Assess. , 188*, 465.
Latif, M., Akram, N.A., Ashraf, M. (2016). Regulation of some biochemical attributes in drought-stressed cauliflower (*Brassica oleracea* L.) by seed pre-treatment with ascorbic acid. J. Hort. Sci. Biotech., 91(2): 129-137.
Lipovac, A., Mandić, M.V., Vuković, A., Stričević, R., Ćosić, M. (2018). Assessment of AquaCrop Model on Potato Water Requirements in Climate Change Conditions. In Proceedings of the 10th Eastern European Young Water Professionals Conference IWA YWP, Zagreb, Croatia, pp. 70–77.
Lupitu, A., Moisa, C., Bortes, F., Peteleu, D., Dochia, M., Chambre, D., Ciutină, V., Copolovici, D.M., Copolovici, L. (2023). The Impact of Increased CO_2 and Drought Stress on the Secondary Metabolites of Cauliflower (*Brassica oleracea* var. *botrytis*) and Cabbage (*Brassica oleracea* var. *capitata*). *Plants.*; 12(17):3098.
Maggio, A., De Pascale, S., Ruggiero, C., Barbieri, G. (2005). Physiological response of field-grown cabbage to salinity and drought stress. *European Journal of Agronomy., 23,* 57–67.
Mall, R.K., Gupta, A., Sonkar, G. (2017). Effect of climate change on agricultural crops. In *Current Developments in Biotechnology and Bioengineering*; Elsevier: Amsterdam, The Netherlands, pp. 23–46.
Manuchehri, R., Salehi, H. (2014). Physiological and biochemical changes of common bermudagrass (*Cynodon dactylon* [L.] Pers.) under combined salinity and deficit irrigation stresses. South African Journal of Botany, 92, 83-88.

Mokhtari, B.R., Baluch, N., Homayouni, T.S., Morgatskaya, E., Kumar, S., Kazemi, P. et al., (2018). The role of sulforaphane in cancer chemoprevention and health benefits: a mini-review. J Cell Commun Signal 12: 91–101.

Murashige, T., Skoog, F. (1962). A revised medium for rapid growth and bio assays with tobacco tissue cultures. Physiologia plantarum, 15(3), 473-497.

Paclik, R. L., Sakova, C. V. (1996). Reaction of different cultivars of *Brassica napus*subsp. oleifera to water stress. *Fytotechnicka-Rada, 1*, 55–62.

Park, S. H., Jun, S. S., An, G., Hong, Y. N., Park, M. C. (2003). A comparative study on the protective role of trehalose and LEA proteins against abiotic stresses in transgenic Chinese cabbage (*Brassica campestris*) overexpressing CaLEA or otsA. *Journal of Plant Biology*, *46*, 277-286.

Rahman, A., Akram, N. A., Iqbal, M. (2024). Phenolic compound vanillic acid modulates growth and defense system of cabbage (*Brassica oleracea* var. *Capitata* L.) under drought stress. *Pak. J. Bot*, *56*(5), 1631-1644.

Sadiq, M., N.A. Akram, M. Ashraf, F. Al-Qurainy and P. Ahmad. (2019). Alpha-tocopherol-induced regulation of growth and metabolism in plants under non-stress and stress conditions. J. Plant Growth Regul., 38: 1325-1340.

Sahin, U., Ekinci, M., Ors, S., Turan, M., Yildiz, S., Yildirim, E. (2018). Effects of individual and combined effects of salinity and drought on physiological, nutritional and biochemical properties of cabbage (*Brassica oleracea* var. *capitata*). Scientia Horticulturae, 240, 196-204.

Satake, A., Sakurai, G., Kinoshita, T. (2015). Modeling strategies for plant survival, growth and reproduction. *Plant Cell Physiol. 56*, 583–585.

Shafiq, S., Akram, N.A., Ashraf, M., Arshad, A. (2014). Synergistic effects of drought and ascorbic acid on growth, mineral nutrients and oxidative defense system in canola (*Brassica napus* L.) plants. Acta Physiol. Plant., 36: 1539-1553.

Shannon, M. C., Grieve, C. M. (1998). Tolerance of vegetable crops to salinity. *Scientia horticulturae, 78*(1–4), 5–38.

Shawon, R. A., Kang, B. S., Lee, S. G., Kim, S. K., Lee, H. J., Katrich, E., Gorinstein, S., Ku, Y. G. (2020). Influence of drought stress on bioactive compounds, antioxidant enzymes and glucosinolate contents of Chinese cabbage (*Brassica rapa*). Food chemistry, 308, 125657.

Tavousi, M., Kaveh, F., Alizadeh, A., Babazadeh, H., Tehranifar, A. (2015). Effects of drought and salinity on yield and water use efficiency in pomegranate tree. J. Mater. Environ. Sci, 6(7), 1975-1980.

Traka, M., Mithen, R. (2009). Glucosinolates, isothiocyanates and human health. Phytochem Rev 8: 269–282.

Zhang, H., Mittal, N., Leamy, L.J., Barazani, O., Song, B.-H. (2017). Back into the wild Apply untapped genetic diversity of wild relatives for crop improvement. *Evol. Appl. , 10*, 5–24.

Zhang, X., Lu, G., Long, W., Zou, X., Li, F., Nishio, T. (2014). Recent progress in drought and salt tolerance studies in Brassica crops. *Breeding science*, *64*(1), 60-73.

UNDERSTANDING FACTORS AFFECTING ENERGY CONSUMPTION IN URBAN METRO SYSTEMS: A DATA-DRIVEN CASE STUDY OF İZMİR, TÜRKİYE

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ABSTRACT
This study investigates the factors influencing total monthly energy consumption per passenger in metro services in İzmir, Türkiye, using open-access data from 2021 to 2024. The dataset comprises a wide range of meteorological and operational variables on a montly basis, including average wind speed, precipitation, humidity, temperature, number of monthly passengers, number of actual and missing trips, and on-time departure rates. To determine the most significant predictors of energy consumption, we employed three regression methods: Ordinary Least Squares (OLS), Forward Stepwise (FS), and Backward Stepwise (BS). Our findings indicate that both environmental and operational factors significantly impact monthly energy consumption per passenger.
By comparing the performance of different regression models, we developed the best-fit model for estimating energy consumption, providing a valuable tool for improving energy efficiency in urban metro systems. This model offers actionable insights for transport authorities and operators, enabling them to make data-driven decisions to optimize energy use in response to weather conditions and operational performance. The findings highlight the crucial role of both environmental and operational factors in energy management, demonstrating the need for a comprehensive approach to enhance the sustainability of urban public transportation systems. By incorporating these variables into planning strategies, transport authorities can achieve more energy-efficient and sustainable urban metro services.

Keywords: Metro Services, Operational Efficiency, Regression Analysis, Stepwise Regression

INTRODUCTION
Urban metro systems play a crucial role in providing efficient and sustainable transportation for rapidly expanding cities. However, the energy consumption associated with these systems presents significant challenges, particularly in terms of operational costs and environmental impact. With increasing urbanization and the growing need to reduce carbon footprints, understanding the factors that influence energy consumption in metro services is vital. Identifying these key variables can help transport authorities make informed decisions to enhance energy efficiency and sustainability.
Previous studies highlight several key factors affecting metro energy consumption. Metro operation intensity shows a "U"-shaped relationship with per-passenger energy use: increasing service frequency initially reduces energy, but further increases lead to diminishing returns and higher consumption (M. Yu et al., 2020). Train traction energy peaks during rush hours, while station energy remains relatively stable throughout the day (Guan, Liu, et al., 2023). Operating distance, passenger flow, and train characteristics (e.g., station spacing and train weight) also significantly influence energy usage (Feng et al., 2023; Xiao-bin et al., 2021). Innovative

strategies like integrating renewable energy and using intelligent energy management systems (EMSs) have shown potential for reducing consumption. Photovoltaic systems with energy storage and energy storage systems (ESSs) that capture and reuse braking energy are among the promising solutions for improving sustainability (Anbang et al., 2023; Gangolells et al., 2016; Guan, Yang, et al., 2023).

This study builds on this foundation by analyzing the factors that affect monthly energy consumption per passenger in metro system in İzmir, Türkiye. Using publicly available data from 2021 to 2024, we examine how operational and meteorological variables influence energy consumption patterns. Through the use of Ordinary Least Squares (OLS), Forward Stepwise (FS), and Backward Stepwise (BS) regression methods, we aim to develop a predictive model that can enhance energy efficiency in urban metro systems.

METHODOLOGY

Ordinary Least Squares (OLS) Regression

The Ordinary Least Squares (OLS) method is commonly used in regression analysis to estimate the relationship between dependent and independent variables. OLS minimizes the sum of squared residuals (errors), as shown in the equation (Moutinho & Hutcheson, 2011):

$$min \sum_{i=1}^{n} \varepsilon_i^2, \qquad i = 1, 2, \dots, n \tag{1}$$

where ε_i represents the error terms, and n is observation number. The OLS estimators for the regression coefficients (β) are calculated using the formula:

$$\hat{\beta} = (X'X)^{-1}X'Y \tag{2}$$

where X is the matrix for independent variables, and Y is the dependent variable vector.

Variable Selection Techniques: Forward Stepwise (FS) and Backward Stepwise (BS) Regression

In this study, FS and BS regression methods were employed to identify and select the most relevant predictors for the regression models. These techniques aim to prevent overfitting by ensuring that only statistically significant variables are included, thereby improving the model's generalizability (Keith, 2019).

FS selection begins with no predictors in the model. The first variable to enter is the one most strongly correlated with the outcome variable, provided it meets a significance threshold (e.g., p-value < 0.05). Additional predictors are included sequentially based on their partial correlation with the outcome, as long as they continue to be statistically significant. This process continues until no further variables meaningfully contribute to the model's explanatory power, as measured by metrics like the R^2. The procedure halts when adding another variable no longer significantly improves model fit (Keith, 2019; Meyers et al., 2016).

BS elimination, in contrast, starts with all potential predictors included in the model. At each step, the least statistically significant variable (often with a p-value > 0.10) is removed, refining the model by eliminating those predictors that do not contribute meaningfully. This method ensures that all variables are considered initially, and only those with a substantial effect on the outcome remain (Keith, 2019)

Both FS and BS rely on criteria such as the F-statistic, partial correlation, or selection criteria like Akaike's Information Criterion (AIC), which helps penalize unnecessary predictors and prevent overfitting. While bidirectional elimination, which combines both forward and backward approaches, is a flexible alternative, this study focused on FS and BS due to their simplicity and effectiveness for the dataset used (Kohavi, 1995; T. Yu et al., 2014)

By applying these stepwise regression techniques, this study ensures that the final models are parsimonious, statistically robust, and capable of accurately identifying the key factors influencing metro system energy consumption.

Performance Criteria

Model performance was evaluated using Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and the coefficient of determination (R^2). RMSE measures the average magnitude of residuals, with greater sensitivity to larger errors, while MAE treats all errors equally, providing a balanced view of accuracy. R^2 assesses the proportion of variance in the dependent variable explained by the model, with values closer to 1 indicating better explanatory power (Karunasingha, 2022; Miles, 2005).

RESULTS

Descriptive statistics for the dataset were calculated using SPSS (Table 1). Pearson correlation values for the independent variables were computed using R Studio (Figure 1).

Table 1. Descriptive statistics of the data

Predictors	**Acronyms**	**Min**	**Max**	**Median**	**Variance**	**Standard deviation**
Number of departures	*NoD*	9430	17528	14816	3768595	1941.287
Number of missing departures	*MissingD*	14	283	161	4930.511	70.218
On-time departure rate	*OntimeD*	0.9873	0.9991	0.9974	0.00001	0.003
Average temperature (°C)	*AvTemp*	7.23	29.59	16.61	50.50693	7.107
Average visibility (km)	*AvVis*	8.5	10.0	9.9	0.11516	0.339
Average humidity	*AvHum*	0.379	0.803	0.606	0.01093	0.105
Total precipitation (mm)	*TotPre*	0.00	16.71	3.21	22.03665	4.694
Average wind speed (kph)	*AvWind*	9.0	19.3	12.8	4.53927	2.131
Total energy consumption per passenger -kwh	**TotEn**	0.44	1.30	0.55	0.03777	0.194

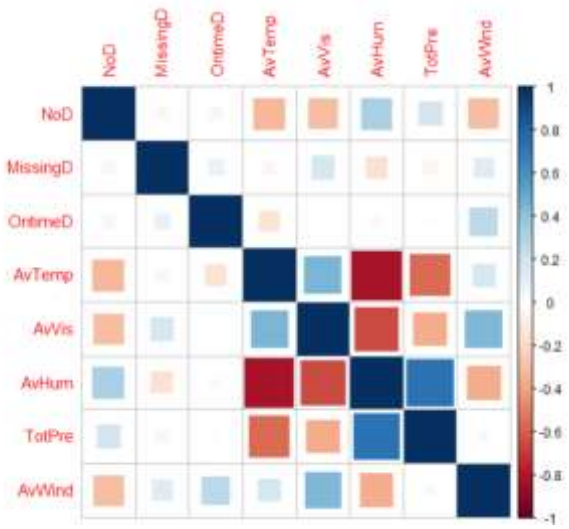


Figure 1. Pearson correlation test values

The correlation matrix visually represents relationships between variables, where darker colors indicate stronger correlations (Wei & Simko, 2024). For example, average humidity (AvHum) and

total precipitation (TotPre) show a strong positive correlation, while average temperature (AvTemp) and AvHum exhibit a negative correlation. Average wind speed (AvWind) shows weaker correlations with other variables like TotPre and Average visibility (AvVis), indicating lower interdependencies.

Table 2 presents the estimated coefficients for the variables derived from the OLS, FS, and BS regression methods.

Table 2. Regression model estimation results

Predictors	OLS	FS	BS
Intercept	-4.706583	**-5.428703**	1.838682
NoD	-0.000075	**-0.000074**	-0.000078
MissingD	0.000192	**0.000195**	
OntimeD	7.465295	**7.632601**	
AvTemp	-0.010140	**-0.009134**	-0.005325
AvVis	-0.038995		
AvHum	-0.861438	**-0.668111**	
TotPre	0.010593	**0.009255**	
AvWind	-0.002167		
RMSE	0.157	0.137	**0.132**
R^2	0.515	**0.569**	0.511
MAE	0.130	**0.107**	0.110

The results show that the FS regression model outperformed others based on RMSE, R^2, and MAE metrics. The FS regression model selected six key variables. The estimated coefficients suggest the following insights:

- Number of departures (NoD) has a negative coefficient (-0.000074), implying that as the number of departures increases, energy consumption per passenger decreases. This may reflect improved operational efficiency and smoother service flow with more frequent departures.
- Number of missing departures (MissingD) has a positive coefficient (0.000195), indicating that missed departures increase energy consumption, possibly due to disruptions requiring additional energy for compensatory actions.
- On-time departure rate (OntimeD) shows a strongly positive coefficient (7.632601), suggesting that maintaining on-time departures increases energy consumption, likely due to the extra effort needed to meet precise schedules.
- Average temperature (AvTemp) has a negative coefficient (-0.009134), meaning that higher temperatures are associated with lower energy consumption, possibly due to reduced heating demands.
- Average humidity (AvHum) also has a negative coefficient (-0.668111), which might indicate that higher humidity leads to lower energy consumption, potentially due to climate control efficiencies and increase in passenger demand.
- Total precipitation (TotPre) has a positive coefficient (0.009255), suggesting that increased precipitation leads to higher energy use, possibly due to additional traction or safety requirements during wet conditions.

In summary, the findings emphasize the intricate balance between operational and environmental factors in determining energy consumption within the İzmir metro system. These insights offer valuable guidance for optimizing energy efficiency while maintaining service standards.

DISCUSSION AND CONCLUSION

This study provides valuable insights into the operational and meteorological factors influencing monthly energy consumption per passenger in İzmir's metro system, utilizing open-access data from 2021 to 2024. The results indicate a significant negative relationship between the number of

departures and energy consumption per passenger, suggesting that optimizing service frequency can enhance energy efficiency. Conversely, the positive correlation between missed departures and energy consumption underscores the importance of minimizing service disruptions to reduce overall energy use.

Environmental factors such as temperature, humidity, and precipitation also play a crucial role in shaping energy consumption. Warmer temperatures and higher humidity levels are associated with lower energy usage, likely due to reduced demands on climate control systems. In contrast, increased precipitation tends to elevate energy demand, reflecting the additional energy required for safety measures and traction in wet conditions.

These findings underscore the necessity for metro operators to focus on effective service management strategies. By managing the number of departures and minimizing missed services, transit authorities can significantly improve energy efficiency. Additionally, balancing service reliability with energy conservation efforts is essential, as disruptions and the drive for punctuality may lead to increased energy usage.

Overall, this study shows that optimizing operational performance and considering environmental factors can significantly enhance energy efficiency in urban transit systems. Future research could investigate advanced techniques such as machine learning and logit models, incorporate disaggregated data and additional variables like passenger load and peak hours, conduct longitudinal analyses, and compare energy consumption factors across various urban metro systems. By leveraging these insights, transit authorities can develop targeted strategies to reduce energy consumption while maintaining high service standards.

REFERENCES

Anbang, L., Xi, C., Qianchuan, Z., & Borui, L. (2023). Optimization method for allocations of energy storage systems and tractions for metro systems. *Journal of Tsinghua University (Science and Technology)*, *63*(9), 1408–1414.

Feng, Z., Chen, W., Liu, Y., Chen, H., & Skibniewski, M. J. (2023). Long-term equilibrium relationship analysis and energy-saving measures of metro energy consumption and its influencing factors based on cointegration theory and an ARDL model. *Energy*, *263*, 125965.

Gangolells, M., Casals, M., Forcada, N., Macarulla, M., & Giretti, A. (2016). Energy performance assessment of an intelligent energy management system. *Renewable and Sustainable Energy Reviews*, *55*, 662–667.

Guan, B., Liu, X., Zhang, T., & Wang, X. (2023). Hourly energy consumption characteristics of metro rail transit: Train traction versus station operation. *Energy and Built Environment*, *4*(5), 568–575.

Guan, B., Yang, H., Li, H., Gao, H., Zhang, T., & Liu, X. (2023). Energy consumption characteristics and rooftop photovoltaic potential assessment of elevated metro station. *Sustainable Cities and Society*, *99*, 104928.

Karunasingha, D. S. K. (2022). Root mean square error or mean absolute error? Use their ratio as well. *Information Sciences*, *585*, 609–629.

Keith, T. Z. (2019). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling*. Routledge.

Kohavi, R. (1995). A study of cross-validation and bootstrap for accuracy estimation and model selection. *Morgan Kaufman Publishing*.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied multivariate research: Design and interpretation*. Sage publications.

Miles, J. (2005). R-squared, adjusted R-squared. *Encyclopedia of Statistics in Behavioral Science*.

Moutinho, L., & Hutcheson, G. (2011). Ordinary least-squares regression. In *The SAGE Dictionary of Quantitative Management Research*. Sage publications.
Wei, T., & Simko, V. (2024). *R package "corrplot": Visualization of a Correlation Matrix*. https://github.com/taiyun/corrplot
Xiao-bin, Z., Yun, B., & Shan-shan, Z. (2021). Metro train energy consumption characteristics based on empirical data analysis. *Journal of Transportation Systems Engineering and Information Technology*, *21*(6), 264.
Yu, M., Yu, R., Tang, Y., & Liu, Z. (2020). Empirical study on the impact of China's metro services on urban transportation energy consumption. *Research in Transportation Economics*, *80*, 100821.
Yu, T., Yu, G., Li, P.-Y., & Wang, L. (2014). Citation impact prediction for scientific papers using stepwise regression analysis. *Scientometrics*, *101*, 1233–1252.

NUMERICAL INVESTIGATION OF CHEMOSIL USAGE IN TEXTILE MACHINES

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ABSTRACT
This study provides a comprehensive evaluation of the thermal and mechanical performance of chemosils used in chemosil coating machines, utilizing ANSYS software for detailed analysis. Chemosils play a critical role in industrial applications where they are subjected to high temperatures and pressures. Therefore, accurately modeling and analyzing the behavior of these materials is crucial for ensuring both reliability and operational efficiency.
The study examines the effects of thermal loads and pressure conditions on the material properties of chemosil during the coating process. Initially, the thermophysical properties of chemosil were determined and integrated into ANSYS simulations. Simulations under various temperature and pressure scenarios revealed changes in key parameters such as temperature distribution, stress state, and deformation of the chemosil material.
The simulation results were meticulously analyzed to identify the performance limits and potential weak points of the chemosil material. Furthermore, based on these findings, optimized design recommendations were provided for the operating conditions of chemosil coating machines. This study offers a comprehensive guide for improving material selection and process parameters to ensure the safer and more efficient operation of chemosil coating machines. In conclusion, this study develops a simulation-based approach to optimize the performance of chemosils used in coating machines. This approach significantly contributes to a better understanding of chemosils in industrial applications and enhances their performance.

Keywords: Chemosil, Heat transfer, Numerical analysis

1.INTRODUCTION
In rubber engineering applications, such as tires and conveyor belts, the adhesion between rubber and textile materials is critical for achieving optimal mechanical performance. Adhesion refers to the bonding of two dissimilar materials at their interface, where mechanical forces can be effectively transferred due to interfacial forces, including van der Waals forces, chemical bonding, or electrostatic interactions. The mechanical properties of the bonded phases, along with the interfacial zone, play a vital role in determining the overall mechanical strength of the system [1-3].

In the context of textile-to-rubber bonding, the use of Chemosil in textile machines provides significant advantages. Chemosil is specifically designed to enhance adhesion between textile materials and rubber compounds, making it a crucial component in the manufacturing processes for products such as tires and conveyor belts. Unlike latex, which is insufficient as an adhesive due to its lack of active chemical groups and weak tensile properties [4], Chemosil forms a chemically reactive interface that promotes strong, durable bonds without compromising the flexibility of the textile or the vulcanization characteristics of the rubber.

Furthermore, the performance of Chemosil in textile machines is enhanced by its ability to create stable bonds under various conditions, such as temperature fluctuations and mechanical stress. This reliability is essential in industrial applications where robust adhesion is necessary to prevent issues like premature peeling, particularly in the tire retread industry [5].

Chemosil formulations can be tailored to specific rubber compounds and textile materials, ensuring compatibility and maximizing the effectiveness of the bonding process. This customization capability enhances the adhesive strength between rubber and textile components, allowing textiles such as nylon, rayon, and canvas to serve their reinforcing roles effectively within rubber products [6,9].

This paper explores the application of Chemosil in textile machines, emphasizing its role as an advanced adhesive formulation in the rubber industry. It aims to highlight the significance of Chemosil in optimizing the bonding process and improving the performance and longevity of rubber-textile composites.

2.MATERIAL METHOD

In this study, decided to use the VOF method, one of the two-phase flow methods. Using the VOF method, velocity profiles at a certain distance from the nozzle outlet were calculated in three dimensions for the nozzle geometry. The nozzle diameter was chosen as 1 mm. The distance of the nozzle to the impacting surface was determined as 250 mm. The width of the impactor surface was selected as 2000 mm. The flow rate from the nozzle was selected as 0.25 l/min. The nozzle was numerically solved for two different chemosil materials. Material properties are given in Table 1.

Table 1. Properties of chemosil

Material	CHEMOSIL 211	CHEMOSIL 411
Density (20°C)	0,92-0,96 gr/cm^3	0,97-1,01 gr/cm^3
Viscosity (25°C)	90-170	200-600
Film thickness	8-12 micron	15-20 micron
Application	With gun	With gun
Chemical Diluent	MIBK (%40/60)	Xylene (%90)
Drying time	5 min	10 min
Colour	Grey	Black
Quantitiy for 500 pieces	1.3 l	1.5 l
Diluent Quantitiy for 500 pieces	0,65 l	1,35

The mesh structure and mesh quality of the geometry made in the Ansys package programme are shown in Figure 1. Chemosil gun design is shown in Figure 2.

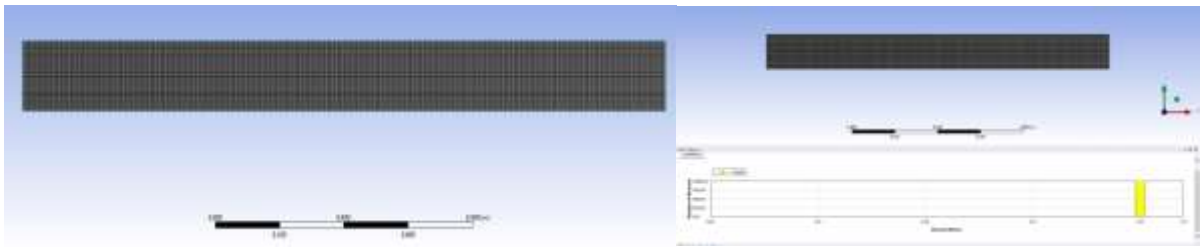


Figure 1. Mesh Structure

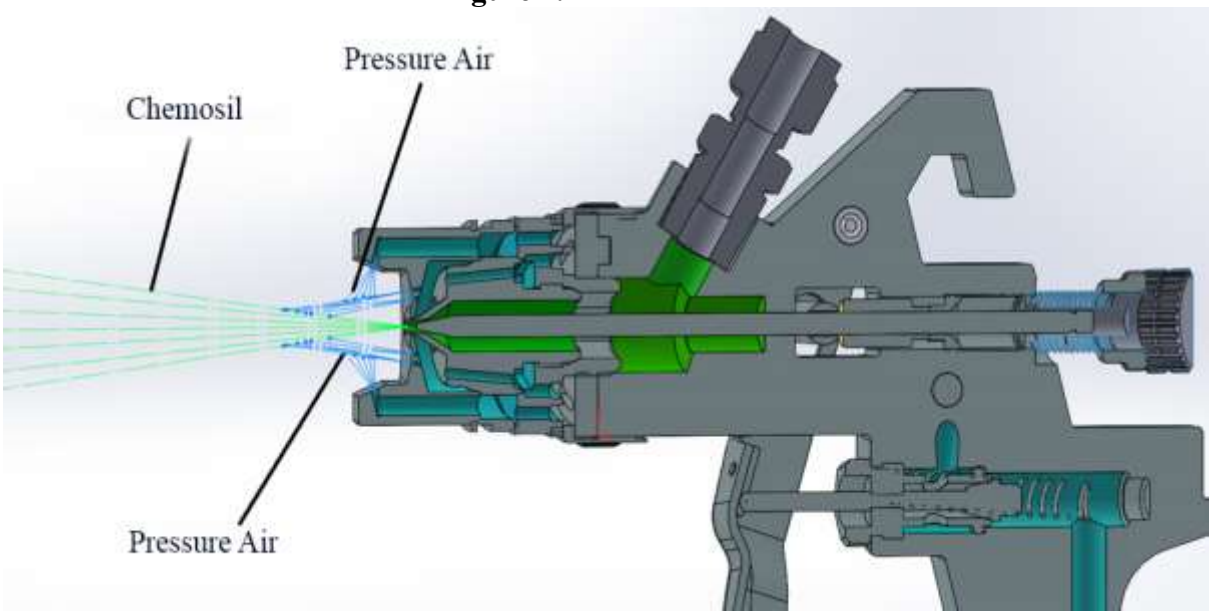


Figure 2. Chemosil Gun

After establishing the network structure in the ANSYS package, the study focused on analyzing various parameters that influence the behavior of the fluid flow and material characteristics for two different Chemosil materials: Chemosil 211 and Chemosil 411.

The analysis involved examining key factors such as pressure variation, velocity variation, particle distribution, and streamlines, all of which are critical for understanding the dynamics of the adhesive materials during processing. The time-dependent simulations allowed for a detailed exploration of how these parameters evolve over time under specified conditions.

For the Chemosil 211 material, simulations were conducted over a duration of 5 minutes, allowing for a comprehensive assessment of the fluid dynamics associated with this adhesive. This relatively shorter time frame facilitated the evaluation of rapid changes in pressure and velocity, enabling insights into the immediate behavior of the material as it interacts with the textile and rubber substrates. Conversely, the Chemosil 411 material was subjected to a longer simulation time of 10 minutes. This extended duration provided a more in-depth analysis of the material's behavior, capturing any slower dynamics and more stable configurations that may arise during the adhesive application process. The additional time allowed for the examination of particle distribution and the formation of streamlines, which are essential for understanding how the adhesive penetrates the textile structure and adheres to the rubber surface.

3.RESULTS AND DISCUSSIONS

Velocity pressure and particle size solutions for chemosil 211 and 411 materials according to the boundary conditions in Ansys programme were performed and the results are given below.

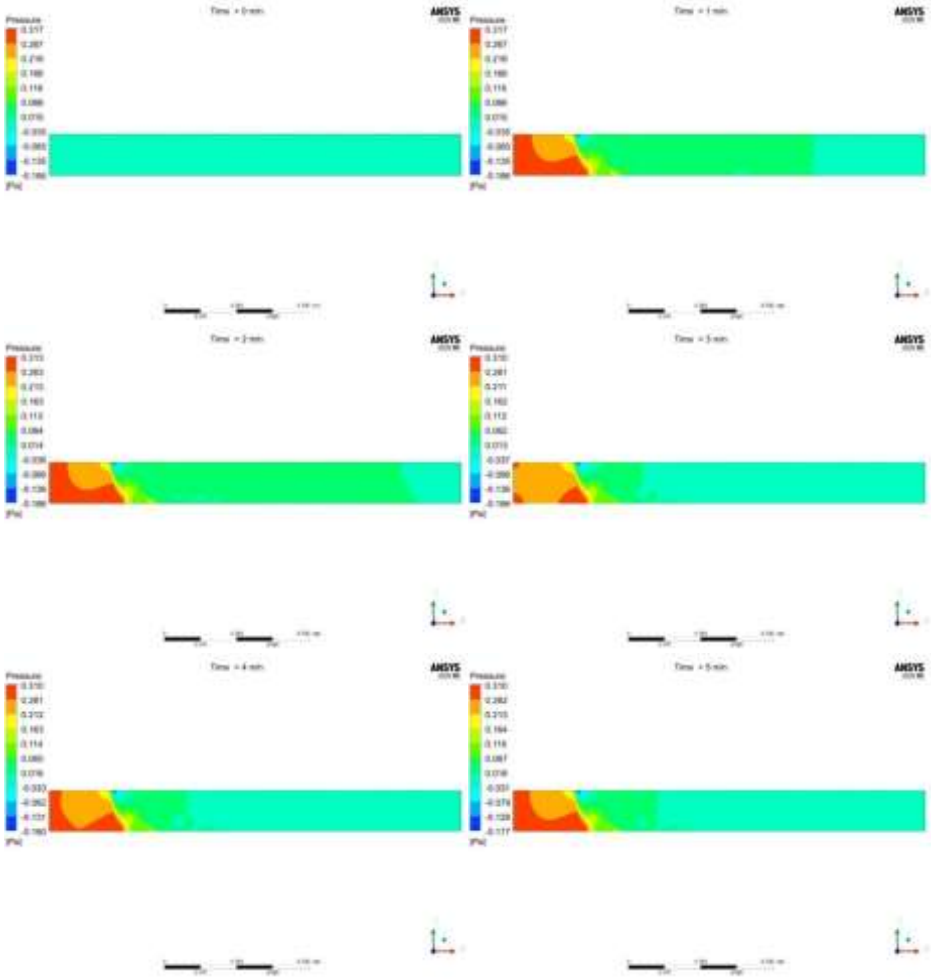
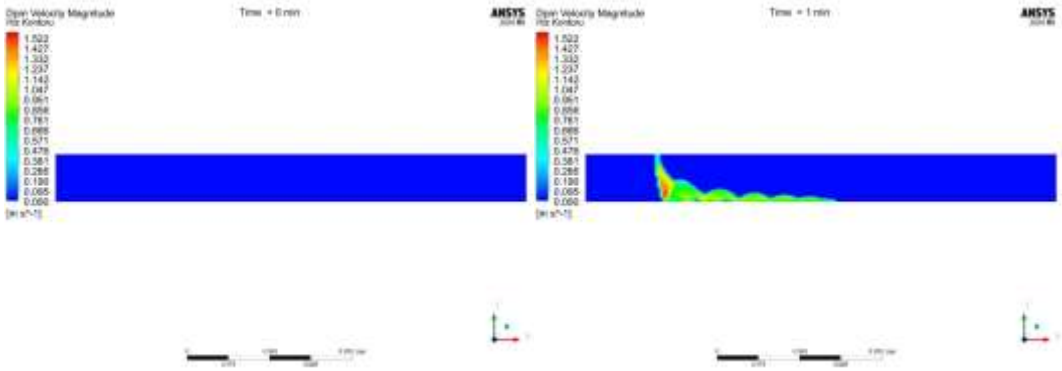


Figure 3. Time-dependent pressure change of Chemosil 211 material



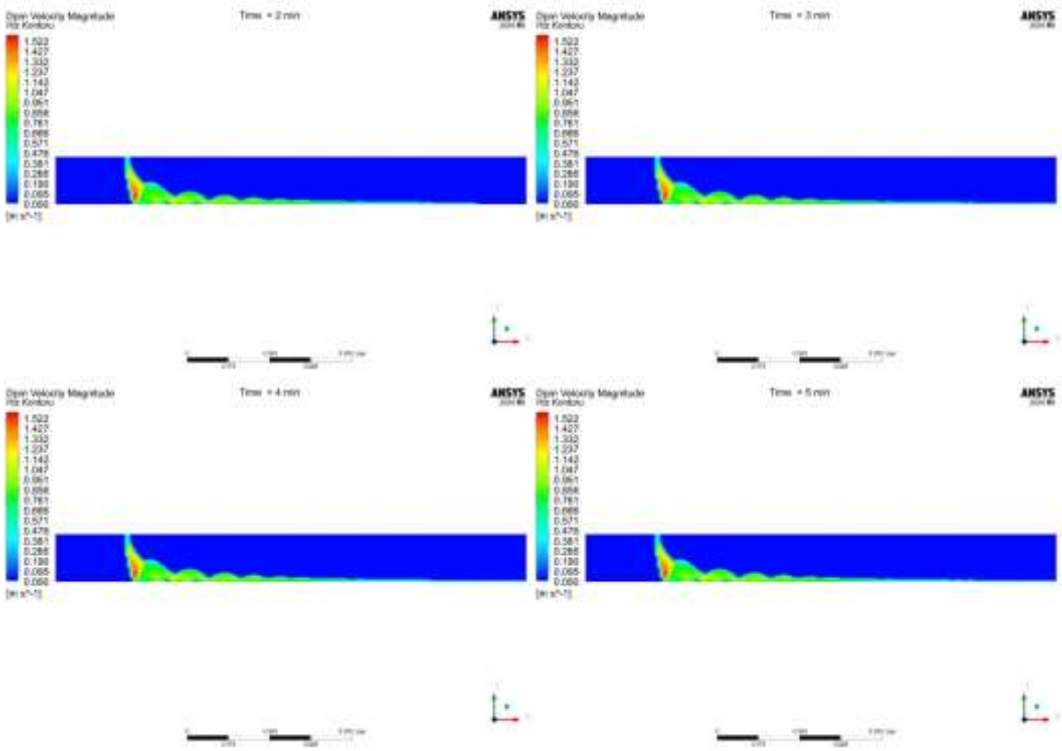
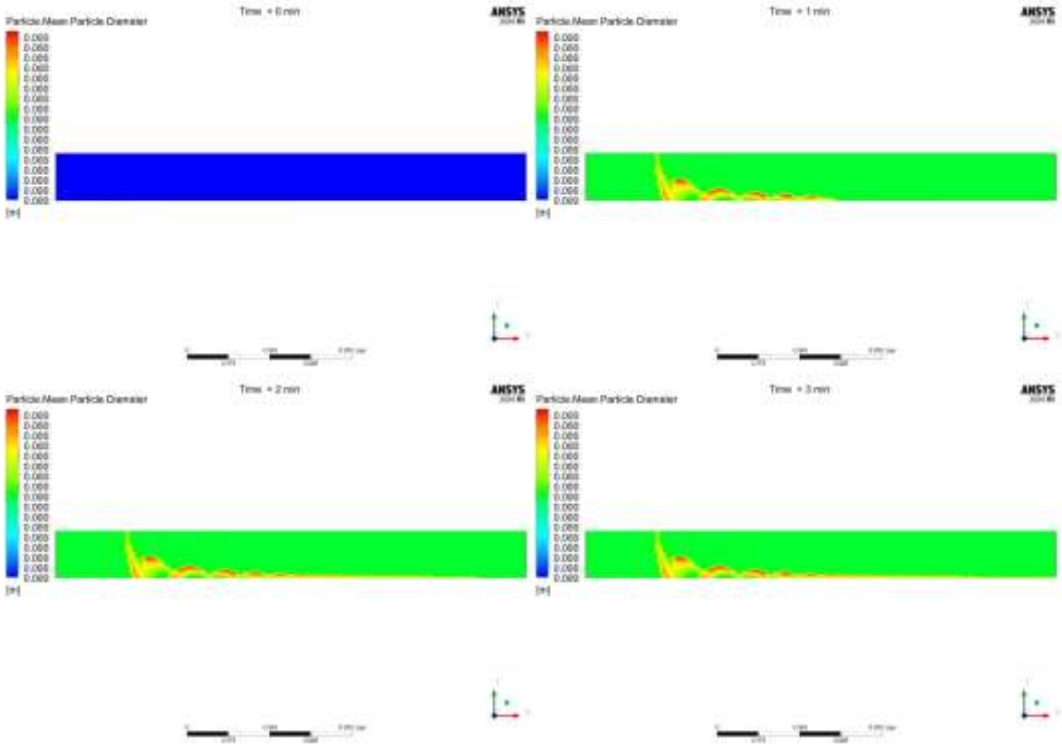


Figure 4. Time-dependent velocity change of chemosil 211 material



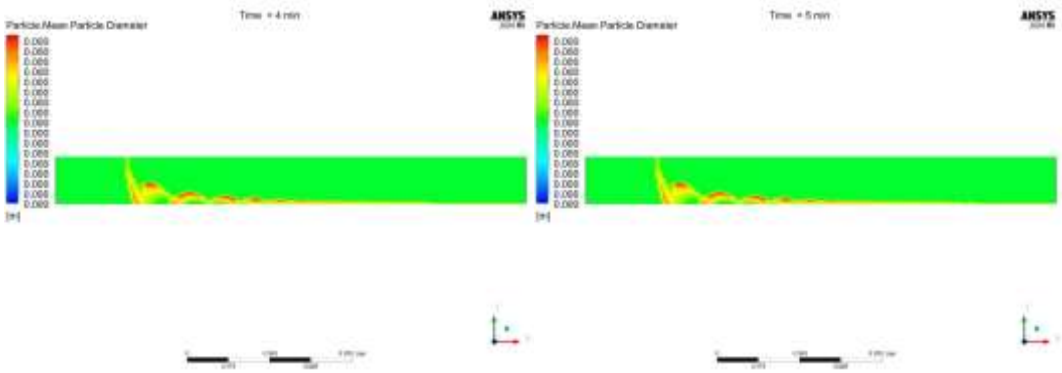


Figure 5. Time-dependent particle distribution of Chemosil 211 material

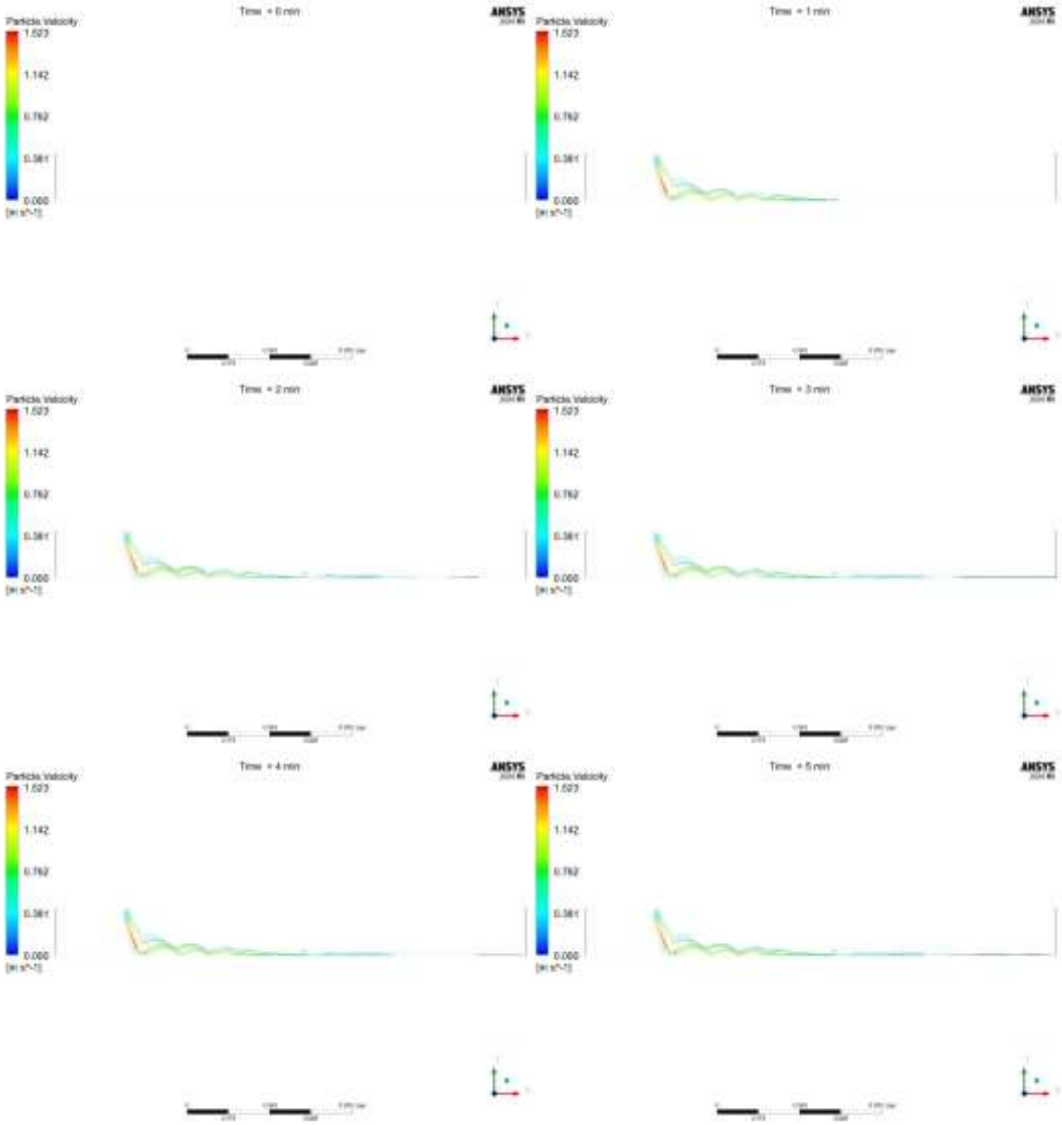


Figure 6. Time-dependent flow line of chemosil 211 material

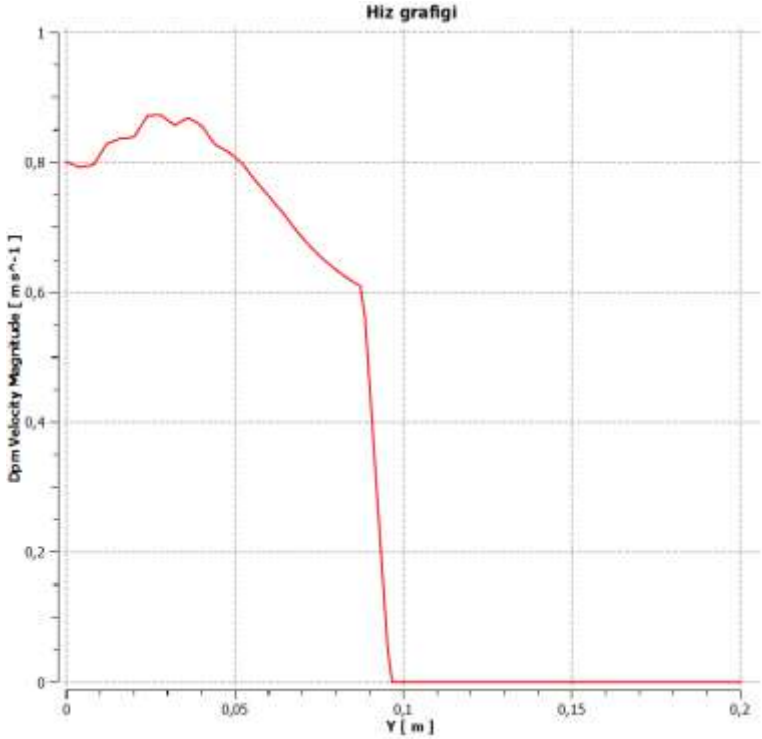


Figure 7. Velocity graph of Chemosil 211 material along the height

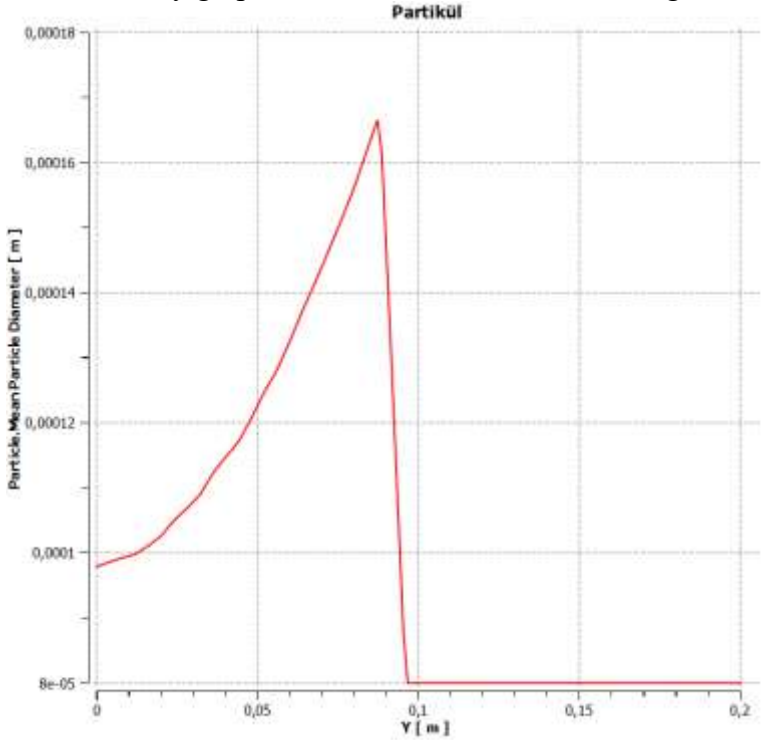


Figure 8. Particle size of Chemosil 211 material along the height

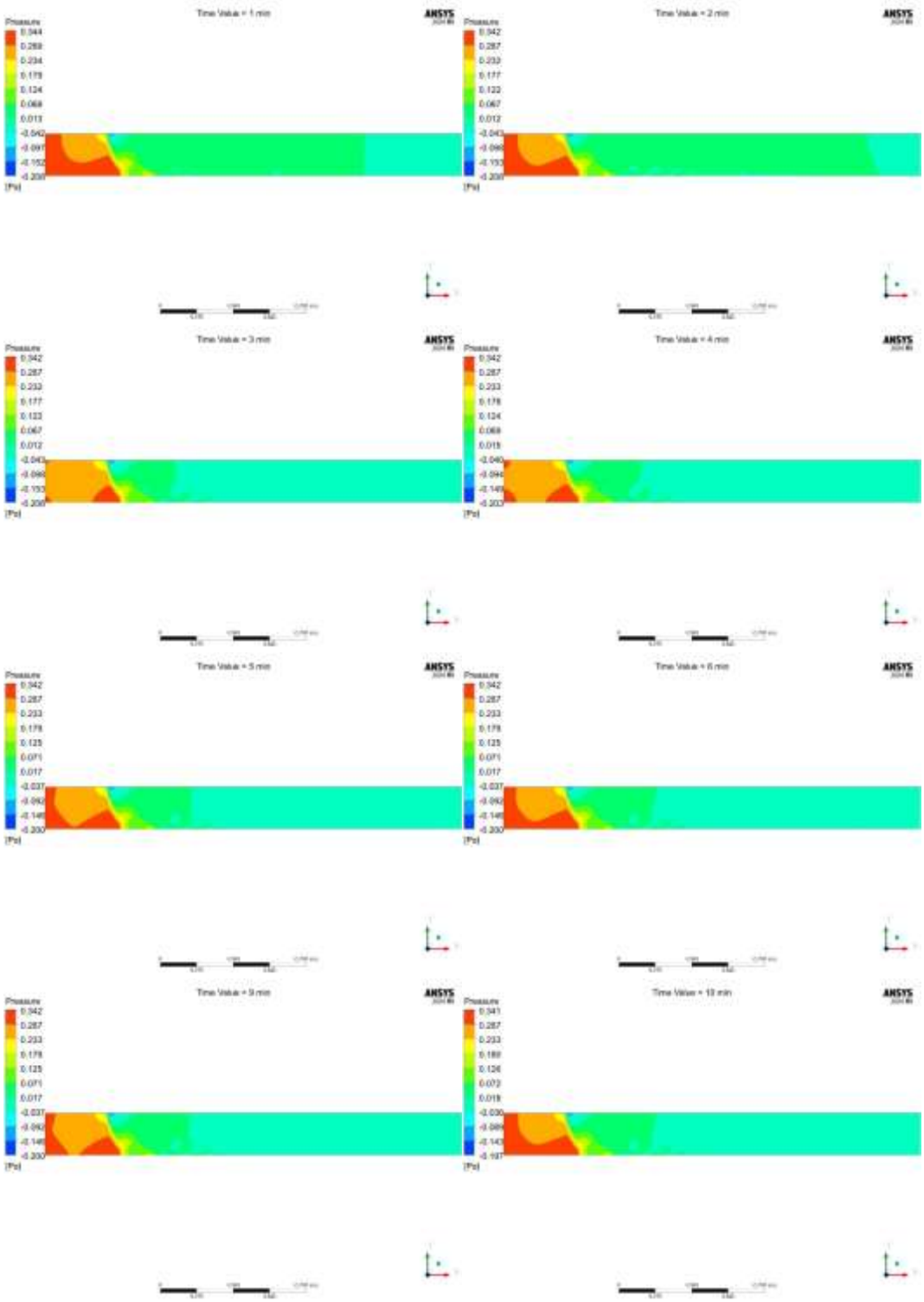
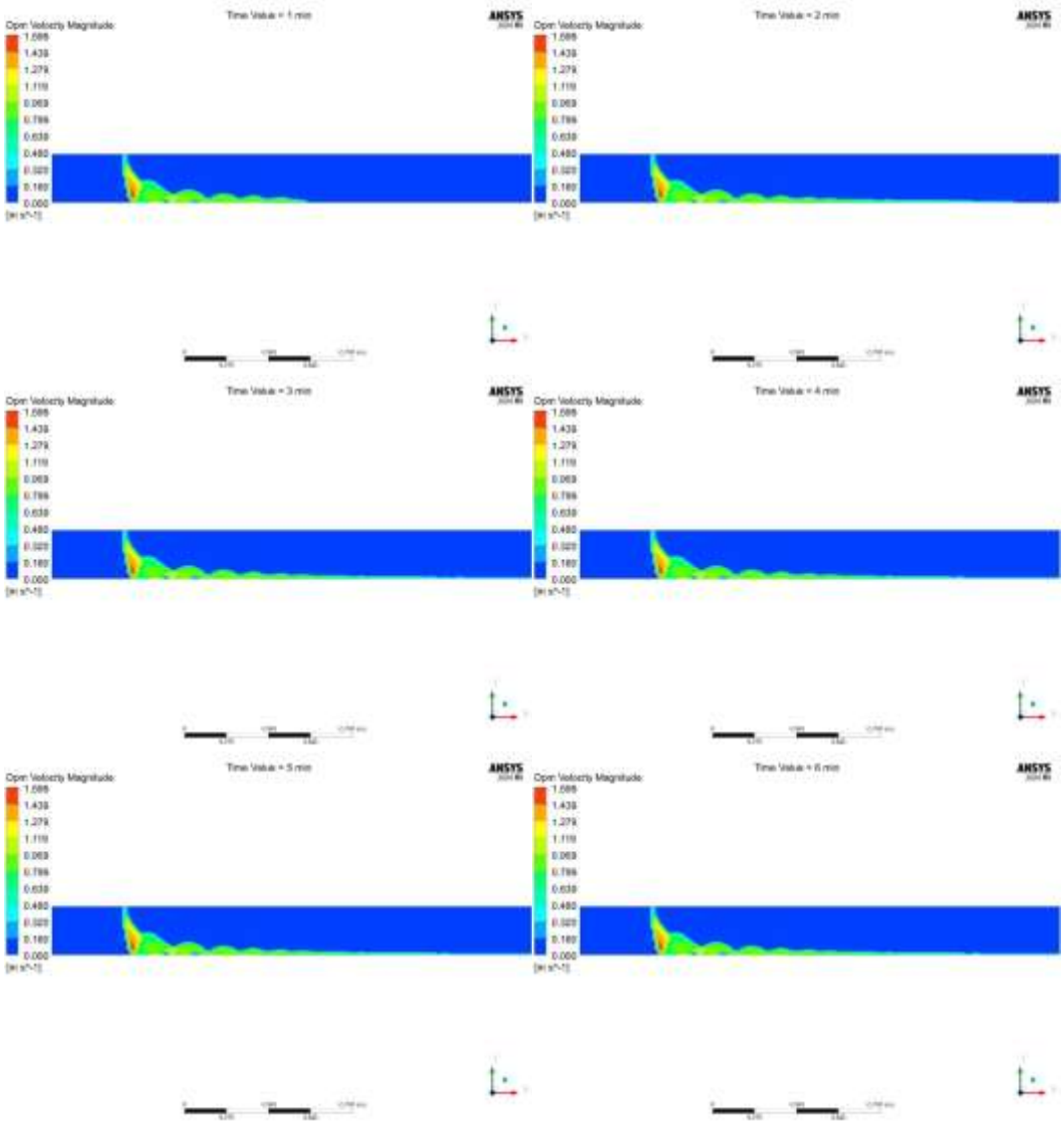


Figure 9. Time-dependent pressure change of Chemosil 411 materia


Time Value = 1 min
Time Value = 2 min
Time Value = 3 min
Time Value = 4 min
Time Value = 5 min
Time Value = 6 min
ANSYS

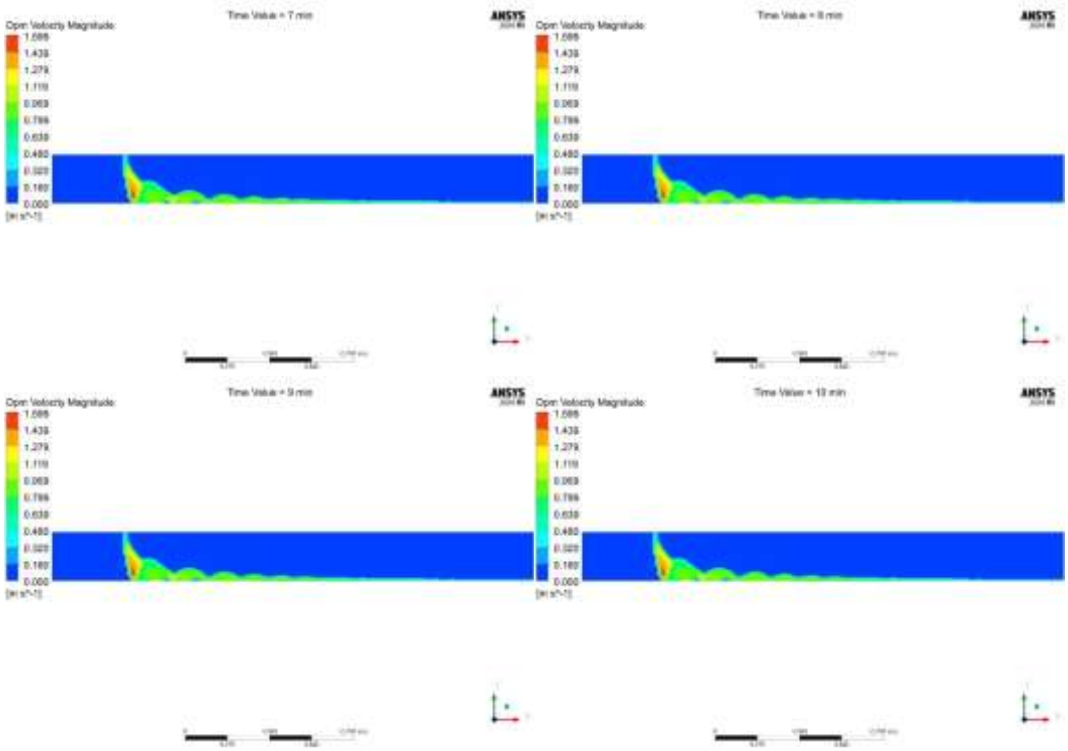
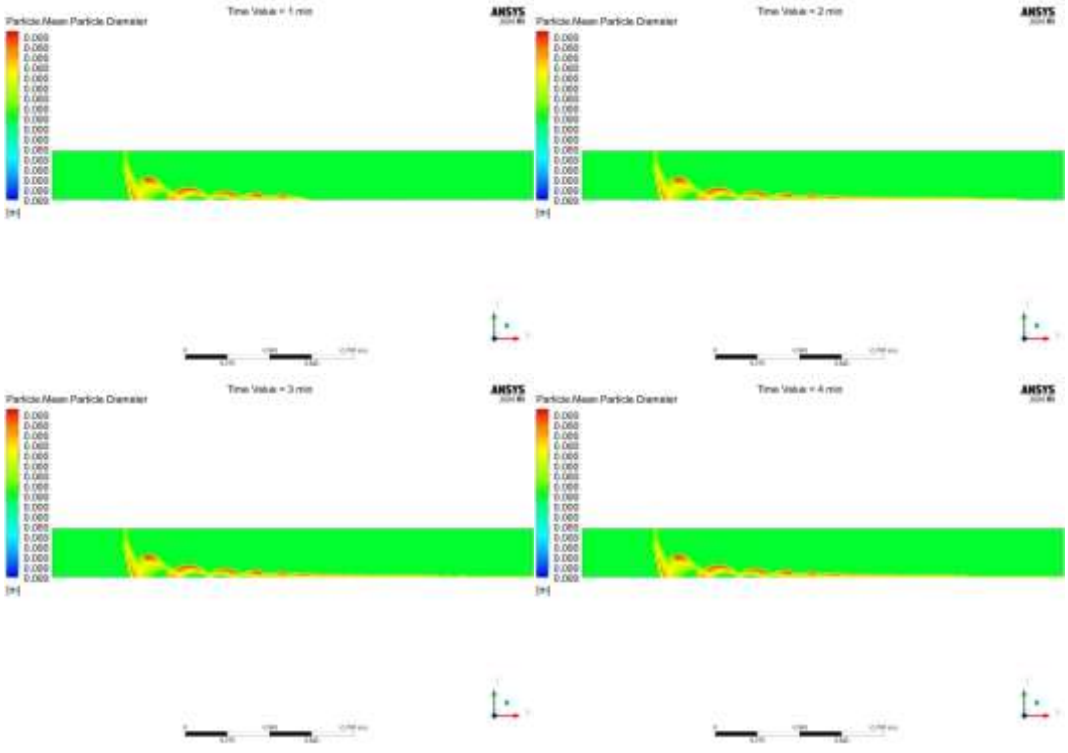


Figure 10. Time dependent velocity change of Chemosil 411 material



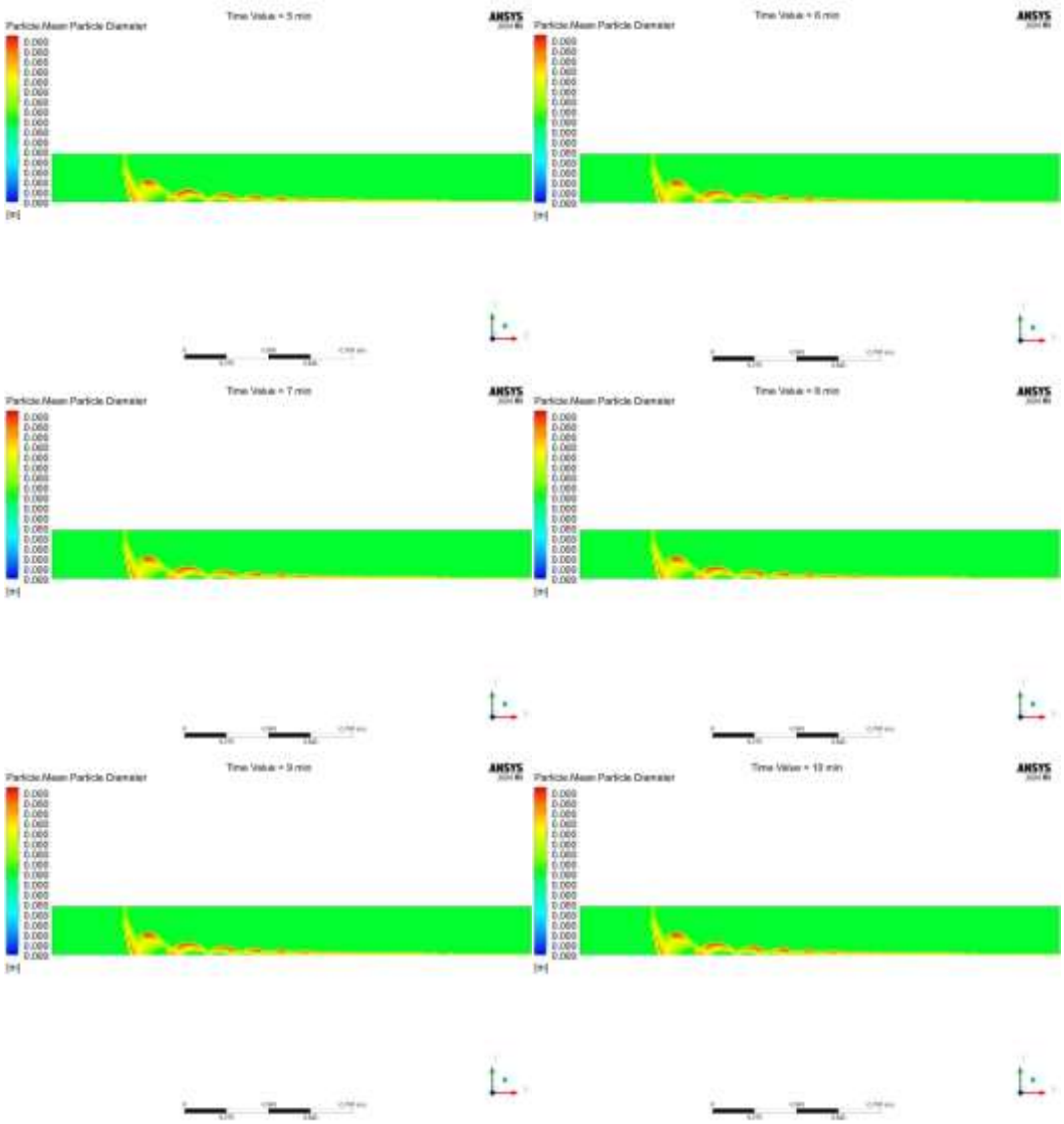
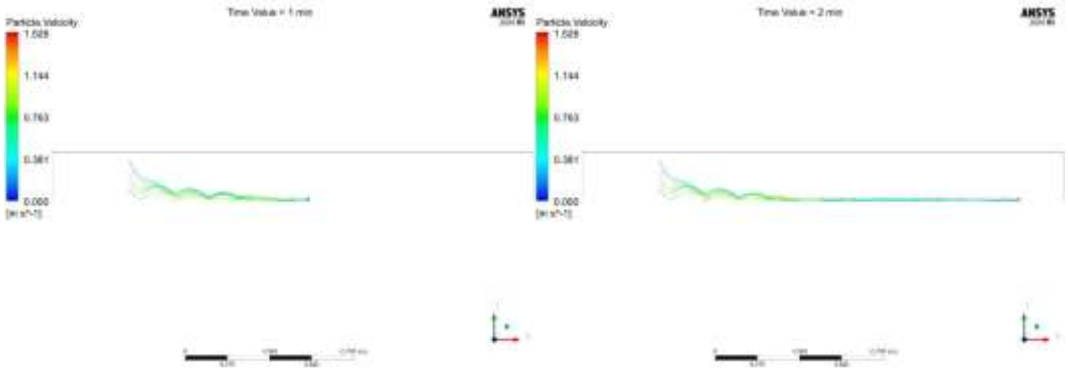


Figure 11. Time-dependent particle distribution of Chemosil 411 material



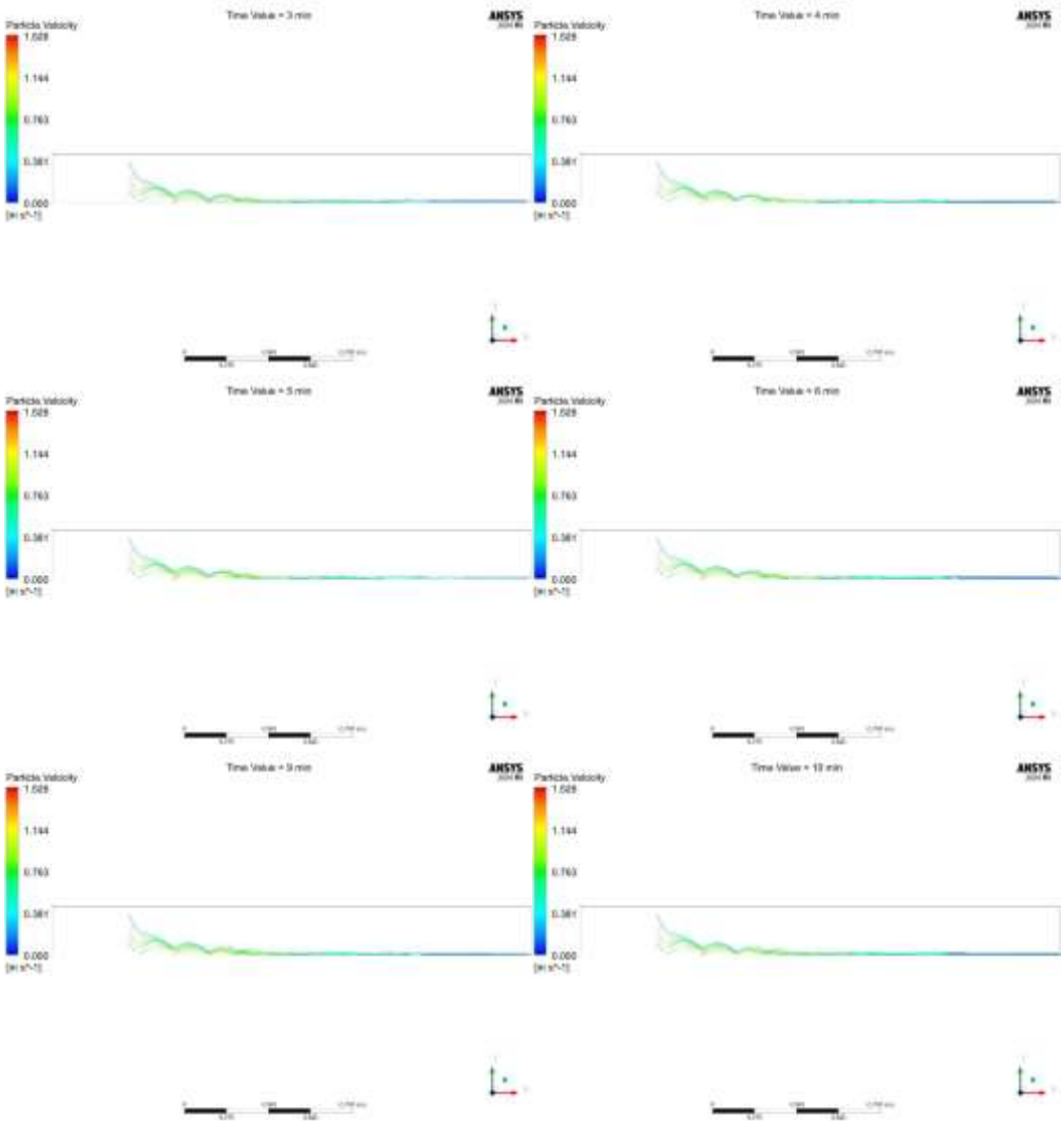


Figure 12. Time-dependent flow line of Chemosil 411 material

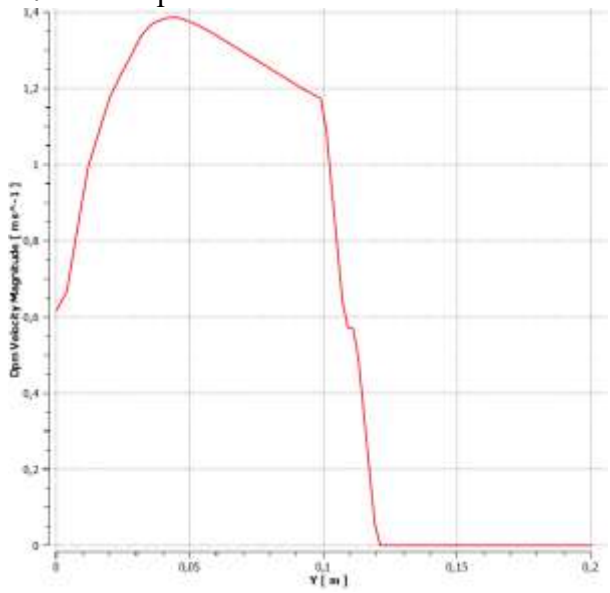


Figure 13. Velocity graph of Chemosil 411 material along the height

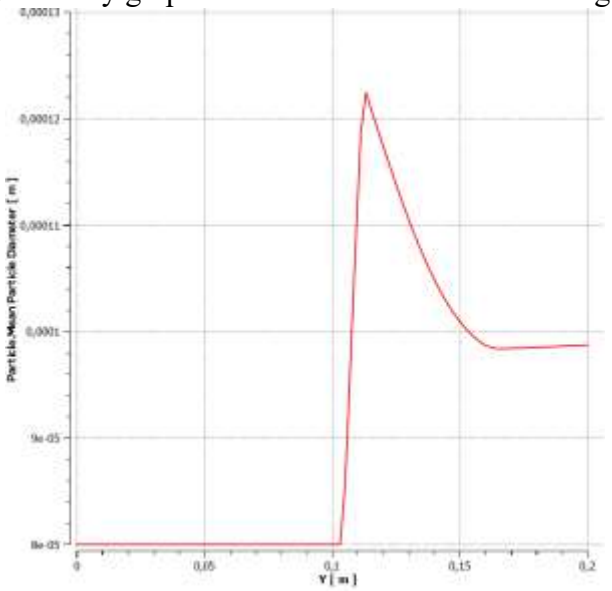


Figure 14. Particle size of Chemosil 411 material along the height

This study successfully employed the Volume of Fluid (VOF) method to analyze the two-phase flow dynamics of Chemosil 211 and Chemosil 411 in a nozzle geometry designed for textile-to-rubber bonding applications. By simulating velocity profiles and other critical parameters such as pressure variation, particle distribution, and streamlines, valuable insights into the behavior of these adhesive materials were gained.

The results indicate that the Chemosil 411 material, subjected to a longer simulation duration of 10 minutes, exhibited superior performance compared to Chemosil 211, which was analyzed over a shorter duration of 5 minutes. The extended simulation time allowed for a more comprehensive understanding of the slower dynamics and stable configurations of Chemosil 411, showcasing its enhanced ability to penetrate the textile structure effectively and form robust bonds with rubber substrates.

Moreover, the detailed analysis of particle distribution and streamline formation further reinforced the advantages of Chemosil 411 in terms of adhesive application and performance. The favorable velocity profiles and pressure variations observed with Chemosil 411 suggest that it is more effective in achieving optimal bonding conditions under the specified flow rates and nozzle configurations.

In conclusion, the findings from this study highlight the importance of selecting appropriate adhesive formulations and optimizing application conditions for improved performance in textile-to-rubber bonding processes. The insights gained from the VOF simulations not only contribute to the understanding of the behavior of Chemosil materials but also pave the way for future research aimed at enhancing adhesive technologies in industrial applications.

4.REFERENCES

[1] Ebnesajjad S. Introduction and adhesion theories. In: Ebnesajjad S, editor. Adhesives technology handbook. 2nd ed. Norwich:William Andrew Publishing; 2015. p. 1-19.

[2] Marques AC, Mocanu A, Tomić NZ, Balos S, Stammen E, Lundevall A, et al. Review on adhesives and surface treatments forstructural applications: recent developments on sustainability and implementation for metal and composite substrates. Materials.2020;13(24):5590.

[3] Hidayat, A. S., Arti, D. K., Utami, W. T., Azahra, S. A., Anggaravidya, M., Saputra, D. A., & Amry, A. (2023). Effect of bonding agent ratio on mechanical and physical properties of natural rubber compounds for rubber to textile adhesion applications. Engineering & Applied Science Research, 50(1).

[4] Khaleel BA, Abed JM, Abed HS. Enhancement of bonding efficiency between overlay and substrate concrete using StyreneButadiene Rubber Latex and different surface roughness methods. Eng Appl Sci Res. 2021;48(1):33-9.
[5] Puspitasari S, Kinasih NA, Ramadhan A, Cifriadi A, Chalid M. Natural rubber based cushion gum compound formulation atvarious type and dosage of rubber processing oil and tackifier resin. Journal of Leather, Rubber and Plastics. 2021;37(2):59-68.
[7] Wisojodharmo LA, Arti DK, Pravitasari RD, Hidayat AS, Nisa AI, Ariesta MN. Effect of tackifier addition on cushion compound formulation for tire retreading application. Indonesian Journal of Applied Chemistry. 2020;21(2):81-90.
[8] Darwish NA, Lawandy SN, El-Shazly SA, Abou-Kandil AI. Effect of bonding systems on the adhesion of nitrile rubber to nylon cord. Polym Plast Technol Eng. 2000;39(5):793-806.
[9] Ansarifar M, Zhang J, Baker J, Bell A, Ellis R. Bonding properties of rubber to steel, aluminium and nylon 6,6. Int J Adhes Adhes. 2001;21(5):369-80.

KONUT VE ÇATILI İŞYERİ KİRALARINDA YAZILI TAHLİYE TAAHHÜDÜ VE BU TAAHHÜDÜN ARABULUCULUK SONUCUNDA DÜZENLENMESİNE İLİŞKİN DEĞERLENDİRMELER

WRITTEN EVICTION COMMITMENT IN RESIDENTIAL AND ROOFED WORKPLACE LEASES AND ANALYSES REGARDING THE ARRANGEMENT OF THIS COMMITMENT AS A RESULT OF MEDIATION

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ÖZET
Türk Borçlar Kanunu'nun konut ve çatılı işyeri kiralarına ilişkin düzenlemeleri, kiraya verenin kiracıyı tahliye sebeplerini sınırlandırmıştır. Bu bakımdan Kanun'da tahliye sebepleri kiraya verenden kaynaklanan sebepler ve kiracıdan kaynaklanan sebepler olmak üzere ikiye ayrılarak düzenlenmiştir. Kiracıdan kaynaklanan tahliye sebeplerinden biri de Türk Borçlar Kanunu madde 352 fıkra 1'de düzenlenen kiracının yazılı tahliye taahhüdü sebebiyle tahliyedir. Tahliye taahhüdünün kiracının tahliyesine dayanak oluşturabilmesi için her şeyden önce geçerli bir taahhüt olması gerekir. Tahliye taahhüdünün geçerliliği açısından Kanun'da bazı koşullar aranmıştır. Bu koşullar taahhüdün yazılı olması, kiralananın tesliminden sonra düzenlenmiş olması ve kiracının kiralananı belli bir tarihte tahliye edeceği taahhüdünü içermesi şeklinde sayılabilir. Söz konusu koşulları sağlayan bir tahliye taahhüdü mevcutsa, kiraya veren, kiralananın tahliyesinin taahhüt edildiği tarihten başlayarak bir ay içinde icra dairesine veya mahkemeye başvurarak tahliyeyi talep edebilir.
2023 Eylül ayının başından itibaren kira uyuşmazlıklarında arabuluculuk zorunlu dava şartı haline getirilmiştir. Bunun doğal bir neticesi olarak kira uyuşmazlıklarının arabuluculuk yoluyla çözülmesine ilişkin başvuru sayılarında büyük oranda artış gözlemlenmiştir. Arabuluculuğa konu uyuşmazlığın temelinde farklı sebepler yatabilir. Diğer yandan bu sebeplerden bağımsız olarak arabuluculuk sürecinin kiracının tahliye taahhüdünde bulunmasıyla sonuçlanması mümkündür. Örneğin kiraya verenin kira bedelinin arttırılması talebiyle yaptığı başvurunun kiracının tahliye taahhüdünde bulunmasıyla sonuçlanmasının önünde bir engel yoktur. Bu gibi hallerde tahliye taahhüdünün yer aldığı anlaşma belgesiyle ilgili arabuluculuk mevzuatı uygulama alanı bulabilecektir. Bu noktada anlaşma belgesinin düzenlenmesine ve icra edilebilirlik şerhine ilişkin hükümler özellikle anılmaya değerdir.
Anahtar Kelimeler: Kira, **y**azılı tahliye taahhüdü, tahliye, arabuluculuk.

ABSTRACT
The provisions of the Turkish Code of Obligations on residential and roofed workplace leases limit the reasons for the lessor to evict the tenant. In this respect, the Law regulates the reasons for eviction in two categories: the reasons arising from the lessor and the reasons arising from the tenant. One of the reasons for eviction arising from the tenant is the eviction due to the eviction commitment of the tenant regulated in Article 352 paragraph 1 of the TCO. In the Law, some conditions are sought for the validity of the commitment. These conditions are that the commitment must be in writing, must be issued after the delivery of the leased property, and must include the tenant's commitment to evacuate the leased property on a certain date. If there is an eviction commitment that meets these conditions, the lessor may request eviction by applying to

the enforcement office or court within one month starting from the date of the commitment to evacuate the leased property.
As of September 2023, mediation in lease disputes has become a mandatory litigation condition. As a natural consequence, there has been a significant increase in the number of applications for the resolution of lease disputes through mediation. Different reasons may underlie the dispute subject to mediation. On the other hand, regardless of these reasons, it is possible that the mediation process may result in the tenant's eviction commitment. For example, there is no obstacle for the lessor's application for an increase in the rental price to result in the tenant's commitment to evacuate. In such cases, the regulations on mediation regarding the agreement document containing the eviction commitment may find an application area. At this point, the provisions regarding the issuance of the agreement document and the annotation of enforceability are particularly worth mentioning.

Keywords: Lease, written eviction commitment, eviction, mediation.

I. GİRİŞ

Konut ve çatılı işyeri kira sözleşmeleri taraflarca öngörülen süre dolduğunda kendiliğinden sona ermemektedir. Bununla birlikte Türk Borçlar Kanunu'nda, kiracıya, kararlaştırılan sürenin dolmasından belli bir süre önce bildirimde bulunmak suretiyle sözleşmeyi sona erdirme imkânı tanınmıştır. Kiracının belli bir süre önceden hiçbir gerekçe ileri sürmeksizin sadece bildirimde bulunmak suretiyle sözleşmeyi sonlandırma hakkı, belirsiz süreli sözleşmelerde de mevcuttur. Ancak kiraya verenin hiçbir sebep göstermeksizin bildirimde bulunmak suretiyle sözleşmeyi sona erdirmesi daha ağır koşullara tâbi tutulmuştur.
Bununla birlikte kanun koyucu, kiraya verene belli sebeplerle sözleşmeyi sona erdirerek kiracıyı tahliye etme imkânı da tanımıştır. Bu sebeplerden bir kısmı kiraya verenden, bir kısmı ise kiracıdan kaynaklanan sebepler olarak sayılmıştır. Kiracıdan kaynaklanan sebeplerinden biri de yazılı tahliye taahhüdü sebebiyle tahliyedir. Kiracının tahliye taahhüdüne dayanarak tahliyenin gerçekleştirilmesi, Kanun'da belli koşullara tâbi tutulmuştur.
Bu tahliye sebebi, kiracının, kiralananı belli bir tarihte boşaltmayı taahhüt etmesine dayanmaktadır. Böyle bir taahhüdün arabuluculuk görüşmeleri sonucunda yapılan anlaşma belgesinde yer almasının önünde bir engel yoktur. Bu anlaşmalar da esas itibarıyla bir borçlar hukuku sözleşmesi niteliğindedir. Ancak anlaşmanın arabuluculuk sonucunda düzenlenmesi, anlaşmaya uygulanacak düzenlemelerin tespitinde arabuluculukla ilgili mevzuat hükümlerini de dikkate almayı gerektirmektedir.
Bu çalışmada, konut ve çatılı işyeri kiralarında yazılı tahliye taahhüdü ile, arabuluculuk mevzuatı da göz önünde tutulmak suretiyle, bu taahhüdün arabuluculuk sonucunda düzenlenmesine ilişkin değerlendirmelerde bulunmak amaçlanmıştır.

II. YAZILI TAHLİYE TAAHHÜDÜ SEBEBİYLE KİRACININ TAHLİYESİ

A. GENEL OLARAK

Yazılı tahliye taahhüdü sebebiyle kiracının tahliyesine ilişkin düzenleme, Türk Borçlar Kanunu'nun (TBK) 352. maddesinin ilk fıkrasında yer almaktadır. Hüküm şu şekilde kaleme alınmıştır: *"Kiracı, kiralananın teslim edilmesinden sonra, kiraya verene karşı, kiralananı belli bir tarihte boşaltmayı yazılı olarak üstlendiği hâlde boşaltmamışsa kiraya veren, kira sözleşmesini bu tarihten başlayarak bir ay içinde icraya başvurmak veya dava açmak suretiyle sona erdirebilir."*
Hükme göre tahliye taahhüdüne dayanarak kira sözleşmesini sona erdirmek ve böylelikle kiracının tahliyesini sağlamak için öncelikle geçerli bir taahhüdün bulunması gerekir. Geçerli bir taahhütten söz edebilmek için taahhüdün yazılı olması, kiralananın tesliminden sonra düzenlenmiş olması ve kiralananın belli bir tarihte tahliye edileceği taahhüdünü içermesi gerekir. Bu koşulları sağlayan

bir taahhüt mevcutsa, kiraya veren, tahliyenin taahhüt edildiği tarihten itibaren bir ay içinde icra veya dava yoluna başvurmak suretiyle kira sözleşmesini sona erdirerek kiracıyı tahliye edebilir.

B. TAAHHÜDÜN GEÇERLİLİK KOŞULLARI

1. Taahhüt Yazılı Olmalıdır

Taahhüdün yazılı olmasından anlaşılması gereken adi yazılı şekildir (Gümüş, s. 326). Adi yazılı şeklin sağlanması için esas olan borç altına girenlerin imzasının bulunmasıdır (TBK m.14/I). Yazılı tahliye taahhüdünde kural olarak sadece kiracı borç altına girdiğinden, onun imzası gerekli ve yeterlidir. Taahhüdün baştan sona kiracı tarafından elle yazılmış olması gerekmez. Örneğin bilgisayar ortamında düzenlenip çıktısı alınan metnin kiracı tarafından elle veya elektronik imza ile imzalanmış olması bu koşulu sağlar. Adi yazılı şekilden daha ağır bir şekil şartı sağlandığı, örneğin noterde onaylama veya düzenleme şeklinde tahliye taahhüdü kurulduğu takdirde, bu da geçerlidir (Eren, s. 422-423).

Taahhüdü kiracının bizzat imzalaması mümkün olduğu gibi, yetkili temsilcisinin kiracı adına imzalaması da mümkündür. Tahliye taahhüdü, özel yetki verilmesini gerektiren işlemlerden değildir (Gümüş, s. 327; Kanık, s. 323). Bu nedenle temsil yetkisi verilmesine ilişkin beyan veya belgede, temsilcinin tahliye taahhüdünde bulunmaya yetkili olduğunun özellikle belirtilmesi zorunluluk arz etmez. Ancak yine de bu hususun belirtilmesi tavsiyeye değer bir davranıştır.

2. Taahhüt Kiralananın Tesliminden Sonra Düzenlenmiş Olmalıdır

Kiralanan henüz teslim edilmeden kiracıdan tahliye taahhüdü alınması durumunda tahliye taahhüdü geçersiz olur. Dolayısıyla böyle bir taahhüde dayanarak kiracının tahliyesi gerçekleştirilemez.

Tahliye taahhüdünün düzenleme tarihini içermemesi, tek başına tahliye taahhüdünün geçersiz olması sonucunu doğurmaz. Bununla birlikte kiracı, bu taahhüdün kiralanan henüz kendisine teslim edilmeden tanzim edildiği savunmasında bulunduğu takdirde, taahhüdün kiralanan teslim edildikten sonra verildiğini ispat yükü kiraya verene düşer (Kanık, s. 319).

Uygulamada düzenleme tarihi boş bırakılarak kiracı tarafından imzalanan taahhütlere sıklıkla rastlanmaktadır. Şayet tahliye taahhüdünde düzenleme tarihi boş bırakılmış ve kiraya veren bu boşluğu sonradan kiralananın teslim tarihinden sonraki bir tarihi yazarak doldurmuşsa, taahhüdün henüz teslim gerçekleşmeden verildiğini iddia eden kiracı, bu iddiasını ispat yükü altındadır.

3. Taahhütte, kiracının kiralananı belli bir tarihte tahliye edeceği taahhüdü yer almalıdır

Tahliye taahhüdü, kiracının kiralananı boşaltmayı üstlendiğine ilişkin beyanının yanında, kiralananın boşaltılacağı tarihi de içermelidir. Kanun bu tarihin belli bir tarih olması gerektiğini kabul etmiştir. Uygulamada kiracının tahliye tarihini boş bırakarak imzaladığı taahhütlere de sıklıkla rastlanmaktadır. Bu tür boş taahhütleri kiraya verenin sonradan belli bir tahliye tarihi yazarak doldurması durumunda, tahliye tarihinin kiraya veren tarafından aralarındaki anlaşmaya aykırı olarak doldurulduğunu ispat yükü kiracıda olmaktadır. Kiracı tarihin anlaşmaya aykırı şekilde doldurulduğunu ispat ederse, taahhüt edilen gerçek tahliye tarihine uygun bir tarihte icra takibi veya dava yoluna başvurulup başvurulmadığına göre bir sonuca varılmalıdır.

C. İCRA TAKİBİ veya DAVA YOLUNA BAŞVURU SÜRESİ

Yukarıda açıklanan koşulları sağlayan geçerli bir tahliye taahhüdü varsa, kiraya veren kiracının kiralananı tahliye edeceğini taahhüt ettiği tarihten itibaren bir ay içinde icra takibine girişmek veya sulh hukuk mahkemesinde dava açmak suretiyle tahliyeyi talep etmelidir. Söz gelimi, kiralananın 01.10.2024 tarihinde tahliye edileceği taahhüt edilmesine rağmen kiralanan tahliye edilmemişse, 02.10.2024 tarihi ila 01.11.2024 tarihleri arasında icra takibi başlatılmalı veya dava açılmalıdır. Bu süre hak düşürücü süredir. Şayet süre kaçırılmışsa, artık söz konusu taahhüde dayanarak tahliye talep edilemez. Şu hâlde verilen örnekte 01.11.2024 tarihi de icra takibi başlatılmaksızın veya dava açılmaksızın geçirilmişse, artık bu taahhüde dayanarak kiracı tahliye edilemez.

Diğer yandan, TBK m. 353'ün *"Kiraya veren, en geç davanın açılması için öngörülen sürede dava açacağını kiracıya yazılı olarak bildirmişse, dava açma süresi bir kira yılı için uzamış sayılır."* şeklindeki düzenlemesi, yazılı tahliye taahhüdü sebebiyle tahliye için de uygulanır.

III. TAHLİYE TAAHHÜDÜNÜN ARABULUCULUK SONUCUNDA DÜZENLENMESİ

A. GENEL OLARAK ARABULUCUK

Arabuluculuk, alternatif bir uyuşmazlık çözüm yöntemidir. Hukuki uyuşmazlıkların arabuluculuk yoluyla çözümüne ilişkin usul ve esasları düzenleyen temel mevzuat Arabuluculuk Kanunu (AK)'dur. Arabuluculukta, uyuşmazlığın dava yoluyla çözümü yerine, tarafların bir araya gelmesi, yürütülen görüşme ve müzakereler sonucunda birbirlerini anlamaları ve çözümlerini kendilerinin üretmesi amaçlanmaktadır. Arabuluculuk süreci, bağımsız ve tarafsız bir arabulucu tarafından yürütülür. Taraflar arasındaki iletişim sürecinde, onların çözüm üretemediklerinin anlaşılması durumunda, arabulucu onlara çözüm teklifi getirebilir (AK m. 2/I-(b); AK m. 15/VII).

Arabuluculuk yolu, tarafların serbestçe tasarruf etme imkânlarının bulunduğu iş veya işlemlerden doğan özel hukuk uyuşmazlıklarının çözümlenmesinde uygundur. Tarafların üzerinde irade serbestisi bulunmayan iş ve işlemler, özellikle de aile içi şiddet iddiasını içeren uyuşmazlıklar arabuluculuk açısından elverişli değildir (AK m. 1/II).

Mevzuatımızda ihtiyari ve dava şartı olmak üzere esas olarak iki tür arabuluculuk düzenlenmiştir. İhtiyari arabuluculukta taraflar herhangi bir zorunlulukları olmamasına rağmen aralarındaki uyuşmazlığı çözmek için arabuluculuğa başvururlar. Dava şartı arabuluculukta ise, dava açılmadan önce arabuluculuğa başvurulması dava şartıdır. Yani arabuluculuğun Kanun'da dava şartı olarak düzenlendiği bir uyuşmazlıkla ilgili olarak arabuluculuk yolu denenmeden doğrudan dava açılmışsa, dava usulden reddedilir (AK m. 18/A-II).

Arabuluculuk Kanunu'na sonradan eklenen m. 18/B-I/(a) hükmü ile, kiralanan taşınmazların 2004 sayılı İcra ve İflas Kanunu'na göre ilamsız icra yoluyla tahliyesine ilişkin hükümler hariç, kira ilişkisinden doğan uyuşmazlıklarda dava açılamadan önce arabulucuya başvurulmuş olması dava şartı olarak kabul edilmiştir. Bu düzenleme 2023 Eylül ayı başından itibaren yürürlüğe girmiştir. Yani artık kira uyuşmazlıklarında dava açılmadan önce kural olarak arabuluculuğa başvurulması gerekmektedir. Şayet arabuluculuğa başvurulmadan dava açılmışsa, dava şartı eksik olduğundan dava usulden reddedilir.

Kira uyuşmazlıklarında arabuluculuğun dava şartı olmasıyla birlikte, doğal olarak bu alanda arabuluculuk dosya sayısı oldukça artmıştır. Arabuluculuğa başvururken, başvurucu taraf başvurusunda uyuşmazlıkla ilgili birtakım sebepler belirtmektedir. Örneğin uygulamada kiralananın tahliyesi, ihtiyaç sebebiyle tahliye, yeni malikin gereksinimi sebebiyle tahliye, iki haklı ihtar sebebiyle tahliye, kira bedelinin uyarlanması, kira bedelinin arttırılması, yazılı tahliye taahhüdü sebebiyle tahliye gibi sebeplere yer verildiği görülmektedir. Arabuluculuk sonucunda, uyuşmazlık için belirtilen sebepten bağımsız olarak, görüşme ve müzakerelerin tarafların kiracının belli bir tarihte kiralananı boşaltması yönünde anlaşmaya varması şeklinde sonuçlanması mümkündür. Örneğin kira bedelinin arttırılması sebebiyle yapılan bir başvuruda, tarafların tahliyeyi müzakere etmeleri ve kira bedelinin arttırılması yerine kiracının belli bir tarihte kiralananı boşaltması yönünde anlaşmaları ihtimal dahilindedir.

B. ARABULUCULUK SONUCUNDA TAHLİYENİN TAAHHÜT EDİLMESİ

Arabuluculuk müzakereleri, kiracı ve kiraya verenin, kiracının kiralananı belli bir tarihte boşaltması hususunda anlaşmalarıyla sonuçlanabilir.

Arabuluculuk Kanunu'nda, arabuluculuk sonucunda anlaşma belgesi düzenlenmesi halinde, bu anlaşma belgesinin düzenlenmesi ve icrasına yönelik bazı hükümler kaleme alınmıştır. Bu hükümlerden AK m. 18/I'e göre, *"Arabuluculuk faaliyeti sonunda varılan anlaşmanın kapsamı taraflarca belirlenir; anlaşma belgesi düzenlenmesi hâlinde bu belge taraflar ve arabulucu tarafından imzalanır."*

Görüldüğü gibi Kanun, anlaşma belgesi düzenlenmesi halinde, bu belgenin taraflar ve arabulucu tarafından imzalanması gerektiğini ifade etmiştir. Uygulamada tarafların birinin ve hatta bazen her ikisinin avukatla temsil edildiği görülebilmektedir. Bu durumda yetkili avukatın imzaladığı anlaşma belgesi, taraflar imzalamasa dahi geçerli olacaktır. Tahliye taahhüdü içerir bir anlaşma belgesi açısından, avukatın özel olarak yetkilendirilmiş olması, diğer bir deyişle tahliye taahhüdünde bulunmak hususunda yetkili olduğunun özel olarak belirtilmesi şart değildir. Diğer yandan avukatın vekaletnamede arabuluculuk anlaşma belgesini imzalamakla yetkili olduğunun belirtilmesinde yarar vardır.

Arabuluculuk Kanunu anlaşma belgesinin icrasına ilişkin olarak da bazı hükümlere yer vermiştir. AK m. 18/II vd. şöyle kaleme alınmıştır:

"...(2) ***Taraflar arabuluculuk faaliyeti sonunda bir anlaşmaya varırlarsa, bu anlaşma belgesinin icra edilebilirliğine ilişkin şerh verilmesini talep edebilirler.*** *Dava açılmadan önce arabuluculuğa başvurulmuşsa, anlaşmanın icra edilebilirliğine ilişkin şerh verilmesi, arabulucunun görev yaptığı yer sulh hukuk mahkemesinden talep edilebilir. Davanın görülmesi sırasında arabuluculuğa başvurulması durumunda ise anlaşmanın icra edilebilirliğine ilişkin şerh verilmesi, davanın görüldüğü mahkemeden talep edilebilir.* ***Bu şerhi içeren anlaşma, ilam niteliğinde belge sayılır.***

(3) ***İcra edilebilirlik şerhinin verilmesi, çekişmesiz yargı işidir ve buna ilişkin inceleme dosya üzerinden yapılır.*** *Ancak arabuluculuğa elverişli olan aile hukukuna ilişkin uyuşmazlıklarda inceleme duruşmalı olarak yapılır.* ***Bu incelemenin kapsamı anlaşmanın içeriğinin arabuluculuğa ve cebri icraya elverişli olup olmadığı hususlarıyla sınırlıdır.*** *Anlaşma belgesine icra edilebilirlik şerhi verilmesi için mahkemeye yapılacak olan başvuru ile bunun üzerine verilecek kararlara karşı ilgili tarafından istinaf yoluna gidilmesi hâlinde maktu harç alınır. Taraflar anlaşma belgesini icra edilebilirlik şerhi verdirmeden başka bir resmî işlemde kullanmak isterlerse, damga vergisi de maktu olarak alınır.*

(4) ***Kanunlarda icra edilebilirlik şerhi alınmasının zorunlu kılındığı haller hariç, taraflar ve avukatları ile arabulucunun, ticari uyuşmazlıklar bakımından ise avukatlar ile arabulucunun birlikte imzaladıkları anlaşma belgesi, icra edilebilirlik şerhi aranmaksızın ilam niteliğinde belge sayılır****…*"

Bundan başka Arabuluculuk Kanunu madde 18/B'de, konut ve çatılı işyeri kiraları açısından dikkate alınması gereken bir düzenleme daha yer almaktadır. Arabuluculuk Kanunu m.18/B-III, *"...(3)* ***Bu madde kapsamında düzenlenen anlaşma belgesinin icra edilebilirliğine ilişkin şerhin alınması zorunlu olup bu şerh taşınmazla ilgili anlaşma belgeleri bakımından taşınmazın bulunduğu yer, diğer anlaşma belgeleri bakımından ise arabulucunun görev yaptığı yer sulh hukuk mahkemesinden alınır.*** *Mahkeme taşınmazla ilgili anlaşma belgeleri bakımından yapacağı incelemede anlaşma içeriğini, arabuluculuğa ve cebri icraya elverişli olup olmadığı ve taşınmazla ilgili olarak kanunlarda yer alan sınırlamalar ile usul ve esaslara uyulup uyulmadığı yönünden denetler; bu kapsamda kurum veya kuruluşlardan bilgi veya belge talep edebilir ve gerektiğinde duruşma açabilir..."* şeklinde kaleme alınmıştır.

Kira uyuşmazlıklarında dava şartı arabuluculuk m. 18/B-I/(a)'da düzenlenmiştir. Dolayısıyla AK m.18/B-III hükmü, bu tür uyuşmazlıklarda düzenlenen anlaşma belgeleri için alınacak icra edilebilirlik şerhleri için de uygulanmalıdır (Çelik/Doğu, s. 851). Şu hâlde, örneğin kiracının tahliye taahhüdünü içerir anlaşma belgesini, taraflar, avukatları ve arabulucunun imzalaması durumunda, mahkemeden icra edilebilirlik şerhi alınması gerekmeksizin anlaşma belgesinin ilam niteliğinde belge sayılacağına ilişkin AK m. 18/IV hükmü uygulanmayacaktır. Söz konusu belgenin ilam niteliğinde belge haline getirilebilmesi için, AK m.18/B-III uyarınca mahkemeden icra edilebilirlik şerhi alınması gerekecektir.

Diğer yandan mahkemeden icra edilebilirlik şerhinin alınamamış olması, tek başına anlaşma belgesinin geçerliliğini etkilemez. Dolayısıyla bu durumda tahliye taahhüdünü içerir anlaşma

belgesi, TBK m.352'deki koşulları sağlıyorsa, kanaatimizce söz konusu hüküm uyarınca icra takibi veya dava yoluyla kiracının tahliyesi talep edilebilir.

IV. SONUÇ

Kiracının, yazılı tahliye taahhüdü sebebiyle kiralanandan tahliye edilebilmesi için tahliye taahhüdünün geçerli bir taahhüt olması ve kiraya verenin taahhüt edilen tahliye tarihinden itibaren bir ay içinde icra veya dava yoluyla tahliyeyi talep etmesi gerekir.

Arabuluculuk müzakereleri, kiracının belli bir tarihte kiralananı boşaltma taahhüdünü içerir bir anlaşmayla sonuçlanabilir. Bu durumda anlaşma belgesinin, arabulucu ve taraflarca imzalanması gerekir. Bununla birlikte tarafların yetkili avukatı tarafından anlaşma belgesi imzalanmışsa, ayrıca taraflarca da belgenin imzalanması zorunlu değildir.

Kiraya veren, kiracının belli bir tarihte tahliye taahhüdünü içerir anlaşma belgesi için icra edilebilirlik şerhi alarak, söz konusu belgeyi ilam niteliğinde belge haline getirebilir. Kira uyuşmazlıklarında dava şartı arabuluculuk m. 18/B'de düzenlendiğinden, bu tür uyuşmazlıklar, anlaşma belgesinin ilam niteliğinde belge haline getirilebilmesi için icra edilebilirlik şerhinin alınmasının zorunlu olduğu uyuşmazlıklardandır. Diğer yandan icra edilebilirlik şerhinin alınamamış olması, TBK m.352/I hükmüne başvurmaya engel değildir.

KAYNAKÇA

Çelik, Aytekin/Doğu, Hakkı Mert: "Kira Uyuşmazlıklarında Dava Şartı Arabuluculuk ve Ticari Dava Şartı Arabuluculuk Üzerindeki Etkileri", Selçuk Üniversitesi Hukuk Fakültesi Dergisi, C. 32, S. 2, 2024, s. 811-860.

Eren, Fikret: Borçlar Hukuku Özel Hükümler, Yetkin Yayınları, 5. Baskı, Ankara, 2017.

Gümüş, Mustafa Alper: "Yeni" 6098 Sayılı Türk Borçlar Kanunu'na Göre Kira Sözleşmesi, Vedat Kitapçılık, İstanbul, 2012.

Kanık, Hikmet: "Güncel Yargıtay Kararları Işığında Kiracıdan Kaynaklanan Sebeplerle Tahliye", Türk Kira Hukukunda Güncel Gelişmeler Sempozyumu, İstanbul Medipol Üniversitesi Hukuk Fakültesi Sempozyumları Dizisi-II, Legal, İstanbul, 2023, s. 271-351.

MİMARLIKTA IŞIK: MEVLANA'NIN ŞİİRLERİNDEN BİR ANALİZ

LIGHT IN ARCHITECTURE: AN ANALYSIS BASED ON RUMI'S POETRY

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Özet

Mevlânâ (Rumi) adıyla tanınan Celaleddin Muhammed Belhî'nin Mesnevî Manevi adlı kıymetli eseri, tasavvufî açıdan insan hayatına ilişkin pek çok konuyu içermektedir. Bu makale, Mesnevî'de yer alan, insan ve toplum için uygun ve güzel şartları, hayat tarzını konu alan ilmî-tasavvufî bir veriyi tahlil etmeyi ve araştırmayı amaçlamaktadır. Işık, tasavvufta önemli bir temadır ve Mevlana bunu kapsamlı bir şekilde araştırmıştır. İslam kültüründen ve onun ana kaynaklarından etkilenen Mevlana, insanlık tarihi boyunca büyük önem taşıyan doğu-İslam mimarisinde ışığın çeşitli türlerini ve kullanımlarını araştırdı. Rumi'nin Mesnevi adlı kitabı sabit ve kararsız ışıkları, bireysel kişiliklerdeki renkleri ve bunların insan ruhu ve ruhu üzerindeki etkilerini tartışıyor. Bu makale, Mevlana'nın Mesnevi'sinin mimari tasarımını bağımsız ve bağımsız değişkenler açısından, özellikle bölümlerine odaklanarak incelemekte ve şiirsel ilhamın mimari yapılarda somut unsurlara nasıl dönüştürülebileceğine dair bir anlayış geliştirmektedir. Bu nedenle çalışma, Molevi'nin şiiri ile Ameri evinin mimari tasarımı arasında yer alan ışıkla ilgili unsurlara odaklanarak Mesnevi'yi incelemeyi amaçlamaktadır. Ameri evinin iç ve dış tasarımlarının detaylı bir analizinin yapılması, ışıkla ilgili şiirsel temaların nasıl somut mimari yapılara dönüştüğünü ortaya çıkarmayı amaçlıyor.

Anahtar Kelimeler: Mevlana, Mesnevi, Mimaride ışığın rolü, Bireysel ve toplumsal yaşam tarzı, Mimaride tasavvuf.

Abstract

The precious work of Jalaluddin Muhammad Balkhi, known as Mevlânâ (Rumi), called Mathnawi Manevi, includes many issues related to human life from a mystical perspective. This article aims to analyze and research one particular scientific-mystical data in Mathnawi, which deals with the way of life and suitable and graceful conditions for man and society. Light is a key theme in mysticism and Rumi explored it extensively. Influenced by Islamic culture and its main sources, Rumi explored the various types and uses of light in oriental-Islamic architecture, which have been of great significance throughout human history. Rumi's book Mathnawi discusses stable and unstable lights, colors in individual personalities, and their influence on the human soul and psyche. This article explores the architectural design of Mevlana's Mathnawi in terms of independent and independent variables, focusing particularly on its parts, and develops an understanding of how poetic inspiration can be translated into concrete elements in architectural structures. Therefore, the study aims to investigate Mathnawi by focusing on the light-related elements that lie between Molevi's poetry and the architectural design of the Ameri house. Conducting A detailed analysis of the interior and exterior designs of the Ameri house aims to reveal how poetic themes related to light are transformed into concrete architectural structures.
Keywords: Rumi, Mathnawi, The role of light in architecture, Personal and social Lifestyle, Mysticism in architecture.

KAZAK VE TÜRK ŞAİRLERİ GELENEĞİNDE ORTAK MÜZİK ALETLERİ VE ÖNEMİ

COMMON MUSICAL INSTRUMENTS AND THEIR IMPORTANCE IN THE TRADITION OF KAZAKH AND TURKISH POETS

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Özet

Türk Dünyasına ortak maddi ve manevi değerlerin araştırılması ve gün ışığına çıkarılması günümüzde önemli meselelerden biridir.

İslamiyet öncesi sözlü şiir tarzının devamı olan Aşıklık Geleneği Halk Edebiyatının en orijinal koludur. İslamiyet sonrası gelişmeye başlayan bu edebiyat kolu Kazak Edebiyatında Jıraulık Gelenek olarak bilinmektedir. Kazak Aşıklarına ise "Jırau" veya "Akın" terimi kullanılmaktadır. Türk Dünyasının söz sanatı zevkini temsil eden ozanlarımız habercilik, eğiticilik hizmetleriyle birlikte doğru yolu gosterici, iyileri övücü, kötüleri yerici, milli duyguları besleyen eserleriyle ulusu birlik ve beraberliğe davet ederek halkın sevgisini kazanmışlardır.

Makalede Türk aşıkları ve Kazak jırauları eserlerindeki ortak edebi gelenekleri üzerinde araştırmalar yapılmıştır. Türk aşıkları ve Kazak jırauları eserlerini müzik aletleri eşliğinde irticalen söyleme yeteneğine sahip olan veya özel yetiştirilmiş halk ozanlarıdır. Dede Korkut'un kopuz eşliğinde şiir söylemesi bu ortak geleneğin başlangıcıdır.

XIV-XIX yy. Kopuz ve dombra eşliğinde şiir söyleyen Kazak jırauları ve saz eşliğinde şiir söyleyen Türk aşıkları eserlerindeki sanat sentezi (şiir, ezgi, doğaçlama ve performans) aynı özelliklere sahiptir. Türk Dünyası folklöründe halk ozanlarının piri olan Dede Korkut'un başlattığı bu gelenek Orta Asyadan Anadolu topraklarına kadar uzamış ve günümüze kadar sürdürülmektedir. Tarihi ve etnografi temelleri esnasında aşıklar ve jıraular müzik aletleriyle (kopuz, saz, dombıra vs.) dertleşerek, onlara hitap ederek bu müzik aletlerinin kutsal olduklarını belirtmeye çalışmışlardır.

Anahtar Kelimeler: Türk Aşıkları, Kazak Jırauları, Dede Korkut, kopuz, dombra, saz.

Abstract

Researching the common material and spiritual values of the Turkic world and bringing them to light are important issues.

The tradition of minstrelsy, which is the continuation of pre-Islamic poetry, is the most original branch of the folk literature. This literary branch, which started to develop after Islam, is known as "zhyraulyk tradition" in Kazakh literature. For Kazakh minsrels, the term 'zhyrau' or 'akyn' is used. Our minstrels representing the entertainment of the Turkicworld's figures of speechhave gained the affection of the public by inviting the nation to unity and solidarity with the works that show the right way, praise the good, repelthe bad and nourish the national feelings along with their journalistic and educational services.

In the article, researches have been done on common literary traditions of Turkish minstrels and Kazakh zhyraus. Turkish minstrels and Kazakh zhyrausare folk poets who have the

ability to sing their works with musical instruments or who are specially trained to do so. Dede Korkut's poetry telling with kobyz is the beginning of this common tradition.

Kazakh zhyraus who sing poetry accompanied by kobyz and dombra and Turkish minstrels who sing poetry accompanied by sazof XIV-XIX centuries have the same characteristics in the synthesis of art (poetry, melody, improvisation and performance) in their works. This tradition was started by Dede Korkut, the Pir of the folk poets in the folklore of the Turkic world, has extended from Central Asia to Anatolia and is continuing to the present day. In the course of the foundations of history and ethnography, the minstrels and the zhyraustried to indicate that themusical instruments (kobyz, saz, dombra, etc.)were sacredby commiserating using them.

Key words: Turkish minstrels, Kazakh zhyraus, Dede Korkut, kobyz, dombra, saz.

SÜRDÜRÜLEBİLİR ENERJİYE YÖNELİK FARKINDALIK ÖLÇEĞİ GELİŞTİRME ÇALIŞMASI

DEVELOPMENT OF AWARENESS SCALE FOR SUSTAINABLE ENERGY

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ÖZET

Sürdürülebilir enerji farkındalığı, çevresel sürdürülebilirliği sağlamak ve gelecekteki enerji gereksinimlerini karşılamak amacıyla, çevresel etkilerin azaltılması ve doğal kaynakların korunmasına katkı sağlamaktadır. Bu bağlamda gerçekleştirilen çalışmada, ortaokul ve lise düzeyindeki öğrencilerin sürdürülebilir enerji farkındalıklarını belirlemeye yönelik "Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği"nin geliştirilmesi amaçlanmıştır. Bu doğrultuda nitel ve nicel araştırma yöntemleri kullanılmıştır. Başlangıçta 71 maddeden oluşan form, Davis tekniğiyle uzman görüşüne sunulmuş ve yapılan değerlendirme sonucunda kapsam geçerlik indeksi 0,95 olarak hesaplanmıştır. Olası faktörlerin belirlenmesi amacıyla Açımlayıcı Faktör Analizi (AFA) için ortaokul (246) ve lise (193) düzeyindeki toplam 439 öğrenciye 39 maddelik form uygulanmıştır. AFA'nın temel varsayımları olan doğrusallık, çoklu bağlantı problemi, örneklem büyüklüğü, kayıp veri, normallik ve korelasyon matrisinin faktörlenebilirliği sınanmıştır. AFA için ölçeğin tabakalı alfa güvenirlik katsayısı 0,791 olarak hesaplanmıştır. Ölçeğin yapı geçerliliğini incelemek amacıyla ortaokul (166) ve lise (196) düzeyindeki toplam 362 öğrenci üzerinde veri toplanmış, varsayımlar test edilmiş ve Doğrulayıcı Faktör Analizi (DFA) gerçekleştirilmiştir. DFA sonuçlarına göre alt boyutlara ilişkin standardize edilmiş yük değerleri, değişkenlere ait kestirilen hata varyansları ve model uyum iyiliği indeksleri analiz edilmiştir. Ayrıca ölçeğin birleştirici güvenirliği, yakınsak ve ıraksak geçerliliği incelenmiştir. DFA için Cronbach alfa güvenirlik katsayısı 0,79 olarak hesaplanmıştır. Sonuç olarak, toplam varyansın % 58,64'ünü açıklayan ve dört dereceli ("Her Zaman", "Genellikle", "Ara Sıra", "Hiçbir Zaman") 17 maddelik bir ölçek formu geliştirilmiştir. DFA ile hesaplanan birleştirici güvenirlik katsayısı (CR) 0,94 olarak belirlenmiştir. Dört faktörden oluşan ölçeğin Cronbach Alfa iç tutarlılık katsayıları "İlgi" faktörü için 0,861, "Olumsuz Algılar" faktörü için 0,847, "Enerji Verimliliği" faktörü için 0,717 ve "Çevresel Önlem" faktörü için 0,590 olarak hesaplanmıştır. Bu sonuçlar, ortaokul ve lise düzeyindeki öğrencilerin sürdürülebilir enerji farkındalığını ölçen ölçeğin geçerli ve güvenilir bir araç olduğunu ortaya koymaktadır.

Anahtar Kelimeler: Sürdürülebilir, enerji, farkındalık, ölçek geliştirme, geçerlik, güvenirlik.

Sustainable energy awareness contributes to reducing environmental impacts and protecting natural resources in order to ensure environmental sustainability and meet future energy needs. In this context, the study aimed to develop the 'Awareness Scale for Sustainable Energy' to determine the sustainable energy awareness of secondary and high school students. In this direction, qualitative and quantitative research methods were used. The form, which initially

consisted of 71 items, was submitted to expert opinion using the Davis technique and the content validity index was calculated as 0.95 as a result of the evaluation. In order to determine the possible factors, 39-item form was applied to a total of 439 students at secondary school (246) and high school (193) levels for Exploratory Factor Analysis (EFA). The basic assumptions of EFA such as linearity, multicollinearity, sample size, missing data, normality and factorability of the correlation matrix were tested. The Cronbach's alpha reliability coefficient of the scale for EFA was calculated as 0.80. In order to examine the construct validity of the scale, data were collected from a total of 362 students at the secondary school (166) and high school (196) levels, assumptions were tested and Confirmatory Factor Analysis (CFA) was performed. According to the CFA results, the standardised loading values for the sub-dimensions, the estimated error variances of the variables and the model goodness of fit indices were analysed. In addition, convergent and divergent validity, convergent reliability and convergent and divergent validity of the scale were analysed. Cronbach's alpha reliability coefficient for CFA was calculated as 0.79. As a result, a 17-item, four-point Likert-type scale (‘Always’, ‘Usually’, ‘Occasionally’, ‘Never’) explaining 58.64% of the total variance was developed. The composite reliability coefficient (CR) calculated by CFA was determined as 0.94. The Cronbach's alpha internal consistency coefficients of the scale consisting of four factors were calculated as 0.861 for the ‘Interest’ factor, 0.847 for the ‘Negative Perceptions’ factor, 0.717 for the ‘Energy Efficiency’ factor and 0.590 for the ‘Environmental Precaution’ factor. These results reveal that the scale measuring sustainable energy awareness of secondary and high school students is a valid and reliable instrument.

Keywords: Sustainable, energy, awareness, scale development, validity, reliability.

GİRİŞ

Sürdürülebilir enerji, geleceğin enerji ihtiyaçlarını karşılamak için çevresel, ekonomik ve sosyal açıdan sürdürülebilir çözümler sunan bir yaklaşımdır. Fosil yakıtların sınırlı kaynakları ve çevresel etkileri göz önüne alındığında, güneş, rüzgar, hidroelektrik ve biyokütle gibi yenilenebilir enerji kaynakları ön plana çıkmaktadır. Sürdürülebilir enerji sistemleri, bu kaynakları kullanarak karbon salınımını azaltmakta, doğal kaynakları korumakta ve enerji güvenliğini artırmaktadır. Ayrıca enerji verimliliği ve teknolojik yenilikler, sürdürülebilir enerji geçişini destekleyerek ekonomik büyümeyi teşvik etmekte ve çevresel sürdürülebilirliği sağlamaktadır. Bu nedenle, sürdürülebilir enerji çözümleri, gelecekte temiz, güvenilir ve erişilebilir enerji sağlama hedeflerine ulaşmanın anahtar unsurları olarak kabul edilmektedir. Ancak iklim değişikliği, doğal kaynakların tükenmesi, biyolojik çeşitliliğin azalması gibi çevresel sorunlar, insanlığın karşı karşıya olduğu tehditler arasında yer almaktadır. Özbuğutu (2021), teknoloji, endüstrileşme ve küreselleşmenin çevre üzerindeki zararlı etkilerini vurgulamaktadır. Ayrıca enerji tüketimi, doğal kaynakların tükenmesine, çevresel sorunlara ve iklim değişikliğine yol açan önemli bir faktör olarak değerlendirmektedir. Öte yandan Doğan (2011), enerjinin yaşamın her aşamasında yer aldığını ve ülkelerin ilerlemesi için önemli bir rol oynadığını belirtmektedir. Bu enerji kaynağı, ilerlemenin devamı için de gereken bir tüketim unsuru olarak kabul edilmektedir (Horwich, 2018). Dolayısıyla nüfusun hızlı büyümesi ve gelişen üretim teknolojileri, dünya genelinde enerji talebinin artışına yol açmaktadır. Enerji kaynaklarının sınırlı olduğu gerçeği, küresel ölçekte karşılaşılması gereken temel meseleler arasında yer almaktadır (Bayraç, vd., 2018; Jho, vd., 2013). Özellikle Çin ve Hindistan'ın artan enerji talebi, gelecekte enerji tüketimini ve fosil yakıtlarla ilişkili çevresel sorunları daha karmaşık hale getirecektir (Yüksel & Kaygusuz, 2011). Bu enerjinin karşılanmasına yönelik yeni enerji kaynakları ön plana çıkmıştır (Ji & Zhang, 2019). Gelişmiş ve gelişmekte olan ülkelerin artan enerji tüketimi sonucunda ortaya çıkan kirlilik ve atıklar, çevre üzerinde olumsuz etkiler yaratmaktadır. Ülkeler, genellikle doğal gaz, kömür ve petrol gibi yenilenemeyen fosil yakıtların yanı sıra rüzgar, güneş, jeotermal ve hidrolik gibi çeşitli yenilenebilir enerji kaynaklarına yönelmektedir (Bayraç, vd., 2018). Fosil yakıtların yol açtığı bu tür sorunların

çözümü için bilim insanları yeni çözüm yöntemleri arayışındadır. Bu bağlamda sürdürülebilir ve çevre dostu enerji kaynaklarına olan ihtiyaç giderek artmaktadır. Yenilenebilir enerji kaynakları, insanlığın bu zorlukları aşmasında umut verici bir çözüm olarak değerlendirilmektedir (Mutlu, 2016). Yenilenebilir enerji kaynakları, kendilerini hızla yenileyebilme yeteneğine sahip olup, bu nedenle sürdürülebilir olarak kabul edilmektedir. Fosil yakıtlar gibi tükenme riski taşımazlar ve sonsuz kaynaklar olarak değerlendirilirler (Acikgöz, 2011; Ataman, 2007; Bayraç, vd., 2018; Kanoğlu, vd., 2023; Mutlu, 2016). Yenilenebilir enerji, doğal çevreden veya yeniden kullanılabilir kaynaklardan elde edilen enerji olarak tanımlanmaktadır (Bayraç, vd., 2018). Twidell (2021), yenilenebilir enerjiyi, doğal çevrede meydana gelen sürekli veya tekrar eden enerji akımlarından elde edilen enerji olarak ifade etmektedir. Verbruggen ve arkadaşları (2010) ise yenilenebilir enerjiyi, doğal olarak kısa bir sürede oluşabilen enerji olarak tanımlamaktadır. Bu tanımlar, yenilenebilir enerjinin çeşitli şekillerde tanımlanabileceğini göstermektedir. Dolayısıyla bir enerji kaynağı tükenmeden veya çevreye olumsuz etki bırakmadan kendini yenileyebiliyorsa, bu kaynak yenilenebilir olarak kabul edilir ve alternatif enerji, sürdürülebilir enerji veya çevre dostu enerji kaynakları olarak adlandırılabilir (Kanoğlu, vd., 2023).

Sürdürülebilirlik terimi, temelde bir denge veya dengelemenin korunarak devamını ve kalıcılığı ifade etmektedir. Sürdürülebilirlik, ekonomik, sosyal, bilimsel, doğal ve beşeri kaynakların dikkatli ve katılımcı bir şekilde kullanımını hedefleyen bir süreç olarak tanımlanmaktadır (Bayraç, vd., 2018). Bu nedenle, bu çalışma kapsamında öğrencilerin enerji farkındalık düzeyini belirlerken "sürdürülebilir enerji" ifadesine yer verilmektedir. Enerji kavramı soyut bir nitelik taşıdığından, küçük yaşlardan itibaren öğrencilere enerji farkındalığı kazandırmak, enerjiyi somutlaştıracak yöntemlerle gerçekleştirilmelidir (Chen, vd., 2014; Lacy, vd., 2021). Bu bağlamda, öğrencilerin yenilenebilir enerji kaynakları hakkında doğru bilgi edinmeleri ve bu konuyu net bir şekilde anlamaları sağlanmalıdır (Mutlu, 2016; Liarakou, vd., 2009). Ayrıca iklim değişikliklerine bağlı olarak ortaya çıkan doğal afetler, yaşam çeşitliliğinin azalması ve enerji kaynaklarının tükenmesinin nedenleri gibi konuları daha iyi kavrayabilmeleri önemlidir (Stone & Barlow, 2009). Bu amaçla, çevre bilincine sahip nesillerin yetiştirilmesi gerekmektedir (Mutlu, 2016; Özdemir, vd., 2019).

Bu alanda yapılan çalışmalar incelendiğinde, Neumann ve arkadaşlarının (2013) gerçekleştirdiği araştırmada 6. 8. ve 10. sınıf düzeyindeki öğrencilere yönelik yenilenebilir enerji kullanımı ele alınmıştır. Türkiye'deki yenilenebilir enerji kaynaklarına ilişkin eğitim ve öğretimi inceleyen ve farklı düzeylerdeki üniversite öğrencileri ile öğretim elemanlarının yer aldığı bir çalışma ise Alkan (2009) tarafından yapılmıştır. Yücel (2007) tarafından yapılan çalışmada, ise öğretmen adaylarına yönelik yenilenebilir enerji kavramlarının öğretilmesini etkileyen değişkenler analiz edilmiştir. Kılınç ve arkadaşlarının (2009) çalışmasında ise 7. ve 8. sınıf düzeyindeki öğrencilerin yenileneilir enerji konusundaki bilgi durumları incelenmiştir. Ayrıca yenilenebilir enerji eğitimi üzerine yapılmış çeşitli diğer çalışmalar da bulunmaktadır (Bhattacharya, 2001; DeWaters & Powers, 2011; Jennings ve Lund, 2001; Kandpal & Broman, 2014; Kandpal & Garg, 1999; Taleghani, vd., 2010).

Yenilenebilir enerji farkındalığını belirlemeye yönelik ölçek kullanımı ile ilgili olarak çeşitli çalışmalar gerçekleştirilmiştir. Üniversite öğrencilerine yönelik bir çalışma Karatepe (2012) tarafından yapılmış, lise öğrencilerine yönelik bir diğer çalışma ise Tortop (2012) tarafından yürütülmüştür. Yenilenebilir enerji tutum düzeylerini belirlemek amacıyla lise düzeyindeki öğrencilere (Çelikler & Aksan, 2016; Keramitsoglou, 2016), ortaokul öğretmenlerine (Liarakou, vd., 2009), fen bilimleri öğretmen adaylarına (Güneş, vd., 2013), ölçek geliştirme çalışmaları gerçekleştirilmiştir. Ayrıca yenilenebilir enerji farkındalığına yönelik kimya öğretmen adaylarına (Morgil vd., 2006), fen bilimleri öğretmen adaylarına (Çelikler, 2013), lisans düzeyindeki üniversite öğrencilerine (Eymur, 2017), Türkiye'nin de yer aldığı çeşitli ülkelerden üniversite öğrencilerine (Özil, vd., 2008) ve öğretmen adaylarına (Mutlu, 2016) ölçek geliştirme çalışmaları yapılmıştır. Ancak ortaokul ve lise düzeyindeki öğrencilerin bulunduğu sürdürülebilir enerji

farkındalığını ölçmeye yönelik alan yazın taranmış ve bu konuda yapılan çalışmaların yetersiz olduğu belirlenmiştir. Bu nedenle, mevcut çalışmanın alan yazına önemli bir katkı sağlaması beklenmektedir. Sürdürülebilir enerji farkındalığı, enerji kaynaklarını etkin ve çevre dostu bir şekilde kullanarak gelecek nesillere sağlıklı bir çevre bırakma amacını taşıyan bir bilinç düzeyidir. Bu farkındalık, enerji tüketim alışkanlıklarını gözden geçirmeyi, enerji tasarruflu teknolojilerinin benimsenmesini ve çevresel etkilerin en aza indirgemeyi hedefler. Bireyler, işletmeler ve toplumlar arasında yaygınlaşan bu bilinç, sadece enerji maliyetlerini azaltmanın ötesinde, doğal kaynakları korunmasına, karbon ayak izinin azaltılmasına ve iklim değişikliği ile mücadeleye olumlu bir katkılarda bulunur. Bu çerçevede, mevcut çalışmada ortaokul ve lise düzeyindeki öğrencilerin sürdürülebilir enerji konusundaki farkındalıklarını ölçmeye yönelik "Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği (SEYFÖ)"nin geliştirilmesi amaçlanmaktadır.

YÖNTEM

Gerçekleştirilen çalışma bir ölçek geliştirme çalışması olarak hazırlanmıştır. Çalışma, Mersin Üniversitesi Sosyal ve Beşeri Bilimler Etik Kurulu tarafından 08.05.2024 tarih ve 144 sayılı kararı ile etik açıdan uygun bulunmuştur. Bu bölümde, çalışma grubu, madde havuzunun oluşturulma süreci, kapsam geçerliliği, denemelik ölçek formun uygulanması, açımlayıcı faktör analizi (AFA) ve doğrulayıcı faktör analizine (DFA) yönelik varsayımların kontrolü ele alınmıştır.

Çalışma Grubu

Mevcut çalışmada, AFA için 439 öğrenci ve DFA için 362 öğrenciden oluşan iki ayrı çalışma grubu oluşturulmuştur. Analizler, her iki grubun verileri üzerinde gerçekleştirilen çalışmaları kapsamaktadır. Bu bölümde, çalışma grubunun seçilme süreci ve özellikleri ayrıntılı olarak sunulmuştur.

Açımlayıcı Faktör Analizine Yönelik Çalışma Grubu

Gerçekleştirilen çalışmada verilerin toplanması için araştırmacılar tarafından oluşturulan ölçme aracı, 2023–2024 Eğitim Öğretim yılında Mersin ilinin merkez ilçesinde yer alan bir ortaokul ve bir lise düzeyindeki iki devlet okulunda uygulanmıştır. Gerekli resmi izinlerin alınmasının ardından, velilerden "Veli Onam Formu"nu doldurmaları istenmiş ve gönüllü olan öğrenciler çalışma grubuna dahil edilmiştir. Ölçek, araştırmacılar tarafından kağıt formda hazırlanarak sınıfta uygulanmış ve AFA için 439 öğrenci çalışmaya katılmıştır.

Tablo 1. Açımlayıcı Faktör Analizine Yönelik Çalışma Grubunun Demografik Özellikleri

		Frekans	Yüzde (%)
Cinsiyet	Kadın	271	50,3
	Erkek	218	49,7
	Toplam	439	100,0
Sınıf düzeyi	Beşinci Sınıf	65	14,8
	Altıncı Sınıf	57	13,0
	Yedinci Sınıf	69	15,7
	Sekizinci Sınıf	55	12,5
	Dokuzuncu Sınıf	55	12,5
	Onuncu Sınıf	30	6,8
	On birinci Sınıf	38	8,7
	On İkinci Sınıf	70	15,9
	Toplam	439	100,0

Tablo 1 incelendiğinde, AFA'ya yönelik çalışmaya katılan öğrencilerin, cinsiyet dağılımının oldukça dengeli olduğu ve katılımcıların %50,3'ünün kadın, %49,7'sinin ise erkek olduğu görülmektedir. Sınıf düzeyleri açısından ise katılımcıların en yüksek oranının beşinci sınıftan (%14,8) ve sekizinci sınıftan (%15,9) olduğu, onuncu sınıfın ise en düşük oranı (%6,8) temsil ettiği anlaşılmaktadır. Genel olarak, katılımcıların çeşitli sınıf düzeylerinden ve cinsiyetlerden temsil edildiği belirlenmiştir.

Madde Havuzunun Oluşturulma Süreci

Alan yazın Taraması: Madde havuzu oluşturma sürecinde sürdürülebilir enerji ile ilişkili alan yazında yer alan ölçekler incelenmiştir. Özellikle kimya öğretmen adaylarına yönelik (Morgil, vd., 2006), fen bilimleri öğretmen adaylarına yönelik (Çelikler, 2013) ve lisans düzeyinde üniversite öğrencilerine yönelik (Eymur, 2017), "Yenilenebilir Enerji Farkındalık Ölçeği" çalışmaları detaylı olarak değerlendirilmiştir. Bu çalışmalar, aday ölçek formunun madde havuzunun oluşturulmasında temel referans olarak kullanılmış ve böylece madde havuzundaki ifadeler, araştırmacılar tarafından sürdürülebilir enerjiye yönelik farkındalığı ölçen cümlelere dönüştürülmüştür.

Meslek Deneyimi ve Odak Grup Görüşmeleri: Birinci araştırmacının fen bilimleri öğretmeni olarak 15 yıllık meslek deneyimi ve bu alandaki uzmanlığı, madde havuzunun oluşturulmasında önemli bir kaynak olmuştur. Ayrıca madde havuzunun geliştirilmesine katkı sağlamak amacıyla, öğrencilerle 10'ar kişilik gruplar halinde dört odak grup görüşmesi gerçekleştirilmiştir. Bu görüşmeler, madde havuzunun içeriğinin şekillendirilmesine destek sağlamıştır.

Kapsam Geçerliliği

Uzman Görüşü: Resmi izinlerin alınmasının ardından, ölçme ve değerlendirme alanında 2 öğretim üyesi ile Türkçe (1) ve fen bilimleri (5) alanlarında toplam altı uzman öğretmenle Davis tekniği kullanılarak dijital ortamda değerlendirme yapılmıştır. Uzmanlara, her madde için iki ana soru yöneltilmiştir: "Madde ölçülecek özelliği temsil edebiliyor mu?" ve "Madde hedef kitle tarafından kolayca anlaşılabilir mi?". Uzmanlar bu sorulara "Madde uygun değil (1)", "Madde ciddi olarak gözden geçirilmeli (2)", "Madde hafifçe gözden geçirilmeli (3)" ve "Uygun (4)" seçeneklerinden uygun olanı "X" sembolü ile işaretlemeleri istenmiştir. Ayrıca her madde için gerekirse düzeltme önerileri alınmış ve uzmanların ölçeğe yönelik genel öneri, düzeltme ve değerlendirmeleri talep edilmiştir. Uzman görüşü sonrasında, 71 maddeden oluşan taslak ölçek maddelerinden öğrenci seviyesine uygun olmayan 7 madde ve benzer içerikli 5 madde çıkarılmıştır. Kapsam geçerlilik oranı 0,85'in altında kalan 20 madde çıkarılmış, 6 madde ise gerekli düzenlemeler yapılarak ölçek içerisinde kalmıştır. Sonuç olarak, belirtilen görüşler doğrultusunda kapsam geçerlilik indeksi (KGİ) 0,95 olarak bulunmuştur. Bu niteliksel adımlar, alan yazın taraması, meslek deneyimi, odak grup görüşmeleri ve uzman görüşünü içeren süreçlerle 39 maddeden oluşan nihai ölçek formu oluşturulmuştur.

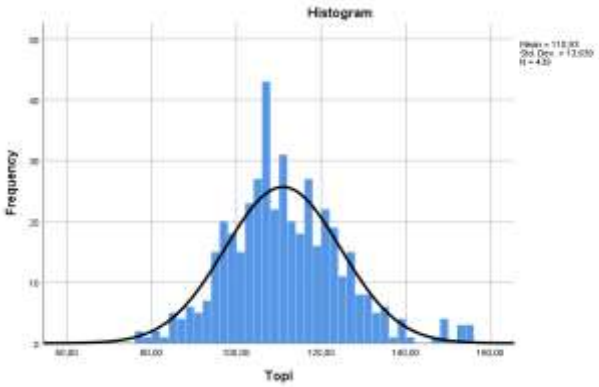
Denemelik Ölçek Formun Uygulanması

Uzman değerlendirmeleri sonucunda kapsam geçerliliği yapılmış ve ölçek üzerinde gerekli düzenlemeler gerçekleştirilerek 39 maddelik dört dereceli ("Her Zaman", "Genellikle", "Ara Sıra", "Hiçbir Zaman") denemelik ölçek formu oluşturulmuştur. Bu form, ortaokul (246) ve lise (193) düzeyinde toplam 439 öğrenciye uygulanmıştır.

Açımlayıcı Faktör Analizine Yönelik Varsayımların Kontrolü

Örneklem Büyüklüğü: Gerçekleştirilen çalışmada, 39 maddeden oluşan AFA'ya yönelik örneklem büyüklüğü 439 katılımcıdan oluşmaktadır. Tabachnick ve Fidel (2013)'e göre örneklem büyüklüğünün minimum 300 olması gerektiği, Child (2006)'a göre madde sayısının 4 ya da 5 katı, Pallant (2016) ve Nunnally (1978)'e göre ise madde sayısının 10 katı kadar katılımcıya ihtiyaç duyulduğu göz önünde bulundurulduğunda, bu örneklem büyüklüğünün yeterli olduğu değerlendirilmektedir.

Kayıp Veri: Analiz öncesinde, ölçek verilerinde kayıp veri olup olmadığını tespit etmek amacıyla geçerli veri sayısı (439), kayıp veri sayısı (0), maksimum (4) ve minumum (1) değerleri incelenmiştir. Sonuçlar, kayıp veri bulunmadığını göstermiştir.
Aykırı Değerler: Tekli aykırı değerleri belirlemek için maddelerin z değerleri, Cook's Uzaklık değerleri, Mahalonobis Uzaklıkları ve Centered Leverage değerleri incelenmiştir. Z değerleri – 2,213 ile + 2,847 arasında değişmekte olup, bu aralıkta herhangi bir tekli aykırı değer olmadığı tespit edilmiştir. Cook's Uzaklık değeri maksimum 0,092 olarak hesaplanmıştır; maksimum değer 1'in altında olduğu için aykırı değer bulunmamıştır. Mahalonobis Uzaklıkları büyükten küçüğe sıralandığında ($X^2_{39}; 0{,}001 = 103{,}129$) herhangi bir aykırılık tespit edilmemiştir. Centered Leverage değeri 2(1+k)/n formülü kullanılarak (k = 39, n = 439) hesaplandığında 0,182 olarak bulunmuş ve bu değer aykırı olmadığını göstermektedir (Seçer, 2015; Tabachnick & Fidell, 2013).
Çoklu Bağlantı Problemi: Çoklu bağlantı problemini tespit etmek amacıyla Varyans Artış Faktörü (Variance Inflation Facor, VIF), Tolerans değerleri (Collinearity Tolerance) ve Durum İndeksi (Condition Index) incelenmiştir. VIF değerleri, sınıf düzeyi ve cinsiyet için 1,001 olarak hesaplanmış, tolerans değerleri ise her iki değişken için de 0,999 bulunmuştur. Tolerans değerlerinin 0,20'den büyük olması ve VIF değerlerinin 5'ten küçük olması gerektiği literatürde belirtilmiştir (Belsley, 1991; Seçer, 2015; Tabachnick & Fidell, 2013). Ayrıca Durum İndeksi (Condition Index) 5,58 ve 10,04 olarak tespit edilmiştir. Bu bulgulara dayanarak, çoklu bağlantı problemi olmadığı sonucuna varılmıştır
Normallik: Normallik testi kapsamında, tek değişkenlerin istatistik analizlerinden merkezi eğilim ölçüleri olan ortanca (medyan), tepe değer (mod) ve ortalama değerleri incelenmiş; ayrıca çarpıklık (skewness) ve basıklık (kurtosis) değerleri ile dağılım grafiği (histogram) değerlendirilmiştir. 39 maddelik aday ölçek formunda merkezi eğilim ölçüleri olan ortanca (110.000), tepe değer (106.00) ve ortalama (110.934) değerlerinin büyük ölçüde birbirine yakın olduğu görülmüştür. Bu durum, ölçeğin tek değişkenli normal dağılım özelliği taşıdığının bir göstergesidir (Büyüköztürk, vd., 2020; Can, 2023). Ayrıca her bir maddenin çarpıklık ve basıklık değerleri incelendiğinde, çarpıklık değerlerinin – 1,099 ile + 0,153 arasında, basıklık değerlerinin ise – 1,344 ile + 1,984 arasında değiştiği görülmüştür. Ölçeğin toplam çarpıklık değeri 0,461 ve basıklık değeri 0,692 olarak hesaplanmıştır. Şencan (2005), çarpıklık ve basıklık değerlerinin her ikisinin de – 1 ile + 1 arasında olmasını normallik için yeterli olduğunu ifade etmektedir. Son olarak, dağılım grafiği incelenmiş ve çan eğrisinin simetrik bir yapıya sahip olduğu gözlemlenmiştir (Şekil 1). Çan eğrisinin bu simetrik yapısı, normallik varsayımını desteklemektedir (Can, 2023). Bu bulgular sonucunda, aday ölçek formunun normal dağılıma sahip olduğu söylenebilir.



Şekil 1. Veri Grubunun Dağılım Grafiği

R'nin Faktörlenebilirliği: Faktör analizi uygulanabilirliğini değerlendirmek amacıyla, 439 gözlem üzerinden Kaise-Meyer-Olkin (KMO) Örneklem Yeterliliği Ölçümü ve Barlett'in Küresellik Testi (Barlett's Test of Sphericity) gerçekleştirilmiştir. KMO değeri 0,89 olarak hesaplanmış olup, her bir madde için bulunan en düşük KMO değeri 0,88'dir. KMO değerinin 0 olması veri setinin faktör analizine uygun olmadığını gösterirken (Field, 2005), 0,50 üzerindeki değerler kabul edilebilir olarak değerlendirilir (Kaiser, 1974). 0,80 ile 0,90 arasındaki değerler ise "çok iyi" olarak kabul edilmektedir (Alpar, 2022; Hutcheson & Sofroniou, 1999). Bu bulgular, AFA için örneklemin yeterli olduğunu göstermektedir. Ayrıca Barlett Testi sonucunda $X^2(741)=5374{,}033$,

p<0,05 değeri elde edilmiştir. Bu sonuç, maddeler arasındaki korelasyonların yeterince büyük ve anlamlı olduğunu göstermektedir (Field, 2005).

Doğrusallık: Veri setinde bulunan değişkenlerin dağılım grafikleri incelenmiş ve değişkenler arasında doğrusal bir ilişkinin olduğu tespit edilmiştir. Doğrusallığı kontrol etmek amacıyla veri setindeki bazı değişkenler üzerinde incelemeler yapılmış ve bu durum doğrulanmıştır (Pallant, 2016).

Faktör Analizleri: Uygulanan ölçek formundan elde edilen veriler, gerekli varsayımlar doğrultusunda incelenmiştir. AFA öncesinde veriler; kayıp veri durumu, örneklem büyüklüğü, aykırı değerler, doğrusallık, normallik, çoklu bağlantı problemi ve R'nin faktörlenebilirliği gibi varsayımlar açısından değerlendirilerek, faktör analizine uygun hale getirilmiştir.

Ölçeğin yapı geçerliğini belirlemek ve faktör yapısını ortaya çıkarmak amacıyla AFA uygulanmıştır. Bu analiz, ölçme aracının hangi yapıyı ölçtüğünü keşfetmeye yönelik bir süreçtir (Field, 2009). Analizde temel bileşenler (principal components) yöntemi ve doğrudan eğik döndürme (direct oblimin) teknikleri kullanılmıştır.

Doğrulayıcı Faktör Analizine Yönelik Çalışma Grubu

Mevcut çalışmada veriler, 2023-2024 Eğitim Öğretim yılı içerisinde Mersin ilinin merkez ilçesinde bulunan bir ortaokul ve bir lise olmak üzere iki devlet okulundan toplanmıştır. Verilerin toplanmasında, araştırmacılar tarafından geliştirilen ölçme aracı kullanılmıştır. Gerekli resmi izinler alındıktan sonra, velilere "Veli Onam Formu" doldurtulmuş ve gönüllü olan öğrenciler çalışma grubuna dahil edilmiştir. Hazırlanan ölçek formu, araştırmacı tarafından kağıt formda hazırlanarak sınıflarda uygulanmış olup, doğrulayıcı faktör analizine yönelik olarak 362 gönüllü öğrenci çalışmaya katılmıştır (Tablo 2).

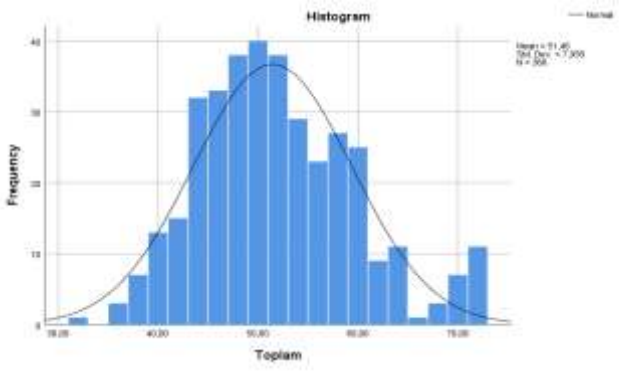
Tablo 2. Doğrulayıcı Faktör Analizine Yönelik Çalışma Grubunun Demografik Özellikleri

		Frekans	Yüzde (%)
Cinsiyet	Kadın	211	58,3
	Erkek	151	41,7
	Toplam	362	100,0
Sınıf düzeyi	Beşinci Sınıf	56	15,5
	Altıncı Sınıf	31	8,6
	Yedinci Sınıf	31	8,6
	Sekizinci Sınıf	48	13,3
	Dokuzuncu Sınıf	70	19,3
	Onuncu Sınıf	45	12,4
	On birinci Sınıf	36	9,9
	On İkinci Sınıf	45	12,4
	Toplam	362	100,0

Tablo 2 incelendiğinde, DFA'ya yönelik çalışmaya katılan örneklem grubunun cinsiyet dağılımında kadınların %58,3, erkeklerin ise %41,7 oranında yer aldığı görülmektedir. Sınıf düzeylerine göre dağılımda ise beşinci sınıf öğrencileri %15,5, altıncı ve yedinci sınıf öğrencileri %8,6 oranında, sekizinci sınıf öğrencileri %13,3 oranında, dokuzuncu sınıf öğrencileri %19,3 oranında, onuncu ve on ikinci sınıf öğrencileri %12,4 oranında, ve on birinci sınıf öğrencileri %9,9 oranında temsil edilmektedir. Bu dağılım, örneklem grubunun çeşitli sınıf seviyelerini kapsadığını ve cinsiyet dengesinin sağlandığını göstermektedir.

Doğrulayıcı Faktör Analizine Yönelik Varsayımların Kontrolü

Örneklem Büyüklüğü: Gerçekleştirilen çalışmada, 17 maddeden oluşan doğrulayıcı faktör analizine katılan örneklem büyüklüğü 362 kişidir. Tabachnick ve Fidel (2013) tarafından önerilen minimum örneklem büyüklüğünün 300 kişi olduğu, Child (2006) tarafından belirtilen madde sayısının 4 veya 5 katı olması gerektiği ve Pallant (2016) ile Nunally (1978) tarafından belirtilen madde sayısının 10 katı olması gerektiği dikkate alındığında, mevcut örneklem büyüklüğünün yeterli olduğu değerlendirilmektedir.
Kayıp Veri: Analiz öncesinde, ölçek verilerindeki kayıp verileri belirlemek amacıyla geçerli veri sayısı (362) ve kayıp veri sayısı (0) incelenmiş, ayrıca minimum (1) ve maksimum (4) değerler gözden geçirilmiştir. Elde edilen sonuçlar, veri kaybının olmadığını ortaya koymuştur.
Aykırı Değerler: Tekli aykırı değerleri belirlemek amacıyla maddelerin Z değerleri, Cook's Uzaklık değeri, Mahalonobis Uzaklıkları ve Centered Leverage değeri incelenmiştir. Z değerleri en düşük –2,213 ve en yüksek +2,847 arasında olup, diğer maddeler de bu aralıkta kalmaktadır. Bu durum, veri setinde tekli aykırı değerlerin olmadığını göstermektedir. Ayrıca Cook's Uzaklık değeri maksimum 0,092 olarak hesaplanmış olup, bu değerin 1'in altında kalması aykırı değer bulunmadığını desteklemektedir. Mahalonobis Uzaklıkları büyükten küçüğe sıralandığında ($X^2_{17}; 0{,}001 = 1{,}995$), herhangi bir aykırı değer tespit edilmemiştir. Son olarak Centered Leverage değeri, 2(1+k)/n formülü kullanılarak (k = 17, n = 362) 0,099 olarak hesaplanmıştır. Bu sonuçlar, veri setinde istatistiksel olarak anlamlı bir aykırı değerin bulunmadığını ortaya koymaktadır.
Çoklu Bağlantı Problemi: Çoklu bağlantı problemini değerlendirmek amacıyla Varyans Artış Faktörü (VIF), Tolerans değerleri (Collinearity Tolerance) ve Durum İndeksi (Condition Index) incelenmiştir. VIF değeri, sınıf düzeyi ve cinsiyet değişkenleri için 1,008 olarak hesaplanmıştır. Tolerans değerleri ise her iki değişken için 0,992 olarak bulunmuştur. Literatürde, tolerans değerlerinin 0,20'nin üzerinde ve VIF değerlerinin 5'in altında olması gerektiği belirtilmektedir (Belsley, 1991). Ayrıca, Durum İndeksi değerleri sırasıyla 5,45 ve 10,66 olarak hesaplanmıştır. Bu bulgular, veri setinde çoklu bağlantı problemine işaret eden bir durumun olmadığını göstermektedir.
Normallik: Normallik testi kapsamında tek değişkenli istatistiksel analizlerde merkezi eğilim ölçüleri olan ortanca (medyan), tepe değeri (mod) ve ortalama değerler ile çarpıklık (skewness) ve basıklık (kurtosis) değerleri ve dağılım grafiği (histogram) incelenmiştir. 17 maddelik ölçek formunda ortanca (51.00), tepe değer (47.00) ve ortalama (51.60) değerlerinin genellikle birbirine yakın olduğu gözlemlenmiştir. Bu durum, ölçeğin tek değişkenli normal dağılım özelliğini sağladığını göstermektedir (Büyüköztürk, vd., 2020; Can, 2023). Ayrıca her bir maddenin çarpıklık ve basıklık değerleri incelenmiştir. Çarpıklık değerleri –2.016 ile +1.094 arasında, basıklık değerleri ise –1.329 ile +3.870 arasında değişmektedir. Toplam maddenin çarpıklık değeri 0.582 ve basıklık değeri 0.085 olarak hesaplanmıştır. Şencan (2005) normallik için çarpıklık ve basıklık değerlerinin her ikisinin de –1 ile +1 arasında olmasının yeterli olduğunu belirtmektedir. Son olarak, dağılım grafiği incelendiğinde, çan eğrisinin simetrik bir görünüm sergilemesi normallik varsayımını desteklemektedir (Can, 2023). Bu bulgulara dayanarak, mevcut ölçek formunun normal dağılım gösterdiği sonucuna ulaşılmıştır.



Şekil 2. Veri Grubunun Dağılım Grafiği

R'nin Faktörlenebilirliği: 362 gözlemden oluşan veri setinin faktör analizi uygulanabilirliğini değerlendirmek amacıyla Kaiser-Meyer-Olkin (KMO) Örneklem Yeterliliği Ölçümü ve Bartlett'in Küresellik Testi (Bartlett's Test of Sphericity) yapılmıştır. KMO değeri 0,83 olarak hesaplanmış olup, her bir madde için hesaplanan KMO değerleri en düşük 0,88'dir. Alpar (2022) ile Hutcheson

ve Sofroniou (1999), KMO değerinin 0,80'in üzerinde olmasını "çok iyi" olarak tanımlamaktadır. Bu bulgular, veri setinin AFA için yeterli olduğunu göstermektedir. Ayrıca Bartlett'in Küresellik Testi sonucunda $X^2(136)=2103.652$ $p<0.05$ olarak bulunmuştur. Bu sonuç, maddeler arasındaki korelasyonların anlamlı ve yeterince büyük olduğunu dolayısıyla faktör analizi için uygun bir yapı oluşturduğunu göstermektedir (Field, 2005).

Doğrusallık: Veri setindeki değişkenlerin dağılım grafikleri incelenmiş ve doğrusal ilişkilerin mevcut olduğu gözlemlenmiştir. Doğrusallığın teyidi amacıyla, veri setindeki bazı değişkenler seçilerek daha ayrıntılı doğrusallık kontrolleri yapılarak bu durum doğrulanmıştır (Pallant, 2016). Bu bulgular,veri setinde doğrusal ilişkilerin varlığını desteklemektedir.

Faktör Analizleri: Uygulanan ölçek formundan elde edilen veriler için gerekli varsayımlar değerlendirilmiştir. DFA öncesinde veriler; kayıp veri, örneklem büyüklüğü, aykırı değerler, doğrusallık, normallik, çoklu bağlantı sorunu ve R matrisinin faktörlenebilirliği açısından incelenmiş ve faktör analizi için uygun hale getirilmiştir. Bu değerlendirmeler, verilerin DFA için uygun olduğunu ve analizlerin güvenilir sonuçlar vereceğini desteklemektedir.

Ölçeğin yapı geçerliğini belirlemek ve faktör yapısını ortaya çıkarmak amacıyla DFA gerçekleştirilmiştir. Tek faktörlü yapı oluşma ihtimaline karşı döndürme işlemi uygulanmadan önce analiz yapılmıştır. Analiz sonucunda çok faktörlü bir yapı ortaya çıktığından, döndüme işleminin yapılmasına karar verilmiştir. Bu bağlamda, Direct oblimin döndürme yöntemi en sık kullanılan yöntemlerden biridir (Pallant, 2016). Bu nedenle mevcut analizde, temel bileşenler (principal components) ve doğrudan eğik döndürme (direct oblimin) yöntemleri kullanılmıştır. Döndürme işlemleri sırasında, maddelerin bir faktördeki yüklerinde artış olurken diğer faktörlerdeki yüklerinde azalma gözlemlenmiştir. Bu süreç, faktör çözümlemesini yaparak faktör durumlarının yorumlanmasını kolaylaştırmaktadır (Büyüköztürk, 2018).

BULGULAR

Açımlayıcı Faktör Analizi İle Elde Edilen Geçerlik ve Güvenirlik Bulguları

Horn'un Paralel Analiz Yöntemi

Paralel analiz, faktör sayısını belirlemek amacıyla rastgele veri oluşturulmasına dayanan bir tekniktir. Bu yöntem, Monte Carlo simülasyonu kullanılarak gerçek veri setine paralel bir yapıda rastgele veri üretir ve bu veriler için beklenen özdeğerler hesaplanır. Gerçek veri setinde elde edilen özdeğerler ile rastgele üretilen verilerin özdeğerleri karşılaştırılır. Rastgele veri setindeki özdeğerin, gerçek veri setindeki özdeğerden büyük olduğu noktada, bu durum önemli bir faktör sayısı olarak kabul edilir (Ledesma & Mora, 2007). Paralel analiz (Horn, 1965), evrene ait korelasyon matrisine dayanarak özdeğeri 1'in üzerinde olan faktörleri önemli olarak belirleyen Kaiser tarafından geliştirilen (K1) yönteminin, örnekleme uyarlanmış bir versiyonudur. Horn (1965), faktör sayısını belirlemek için kullanılan 1'den büyük özdeğer yönteminde, örneklem matrislerine yansıyan hata paylarının dikkate alınması gerektiğini savunmuştur. Çünkü bu yöntem, özellikle küçük örneklemlerde, örneklem hatalarının korelasyon matrisine eklendiği durumlarda gereğinden fazla faktör belirlenmesine neden olabilir. Bu nedenle, rastgele üretilen korelasyon matrislerinin gerçek veri setine ait matrislerle karşılaştırılması önerilmektedir. Rastgele seçilen veri setlerinden elde edilen korelasyon matrislerinin ortalama özdeğerleri, bu örneklem hatasının etkilerini yansıtmakta ve bu hataları içermektedir (Weng & Cheng, 2005).

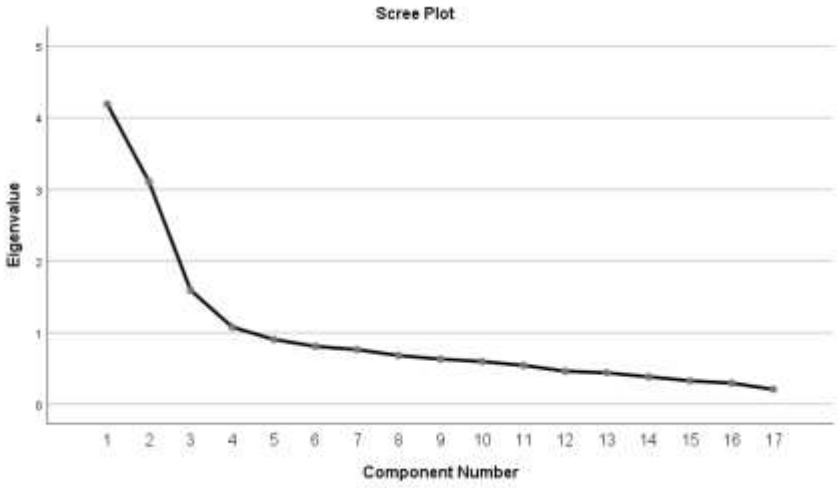
Horn (1965), evrendeki p sayıda değişkene ait bir korelasyon matrisinin özdeğerlerinin 1 olabileceğini, ancak örneklem düzeyinde, ilk özdeğerlerin 1'e yakınken, sonraki özdeğerlerin örneklem hataları nedeniyle 1'in altına düşeceğini belirtmiştir. Buna göre, gerçek veriyle paralel olarak üretilen matriste daha yüksek özdeğer veren faktörler veya bileşenler önemli kabul edilir (Zwick & Velicer, 1986). Eğer normal dağılım gösteren bir evrenden rastgele N büyüklüğünde m adet veri seti çekilirse ve bu m değişkenleri birbiriyle ilişkilidir, mxm korelasyon matrisinin birim matrise yakın olması beklenir (Horn, 1965).

Tablo 3. AFA Değerlendirmesinin Ardından Çıkarılan Maddeler

Faktör yükü 0,45 değerinin altında olan maddeler	Benzerlik gösteren maddeler*
Md1, Md4, Md5, Md7, Md8, Md12, Md13, Md14, Md17, Md18, Md21, Md24, Md31, Md35,	Md15, Md19, Md27, Md28, Md30, Md32, Md37, Md38

*İki faktörde de yüksek puanlar alan ve aralarında 0,10 değerinden az fark bulunan maddeler

Tablo 3 incelendiğinde, 39 maddeden oluşan ölçeğin faktör yükü 0,45 değerinin altında olan 14 madde ve benzerlik gösteren 8 madde çıkarılmıştır. Elde edilen veri setinin faktör sayısını belirlemek için yamaç birikinti grafiği (Scree Plot) (Şekil 3) incelenmiştir. Yamaç birikinti grafiği değişkenlere yönelik öz değerlerin çizgi grafiğinden oluşmaktadır (Cattell, 1966). Grafikte yer alan çizgide keskin düşüşler faktör sayısını vermektedir. Bu bağlamda faktör sayısı 4 olarak değerlendirilmiştir.



Şekil 3. Yamaç birikinti grafiği

Doğrulayıcı faktör analizinde maddelere yönelik faktör yükleri için en az 0,45 değeri alınmıştır. Büyüköztürk (2018), faktör yükleri 0,45 değeri ve üzerinde alındığında ilgili yapıyı ölçtüğünü düşünmektedir. Maddelerin bir faktör altında toplanması için ortak bir nedene veya sonuca dayanması gereklidir (DeVellis, 2014). Bu nedenle dört alt faktörlü bir ölçek yapısına ulaşılmıştır. Karar verilen faktörlerin oluşturduğu maddeler ve maddelerin faktör yükleri Tablo 4'te sunulmuştur.

Tablo 4. Maddelerin Faktör Yükleri ve Ortak Faktör Varyansları

Sıra No	Madde No	Madde	Faktörler			
			1	2	3	4
11	Md 25	Sürdürülebilir enerji kaynaklarına yönelik etkinliklerde görev almak isterim.	0,906			
12	Md 26	Sürdürülebilir enerji kaynaklarının kullanımı konusunda verilen eğitimlere katılmak isterim.	0,888			
9	Md 22	Sürdürülebilir enerji kullanımının tanıtımında gönüllü çalışmak isterim.	0,830			
16	Md 39	Gelecekte sürdürülebilir enerji sektöründe kariyer yapmak isterim.	0,676			
13	Md 33	Sürdürülebilir enerji uygulamaları, canlı çeşitliliğinin azalmasına sebep olur.		– 0,848		
14	Md 34	Sürdürülebilir enerji uygulamaları sağlığımıza zarar verir.		– 0,840		
17	Md 29	Sürdürülebilir enerji farkındalığına yönelik reklamlar (kamu spotları) zaman kaybıdır.		– 0,784		
7	Md 16	Sürdürülebilir enerji kaynaklarının kullanımı		– 0,741		

		iklim değişikliği ile mücadelede gereksizdir.		
1	Md 2	Evimizde enerji tasarrufu sağlamak için enerji verimli aydınlatma sistemleri kullanmaya dikkat ederiz.	0,707	
5	Md 10	Enerji tasarrufu sağlayan cihazları öğrenmeye çalışırım.	0,655	
2	Md 3	Benim için, sürdürülebilir enerjinin çevresel etkilerini anlamak ve önemini kavramak çok değerlidir.	0,638	
4	Md 9	Evde geri dönüşümlü malzemeler kullanmaya özen gösteririm.	0,596	
6	Md 11	Sürdürülebilir enerji uygulamaları geri dönüşümü teşvik eder.	0,546	
3	Md 6	Enerji tasarrufu cihazlarını kullanarak çevreye daha az zarar veririm.	0,522	
8	Md 20	Ülkemizin gelişmesi için enerji üretimi ve kullanımında sürdürülebilir kaynaklara öncelik vermek gereklidir.		0,792
10	Md 23	Sürdürülebilir enerji kaynaklarının kullanımı iklim değişikliği ile mücadeleye katkı sağlar.		0,776
15	Md 36	Sürdürülebilir enerji kaynakları, havamızın temiz olmasını sağlar.		0,480

Tablo 4 incelendiğinde, Açımlayıcı Faktör Analizi (AFA) sonucunda 17 maddeden oluşan ölçeğin dört faktörlü (boyutlu) bir yapıdan oluştuğu ve bu dört faktörün toplam varyansının % 58,64'ünü açıkladığı belirlenmiştir. Buna göre, ölçeğin geçerli özellik gösterdiği sonucuna ulaşılmıştır. Ayrıca alt faktörlerden birincisi 4 maddeden oluşmakta ve toplam varyansın % 24,65'ini, ikincisi 4 maddeden oluşmakta ve toplam varyansın % 18,28'ini, üçüncüsü 6 maddeden oluşmakta ve toplam varyansın % 9,37'sini ve dördüncüsü 3 maddeden oluşmakta ve toplam varyansın % 6,34'ünü açıklamaktadır. Faktör yükleri en düşük 0,48 ve en yüksek 0,91 olarak tespit edilmiştir. Dolayısıyla 0,40 ve üzeri faktör yükleri ideal olarak kabul edildiği için maddelerin faktörlere önemli katkılar yaptıkları değerlendirilmiştir. İlgili alan yazın incelemesi ve uzman görüşleri sonrasında oluşan yapı "Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği" (SEYFÖ) şeklinde, faktörleri ise birinci faktör, "İlgi", ikinci faktör "Olumsuz Algılar", üçüncü faktör "Enerji Verimliliği" ve dördüncü faktör "Çevresel Önem" olarak adlandırılmıştır.

Tablo 5. Faktör İsimleri Ve Güvenirlik Katsayıları

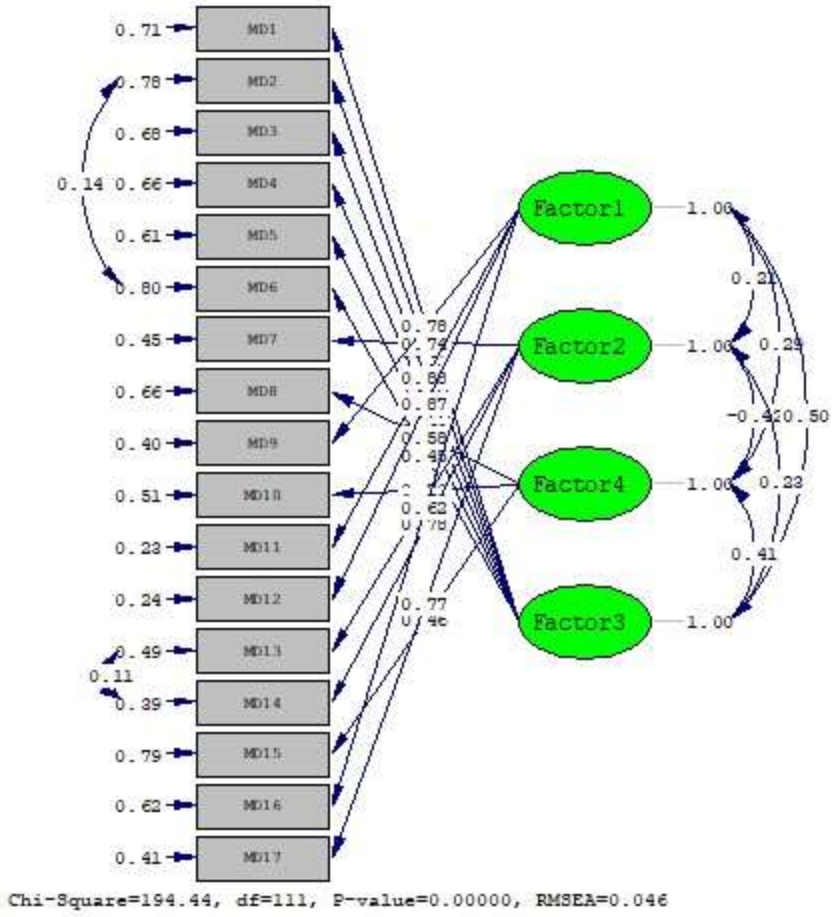
	Faktör Sayısı	Faktör İsimleri	Madde Sayısı	Cronbach Alfa	Tabakalı Alfa
Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği	1	İlgi	4	0,861	0,791
	2	Olumsuz Algılar	4	0,847	
	3	Enerji Verimliliği	6	0,717	
	4	Çevresel Önem	3	0,590	

Tablo 5 incelendiğinde, faktörlerin iç tutarlılığını ölçmek amacıyla Tabakalı Alfa (Stratified Alpha) hesaplanmıştır. Birbirinden nispeten bağımsız alt boyutlara sahip ölçeklerde, toplam Cronbach Alfa değeri yerine, ölçüm aracından elde edilen bileşik puanların güvenilirliğini değerlendirmek için Tabakalı Alfa katsayısının kullanılması önerilmektedir (Cronbach ve ark., 1965). SEYFÖ için yapılan analizlerde, birinci faktör olan "İlgi" faktörü 4 maddeden oluşmakta ve Cronbach Alfa değeri 0,861 olarak hesaplanmıştır. İkinci faktör olan "Olumsuz Algılar" faktörü de 4 madde içermekte olup, Cronbach Alfa değeri 0,847'dir. Üçüncü faktör "Enerji Verimliliği" 6 maddeden

oluşmakta ve Cronbach Alfa değeri 0,717 olarak belirlenmiştir. Dördüncü ve son faktör olan "Çevresel Önem" faktörü ise 3 maddeden oluşmakta ve Cronbach Alfa değeri 0,590'dır. Ölçeğin Tabakalı Alfa değeri ise 0,791 olarak hesaplanmıştır. Bu sonuçlar, ölçeğin genel olarak iyi bir iç tutarlılığa sahip olduğunu göstermektedir.

Doğrulayıcı Faktör Analizi

SEYFÖ'nün yapı geçerliğini tespit etmek ve faktör yapısını test için DFA yapılmıştır. Bu analiz ölçme aracının mevcut yapıyı ölçme durumunu test eder (Field, 2009).



Şekil 4. Doğrulayıcı Faktör Analizi Sonucu Oluşan Faktörler ve Maddeler

Maddeler kare (veya bazı yazılımlarda dikdörtgen) ile gösterilirken, faktörler elips şeklinde ifade etmektedir. Her bir kareye dışarıdan gelen oklar, hata varyansını temsil etmektedir. Maddeler, DFA modelinde gözlenen değişkenlerdir. Faktörler ise gizil değişkenlerdir; bunlar maddelere verilen yanıtları etkileyen ve ölçmeyi hedeflediğimiz psikolojik yapıyı temsil etmektedir. Hatalar, ölçme sonuçlarındaki hata değil, maddenin faktör ile açıklanamayan varyansını göstermektedir (Brown, 2006). X^2/sd (194,44 / 111) oranı 1,75 bulunmuştur.

Tablo 6. Model Uyum İndeksleri

Uyum Ölçüsü	İyi Uyum	Kabul Edilebilir Uyum	DFA Model Değeri	Uyum
[1]X^2/sd	$0 \leq X^2/sd \leq 2$	$2 \leq X^2/sd \leq 3$	1,75	İyi uyum
[2]RMSEA	$0 \leq$ RMSEA<0,05	$0,05 \leq$ RMSEA<0,08	0,04	İyi uyum
[2]RMR	0≤RMR<0,05	0,05≤RMR≤0,10	0,046	İyi uyum
[3]NFI	0,95<NFI ≤ 1,00	0,90≤NFI≤ 0,95	0,94	Kabul edilebilir uyum
[3]NNFI	0,95<NNFI ≤ 1,00	0,90≤NNFI ≤ 0,95	0,97	İyi uyum
[3]CFI	0,95<CFI ≤ 1,00	0,90≤CFI≤ 0,95	0,97	İyi uyum
[3]GFI	0,95<GFI ≤ 1,00	0,80≤GFI≤ 0,95	0,94	Kabul edilebilir uyum

(RMSEA: Root Mean Square Error of Approximation, RMR: Root Mean Square Residual, NFI: Normed Fit Index, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index, GFI: Goodness of Fit Index) [1](Kline, 2015), [2](Browne, & Cudeck, 1993), [3](Baumgartner & Homburg, 1996; Bentler, 1980; Bentler & Bonett, 1980; Marsh, vd., 2006)

Tablo 6'ya göre, DFA modelinin uyum indeksleri genel olarak iyi bir uyum göstermektedir. X^2/sd (1,75), RMSEA (0,04) ve RMR (0,046) değerleri iyi uyum sınırları içinde yer alırken, NFI (0,94) ve GFI (0,94) kabul edilebilir uyum seviyesindedir. NNFI (0,97) ve CFI (0,97) değerleri ise iyi uyum sağlamaktadır. Bu bulgular, modelin genel olarak veri setine uygun olduğunu ve faktör yapısının kabul edilebilir bir uyum sergilediğini göstermektedir.

Model Veri Uyumu

Yakınsak ve Iraksak Geçerlik ile Birleştirici Güvenirlik

SEYFÖ'nün yapı geçerliğinin doğrulanmasının ardından, faktörlere ilişkin ortalama açıklanan varyans (AVE), birleştirici güvenilirlik değerleri (CR), maksimum paylaşılan varyansın karesi (MSV), maksimum paylaşılan varyansın karesinin ortalaması (ASV) veCronbach Alfa (CA) değerleri Tablo 7'de sunulmuştur.

Tablo 7. Geliştirilen Ölçeğin Yakınsak Ve Iraksak Geçerlik İle Birleştirici Ve Crombach Alfa Güvenirlik Değerleri

Faktörler	AVE	CR	MSV	ASV	CA
İlgi	0,69	0,90	0,18	0,05	0,86
Olumsuz Algılar	0,65	0,88	0,06	0,05	0,85
Enerji Verimliliği	0,38	0,78	0,18	0,05	0,72
Çevresel Önem	0,49	0,73	0,16	0,05	0,59
Ölçütler	AVE>0,50, CR>AVE	CR > 0,70	AVE > MSV	MSV > ASV	CA > 0,70

Tablo 7 incelendiğinde, faktörlerin güvenirliği ve geçerliliğini değerlendirmek için çeşitli istatistiksel kriterleri sunmaktadır. Tablodaki sütunlar, her bir faktör için hesaplanan ortalama varyans açıklaması (Average Variance Extracted, AVE), birleştirici güvenirlik (Composite Reliability, CR), maksimum paylaşılan varyans (Maximum Shared Variance, MSV), ortalama paylaşılan varyans (Average Shared Variance, ASV) ve Cronbach Alfa (Cronbach's Alpha, CA) değerlerini göstermektedir. Ayrıca geçerlilik ve güvenirlik açısından kabul edilen sınır değerler belirtilmiştir.

AVE değerlerinin 0,50'den büyük, CR ve CA değerlerinin 0,70'ten büyük, AVE değerlerinin MSV değerlerinden büyük ve MSV değerlerinin ASV değerlerinden büyük olduğu tespit edilmiştir. Ölçeğin toplam birleştirici güvenirlik katsayısı 0, 94 ve Cronbach alfa güvenirlik katsayısı 0,79 olarak hesaplanmıştır. Dolayısıyla ıraksak geçerliliği sağladığı görülmüştür (Yaşlıoğlu, 2017).
AVE (Ortalama Açıklanan Varyans): Bu değer, her faktördeki maddelerin ortak varyansını gösterir. AVE'nin 0,50'den büyük olması, faktörlerin yeterli açıklayıcı güce sahip olduğunu gösterir. Burada, "İlgi" ve "Olumsuz Alglar" faktörlerinin AVE değerleri 0,50'nin üzerinde olduğu görülüyor, bu da her bir faktörün yeterli açıklayıcı güce sahip olduğunu gösterir. "Enerji Verimliliği" faktörünün AVE değerinin 0,50'den düşük çıkmasının nedeni faktör modellemesinde hata varyansının yüksek çıkması olabilir. Eğer ilgili faktörlerde hata varyansı yüksekse, yani model gözlemlenen değişkenlerdeki varyansın büyük bir kısmını açıklayamıyorsa, AVE değeri düşük olabilir. Hata varyansı, açıklanamayan kısmı temsil eder ve AVE hesaplamasını olumsuz etkiler. "Çevresel Önem" faktörünün AVE değerinin 0,50'den düşük çıkmasının nedeni faktörlerin yeterince iyi açıklayıcı değişkenleri içermemesi, bu faktörlerin varyansını yeterince açıklayamamalarına neden olabilir.
CR (Birleştirici Güvenirlik): Faktörün güvenilirliğini değerlendirmek için kullanılan bir ölçüttür. CR>0,70 olması beklenir. Bu sonuç, ölçek maddelerinin birlikte güvenilir bir şekilde ölçtüğünü gösterir. Burada tüm faktörlerde CR > 0,70 sağlanmıştır.
MSV (Maksimum Paylaşılan Varyans): Faktörler arasında paylaşılan en yüksek varyansı gösterir. AVE'nin MSV'den büyük olması gerekir. Ayrıca faktörün kendi maddeleriyle olan ilişkisi, diğer faktörlerle olan ilişkisinden daha büyük olmalıdır. Tabloya göre bu koşul tüm faktörler için sağlanmıştır.
ASV (Ortalama Paylaşılan Varyans): Faktörler arasında ortalama paylaşılan varyanstır. MSV > ASV olması gerekir. Bu kural da tabloya göre sağlanmıştır.
CA (Cronbach Alfa): Faktörün iç tutarlılığını ölçer. CA>0,70 genelde kabul edilen sınırdır. Tabloda İlgi, Olumsuz Algılar, ve Enerji Verimliliği faktörleri bu koşulu sağlarken, Çevresel Önem faktörü 0,59 ile sınırın altında kalmıştır.
Çevresel Önemde CA Değerinin Düşük Çıkması (0,59): Çevresel Önem faktörü 3 maddeden oluşmakta, ve bu maddeler birbirleriyle tutarlı olmayabilir. İç tutarlılığın düşük çıkması, maddeler arasında yeterince güçlü korelasyon olmadığını gösterir. Özellikle, faktördeki madde sayısının az olması (3 madde), CA'nın düşük çıkmasına neden olabilir. İç tutarlılık düşük olduğunda, ölçeğin o faktörde güvenilirlik anlamında zayıf olduğunu işaret eder.

SONUÇLAR

Gerçekleştirilen çalışma, "Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği", ortaokul ve lise düzeyinde bulunan öğrencilerin sürdürülebilir enerjiye yönelik farkındalıklarını belirlemeyi amaçlayan dört faktörden oluşan bir ölçme aracıdır. **Birinci faktör**, "*İlgi*", 9. 12. 13. ve 17. maddelerden oluşmakta olup toplamda dört maddeden meydana gelmektedir. Bu faktör, öğrencilerin sürdürülebilir enerji kaynakları ve uygulamalarına yönelik meraklarını, bu alanda aktif rol alma isteklerini ve gelecekte bu sektörde kariyer yapma hedeflerini ifade etmektedir. Ayrıca sürdürülebilir enerji kullanımının tanıtımında gönüllü olarak çalışma, çevre dostu enerji kaynaklarına ilgi duyma, bu konudaki etkinliklerde görev alma, ilgili eğitimlere katılma ve gelecekte bu alanda profesyonel bir kariyer planlama gibi davranışları içermektedir. **İkinci faktör**, "*Olumsuz Algılar*", 7. 14. 15. ve 18. maddelerden oluşmaktadır ve dört maddeyi kapsamaktadır. Bu faktör, öğrencilerin sürdürülebilir enerji kaynakları ve uygulamaları hakkındaki olumsuz tutumlarını ve yanlış inançlarını yansıtmaktadır. Özellikle sürdürülebilir enerji kullanımının iklim değişikliği ile mücadelede gereksiz olduğu, bu konuda yapılan reklamların zaman kaybı olduğu, sürdürülebilir enerji uygulamalarının canlı çeşitliliğini azalttığı ve sağlığa zarar verdiği gibi yanlış algıları içermektedir. **Üçüncü faktör,** "*Enerji Verimliliği*", 1. 2. 3. 4. 5. ve 6. maddelerden oluşmakta olup toplamda altı madde içermektedir. Bu faktör, öğrencilerin günlük yaşamlarında

enerji verimliliğini artırmaya yönelik bilinçli seçimler yapmalarını ve çevreye duyarlı davranışlar sergilemelerini ifade etmektedir. Ayrıca enerji tasarrufu sağlayan aydınlatma sistemleri ve cihazların kullanımına dikkat etmeyi, geri dönüşümlü malzemelerin kullanımını teşvik etmeyi ve enerji tasarrufuna yönelik bilgi edinme çabasını içermektedir. **Dördüncü faktör,** "*Çevresel Önem*" 8. 10. ve 16. maddelerden oluşmakta ve toplam üç maddeyi kapsamaktadır. Bu faktör, sürdürülebilir enerji kaynaklarının çevreye ve topluma olan olumlu etkilerini anlama ve bu etkilerin farkında olma durumunu ifade etmektedir. Ayrıca sürdürülebilir enerji uygulamalarının geri dönüşümü teşvik etmesi, ülkenin gelişimi için bu kaynaklara öncelik verilmesi gerekliliği, sürdürülebilir enerji kullanımının iklim değişikliğiyle mücadeleye katkı sağlaması ve hava kalitesini iyileştirmesi gibi konuları kapsamaktadır.

Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği, dört dereceli bir ölçektir ve cevap seçenekleri "Her Zaman", "Genellikle", "Ara Sıra" ve "Hiçbir Zaman" olarak belirlenmiştir. Ölçeğin son hali EK'te sunulmuştur. Ölçeğin "Sürdürülebilir Enerjiye Yönelik Olumsuz Algılar ve Yanılgılar" olarak adlandırılan ikinci faktöründeki maddeler (7., 13., 14. ve 17. maddeler) ters puanlanmaktadır. Bu ölçek, dört faktörden oluşmakta olup toplam 17 madde içermektedir. Ölçekten elde edilen puanlar, her bir faktör bazında değerlendirilmektedir. Birinci ve ikinci faktör, 4 ile 16 puan aralığında; üçüncü faktör, 6 ile 24 puan aralığında; dördüncü faktör ise 3 ile 12 puan aralığında değerlere sahiptir. Ölçekten elde edilen puanların yüksek olması, öğrencilerin sürdürülebilir enerjiye olan farkındalıklarının arttığını göstermektedir.

Literatür incelendiğinde, ülkemizde ortaokul ve lise düzeyinde öğrencilerin sürdürülebilir enerji farkındalığını ölçmeye yönelik bir araç bulunmadığı görülmektedir. Bu nedenle, ortaokul ve lise öğrencilerinin sürdürülebilir enerji farkındalığını ölçmek amacıyla geçerli ve güvenilir bir ölçeğin geliştirilmesinin önemli olduğu düşünülmektedir. Sonuç olarak, geliştirilen "Sürdürülebilir Enerjiye Yönelik Farkındalık Ölçeği", ortaokul ve lise düzeyindeki öğrencilerin sürdürülebilir enerji farkındalıklarını değerlendirmek için uygun, geçerli ve güvenilir bir araç olarak değerlendirilmektedir.

KAYNAKÇA

Açıkgöz, C. (2011). Renewable energy education in Turkey. *Renewable Energy, 36*(2), 608–611.

Alkan, M. A. (2009). *Türkiye'deki yenilenebilir enerji kaynaklarının eğitimi ve öğretimi.* (Tez Numarası: 238315) [Yüksek lisans tezi, Afyon Kocatepe Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Alpar, *R*. (*2022*). *Spor, sağlık ve eğitim bilimlerinden örneklerle uygulamalı istatistik ve geçerlik-güvenilirlik.* Detay Yayıncılık.

Ataman, A. R. (2007). *Türkiye'de yenilenebilir enerji kaynakları.* (Tez Numarası: 208041) [Yüksek lisans tezi, Ankara Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.

Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing*, *13*(2), 139-161. https://doi.org/10.1016/0167-8116(95)00038-0

Bayraç, N., Çelikay, F., & Çildir, M. (2018). *Küreselleşme sürecinde sürdürülebilir enerji politikaları*. Ekin Yayınevi.

Belsley, D. A. (1991). *Conditioning diagnostics: Collinearity and weak data in regression*. John Wiley ve Sons.

Bentler, P. M. (1980). Multivariate analysis with latent variables: Causal modeling. *Annual Review of Psychology*, *31*(1), 419-456. https://doi.org/10.1146/annurev.ps.31.020180.002223

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588-606. https://doi.org/10.1037/0033-2909.88.3.588

Bernstein, I. (2000). Some consequences of violating sem's assumption. *Paper Presented at The Annual Meet*

Bhattacharya, S. (2001). Renewable energy education at the university level. *Renewable Energy, 22*(1), 91–97.
Büyüköztürk, Ş. (2018). *Sosyal bilimler için veri analizi el kitabı: İstatistik, araştırma deseni, SPSS uygulamaları ve yorum.* (24. baskı). Pegem Akademi Yayıncılık.
Büyüköztürk, Ş., Çokluk, Ö., & Köklü, N. (2020). *Sosyal bilimler için istatistik* (24. baskı). Pegem Akademi Yayıncılık.
Brown, T.A. (2006). Confirmatory factor analysis for applied research. The Guilford Press.
Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing Structural Equation Models* (pp. 136-162). Sage Publications.
Can, A. (2023). *SPSS ile bilimsel araştırma sürecinde nicel veri analizi.* (11. baskı). Pegem Akademi Yayıncılık.
Cattell, R. B. (1966). The scree plot test for the number of factors. *Multivariate Behavioral Research*, 1, 140-161.
Chen, R. F., Scheff, A., Fields, E., Pelletier, P., & Faux, R. (2014). Mapping energy in the Boston public schools curriculum. In *Teaching and Learning of Energy in K–12 Education* (135-152). Springer International Publishing.
Child, D. (2006). *The essentials of factor analysis*. (3. baskı). Continuum.
Cronbach, L. J., Schönemann, P., & McKie, D. (1965). Alpha coefficients for stratified-parallel tests. *Educational and Psychological Measurement*, *25*(2), 291-312.
Çelikler, D. (2013). Awareness about renewable energy of pre-service science teachers in Turkey. *Renewable Energy,* 60, 343–348.
Çelikler, D., & Aksan, Z. (2016). The development of an attitude scale to assess the attitudes of high school students towards renewable energy sources. *Renewable and Sustainable Energy Reviews*, *54*, 1092–1098.
DeWaters, J. E., & Powers, S. E. (2011). Energy literacy of secondary students in New York State (USA): A measure of knowledge, affect, and behavior. *Energy Policy, 39*(3), 1699–1710.
Doğan, M. (2011). Enerji kullanımının coğrafi çevre üzerindeki etkileri. *Marmara Coğrafya Dergisi*, (23), 36-52. https://dergipark.org.tr/tr/download/article-file/3233
Eymur, G. (2017). Developing energy systems engineering students' perceptions of renewable energy for sustainable future. *Türk Fen Eğitimi Dergisi*, *14*(2), 41-51. https://doi.org/10.12973/tused.10197a
Field, A. (2005) Reliability analysis. In Field, A., Ed., Discovering statistics using SPSS. (2nd ed.). Sage Publishing.
Güneş, T., Alat, K., İbrahim, A., & Gözüm, C. (2013). Fen öğretmeni adaylarına yönelik yenilenebilir enerji kaynakları tutum ölçeği: Geçerlilik ve güvenirlik çalışması. *Eğitim Bilimleri Araştırmaları Dergisi, 3*(2), 269-289.
Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrica, 30*(2), 179-185.
Horwich, G. (2018). E*nergy policy, oil markets, and middle east war: did we learn the lessons of the 1970s?* In *international ıssues in energy policy, development, and economics*. James P. Dorian ve Fereidun Fesharaki (Eds.), Roudledge Publishing.
Hutcheson, G. D., & Sofroniou, N. (1999). *The multivariate social scientist: Introductory statistics using generalized linear models*. Sage Publications.
Jennings, P., & Lund, C. (2001). Renewable energy education for sustainable development. *Renewable Energy, 22*(1), 113–118.
Jho, H., Yoon, H. G., & Kim, M. (2013). The relationship of science knowledge, attitude and decision making on socio-scientific ıssues: The case study of students' debates on a nuclear power plant in Korea. *Science & Education*, 23, 1131-1151.

Ji, Q., & Zhang, D. (2019). How much does financial development contribute to renewable energy growth and upgrading of energy structure in China?. *Energy Policy*, 128, 114-124. http://dx.doi.org/10.1016/j.enpol.2018.12.047
Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31–36. https://doi.org/10.1007/BF02291575
Kandpal, T. C., & Broman, L. (2014). Renewable energy education: A global status review. *Renewable and Sustainable Energy Reviews,* 34, 300–324.
Kandpal, T. C., & Garg, H. P. (1999). Energy education. *Applied Energy*, *64*(1), 71–78.
Kanoğlu, M, Çengel, Y. A., & Cımbala, J. M. (2023). *Yenilenebilir enerji*. Engin. T. (Çev. Ed.), Palme Yayıncılık.
Karatepe, Y., Neşe, S. V., Keçebaş, A., & Yumurtacı, M. (2012). The levels of awareness about the renewable energy sources of university students in Turkey. *Renewable Energy, 44*, 174-179. https://doi.org/10.1016/j.renene.2012.01.099
Keramitsoglou, K. M. (2016). Exploring adolescents' knowledge, perceptions and attitudes towards Renewable Energy Sources: A colour choice approach. *Renewable and Sustainable Energy Reviews, 59,* 1159–1169.
Kılınç, A., Stanisstreet, M., & Boyes, E. (2009). Incentives and disincentives for using renewable energy: Turkish students' ideas. *Renewable and Sustainable Energy Reviews, 13*(5), 1089–1095.
Kline, R. B. (2015). *Principles and Practice of Structural Equation Modeling*. Guilford Publications.
Lacy, S. J., Tobin, R. G., Crissman, S., DeWater, L., Gray, K. E., Haddad, N., Hammerman, J. K. L., & Seeley, L. (2021). Telling the energy story: Design and results of a new curriculum for energy in upper elementary school. Science Education, *106*(1), 27-56. https://doi.org/10.1002/sce.21684
Ledesma, D. R., & Mora, P. V. (2007). Determining the number of factors to retain in EFA: An easy-to-use computer program for carrying out paralel analysis. *Practica Assessment, Research and Evaluation, 12*(2).
Liarakou, G., Gavrilakis, C., & Flouri, E. (2009). Secondary school teachers' knowledge and attitudes towards renewable energy sources, *Journal Of Science Education And Technology*, *18*(2), 120-129.
Marsh, H. W., Hau, K. T., Artelt, C., Baumert, J., & Peschar, J. L. (2006). OECD's brief self-report measure of educational psychology's most useful affective constructs: Cross-cultural, psychometric comparisons across 25 countries. *International Journal of Testing*, *6*(4), 311-360. https://doi.org/10.1207/s15327574ijt0604_1
Morgil, I., Secken, N., Yücel, A. S., Oskay, O. O., Yavuz, S., & Ural, E. (2006). Developing a renewable energy awareness scale for pre-service chemistry teachers. *Turkish Online Journal of Distance Education, 7*(1), 57–67s.
Mutlu, O. (2016). *Fen dersleri (fizik, kimya ve biyoloji) öğretmen adaylarının yenilenebilir enerji farkındalık düzeylerinin incelenmesi.* (Tez Numarası: 429304) [Yüksek lisans tezi, Süleyman Demirel Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi.
Neumann, K., Viering, T., Boone, W. J., & Fischer, H. E. (2013). Towards a learning progression of energy. *Journal of Research in Science Teaching*, *50*(2), 162-188.
Nunnally, J. C. (1978). Psychometric theory. (2nd ed.). McGraw-Hill.
Özbuğutu, E. (2021). 2018 ilköğretim ve ortaöğretim programlarında çevre konusunun yeri. *Ekev Akademi Dergisi*, *25*(86), 249-268.
Özdemir Ö., D., & Öztürk, C. (2019). Birer çevresel vatandaş olarak ilköğretim öğrencileri: 6., 7. ve 8. sınıf öğrencilerinin çevresel sorumlu vatandaş davranışlarının incelenmesi. *Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi,* 20, 363-392.

Özil, E., Uğursal, V. I., Akbulut, U., & Özpınar, A. (2008). Renewable energy and environmental awareness and opinions: A survey of university students in Canada, Romania, and Turkey. *International Journal of Green Energy, 5*(3), 174–188.
Pallant, J. (2016). SPSS Survival manual: A step by step guide to data analysis using IBM SPSS (6th ed.). George Allen & Unwin.
Seçer, İ. (2015). *The process of development and adaptation measurement: applications of SPSS and LISREL*. Anı Yayıncılık.
Stone, M. K., & Barlow, Z. (2009). Smart by natüre: Schooling for sustainability. Watershed Media.
Şencan, H. (2005). *Sosyal ve davranışsal ölçümlerde güvenirlik ve geçerlik.* Seçkin Yayıncılık.
Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics (8th ed.).* Pearson.
Taleghani, M., Ansari, H. R., & Jennings, P. (2010). Renewable energy education for architects: Lessons from developed and developing countries. *International Journal of Sustainable Energy, 29*(2), 105–115.
Tortop, H. S. (2012). Awareness and misconceptions of high school students about renewable energy resources and applications: Turkey case. *Energy Education Science and Technology Part B: Social and Educational Studies, 4*(3), 1829–1840.
Twidell, J. (2021). *Renewable energy resources*. (4th ed.). Routledge. https://doi.org/10.4324/9780429452161
Verbruggen, A., Fischedick, M., Moomaw, W., Weir, T., Nadai, A., Nilsson, L. J., Nyboer, J., & Sathaye, J. (2010). Renewable energy costs, potentials, barriers: Conceptual issues. *Energy Policy*, *38*(2), 850–861. https://doi.org/10.1016/j.enpol.2009.10.036
Weng, L. J. & Cheng, C.P. (2005). Parallel analysis with unidimensional binary data. *Educational and Psychological Measurements, 75*(5), 697-716.
Yaşlıoğlu, M. M. (2017). Sosyal bilimlerde faktör analizi ve geçerlilik. keşfedici ve doğrulayıcı faktör analizlerinin kullanılması. *İstanbul Üniversitesi İşletme Fakültesi Dergisi*, *46*(Özel Sayı), 74-85.
Yücel, A. S. (2007). Factors affecting teaching the concept of renewable energy in technology assisted environments and designing process in the distance education model, *Turkish Online Journal of Distance Education*, *8*(1), 114–124.
Yüksel, I., & Kaygusuz, K. (2011). Renewable energy sources for clean and sustainable energy policies in Turkey. *Renewable and Sustainable Energy Reviews*, *15*(8), 4132-4144. https://doi.org/10.1016/j.rser.2011.07.007
Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99*(3), 432-442.

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SÜRDÜRÜLEBİLİR ENERJİYE YÖNELİK FARKINDALIK ÖLÇEĞİ

Sıra No	Madde	Her Zaman	Genellikle	Ara Sıra	Hiçbir Zaman
1	Evimizde enerji tasarrufu sağlamak için enerji verimli aydınlatma sistemleri kullanmaya dikkat ederiz.	4	3	2	1
2	Benim için, sürdürülebilir enerjinin çevresel etkilerini anlamak ve önemini kavramak çok değerlidir.	4	3	2	1
3	Enerji tasarrufu cihazlarını kullanarak çevreye daha az zarar veririm.	4	3	2	1
4	Evde geri dönüşümlü malzemeler kullanmaya özen gösteririm.	4	3	2	1
5	Enerji tasarrufu sağlayan cihazları öğrenmeye çalışırım.	4	3	2	1
6	Sürdürülebilir enerji uygulamaları geri dönüşümü teşvik eder.	4	3	2	1
7	Sürdürülebilir enerji kaynaklarının kullanımı iklim değişikliği ile mücadelede gereksizdir.	4	3	2	1
8	Ülkemizin gelişmesi için enerji üretimi ve kullanımında sürdürülebilir kaynaklara öncelik vermek gereklidir.	4	3	2	1
9	Sürdürülebilir enerji kullanımının tanıtımında gönüllü çalışmak isterim.	4	3	2	1
10	Sürdürülebilir enerji kaynaklarının kullanımı iklim değişikliği ile mücadeleye katkı sağlar.	4	3	2	1
11	Sürdürülebilir enerji kaynaklarına yönelik etkinliklerde görev almak isterim.	4	3	2	1
12	Sürdürülebilir enerji kaynaklarının kullanımı konusunda verilen eğitimlere katılmak isterim.	4	3	2	1
13	Sürdürülebilir enerji uygulamaları, canlı çeşitliliğinin azalmasına sebep olur.	4	3	2	1
14	Sürdürülebilir enerji uygulamaları sağlığımıza zarar verir.	4	3	2	1
15	Sürdürülebilir enerji kaynakları, havamızın temiz olmasını sağlar.	4	3	2	1
16	Gelecekte sürdürülebilir enerji sektöründe kariyer yapmak isterim.	4	3	2	1
17	Sürdürülebilir enerji farkındalığına yönelik reklamlar (kamu spotları) zaman kaybıdır.	4	3	2	1

7., 13., 14. ve 17. maddeler ters puanlanmaktadır.

THE ROLE OF OWNERSHIP OF WOOD PLANTS AS A DETERMINANT OF ACCEPTABILITY TO THE IDEA OF AGROFORESTRY DEVELOPMENT IN MONOCULTURAL FOOD CROPS AREAS: A STUDY AT NATAR DISTRICT, SOUTH LAMPUNG REGENCY

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ABSTRACT

Agroforestry as an agricultural pattern inherited from Southeast Asian nations is urgent to be pushed for its prolerification into monoculture food farming areas in order to provide a strong hope for sustainability. However, community acceptability is a critical variable in its implementation. Therefore, it is important to conduct this study with the aim of determining the influence of demographic variables, ethnicity, social capital, and woody plant stand ownership on farmers' acceptability of the planned proliferation of agroforestry systems. The research was conducted from May to August 2024 in Natar Sub-district, South Lampung Regency. Binary Logistic Regression Model was applied at 90% accuracy level. The response variable used was acceptability [AGREE] which was scored 1 if it gave an agreeing attitude or 0 if it refused. Demographic variables used included age in years [AGE], ethnicity 0 if migrant, 1 if native), side job (=1 if present and 0 other), education level (SMP dummy, SMA dummy with SD reference), social capital performance (broken down into *norm, trust,* and *network* elements all three of which were scored 1, 2, or 3 as low, medium, high respectively), timber tree crop ownership (teak, acacia, and albisia) and MPTS crop ownership. Scoring these last two types of variable groups used dummy variables with reference to not having these woody plants. Conclusion: AGREE attitude [1] was not influenced by demographic factors (age, education, and ethnicity), [2] was significantly influenced by social capital (especially the norm element with P=0.087), and also by [3] ownership of acacia (P=0.031); albizia (P=0.065), and Pithecollobium lobatum (P=0.094).

Keywords: adoption, agroforestry proliferation, binary logistic regression, wood plants

SERVİKAL VERTEBRA OLGUNLAŞMA AŞAMASI TESPİTİNDE VERİ ARTIRMA YÖNTEMLERİNİN ROLÜ: BİR İNCELEME

THE ROLE OF DATA AUGMENTATION METHODS IN CERVICAL VERTEBRA MATURATION STAGE DETECTION: A REVIEW

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ÖZET

Servikal vertebra maturasyonu (SVM), bireylerin büyüme ve gelişim süreçlerini değerlendirmek için kullanılan bir tekniktir. Bu değerlendirme genellikle servikal vertebraların X-ray görüntüleri aracılığıyla yapılır. SVM yöntemi, bireyin büyüme dönemindeki olgunlaşma durumunu belirleyerek diş hekimliği ve ortodonti uygulamalarında önemli bilgiler sağlar. Belirli kriterlere göre sınıflandırılan SVM evreleri, diş gelişimi, yüz yapısı ve genel ortodontik tedavi planlamasında etkili olabilir. Bu sayede, tedavi süreçleri bireylerin gelişim seviyelerine daha iyi uyumlu hale getirilebilir. Kısacası, SVM, uzmanlar tarafından bireylerin iskelet gelişimini izlemek ve tedavi stratejilerini optimize etmek için kullanılan önemli bir araçtır.

SVM yönteminde büyüme gelişme evreleri, bireylerin kraniyofasiyal iskelet olgunlaşma seviyesini değerlendirmek için altı evrede sınıflandırılmaktadır. Evre-1 büyümenin başlangıcını, vertebraların belirgin olgunlaşma göstermediği durumu ifade etmektedir. Evre-2 ise ilk olgunlaşma belirtilerinin görüldüğü, omurların şeklinin daha belirgin hale geldiği aşama olarak tanımlanmaktadır. Evre-3' e gelindiğinde, orta olgunlaşma aşaması olarak bilinmekte olup, bu evrede omurlar arasında daha fazla kemik oluşumu gözlemlenmektedir. Evre-4 ileri olgunlaşma dönemini temsil etmekte ve bu evrede vertebral kemik yapısında belirgin değişiklikler ortaya çıkmaktadır. Evre-5 olgunlaşmanın en ileri aşaması olup, bu aşamada kemik yapıları belirgin bir olgunluk sergilemektedir. Son olarak, Evre-6 tamamen olgunlaşmış bir durumu ifade etmektedir ve bu evrede iskelet yapısı stabil hale gelmektedir. Görüldüğü üzere belirtilen evreler, ortodontik tedavi planlamasında önemli bilgiler sunmaktadır.

Veri artırma yöntemleri, bir veri setinin boyutunu ve çeşitliliğini artırmak için kullanılan tekniklerdir. Bu yöntemler, özellikle makine öğrenmesi ve derin öğrenme alanlarında, sınırlı veri ile çalışırken modellerin genel performansını iyileştirmek amacıyla uygulanmaktadır. Veri artırma teknikleri, büyüme gelişme evresi tespitinde de oldukça önemlidir. SVM uygulamalarında genellikle sınırlı sayıda röntgen görüntüsüyle çalışıldığı için bu teknikler direkt kullanılan veya sayısal veriye dönüştürülen görüntülerin çeşitliliğini ve sayısını artırarak modelin öğrenme kapasitesini geliştirmektedir. Bu sayede, SVM ile elde edilen tahminlerin doğruluğu ve güvenilirliği önemli ölçüde iyileşebilmektedir. Bu sebeple bu çalışmada, literatürde SVM uygulamalarında kullanılan veri artırma teknikleri üzerinde durulmuş olup, ayrıntılı bir inceleme sunulmaktadır.

Anahtar kelimeler: Servikal Vertebra Maturasyonu, Büyüme Evresi Sınıflama, Veri Artırma Yöntemleri, Makine Öğrenmesi.

ABSTRACT
Cervical vertebrae maturation (CVM) is a technique used to evaluate the growth and development processes of individuals. This evaluation is usually done through X-ray images of the cervical vertebrae. The CVM method provides important information in dentistry and orthodontics by determining the maturation status of the individual during the growth period. In this way, treatment processes can be better adapted to the development levels of individuals.
In the CVM method, growth and development stages are classified into six stages to evaluate the craniofacial skeletal maturation level of individuals. Stage-1 marks the beginning of growth, during which the vertebrae do not show significant maturation. Stage-2 is characterized by the first signs of maturation, with the shape of the vertebrae becoming more distinct. Stage-3 is recognized as the mid-maturation stage, where more bone formation is observed between the vertebrae. Stage-4 signifies the advanced maturation period, during which significant changes occur in the vertebral bone structure. Stage-5 represents the most advanced stage of maturation, with the bone structures exhibiting considerable maturity. Finally, Stage-6 indicates a fully matured state, where the skeletal structure becomes stable. These specified stages provide essential information for orthodontic treatment planning.
Data augmentation methods are techniques used to develop the detection performance of models by increasing the size and diversity of a dataset when working with limited data in machine learning applications. These techniques are also crucial for determining growth and development stages. CVM applications often work with a limited number of X-ray images, so data augmentation increases both the diversity and quantity of images, enhancing the model's learning capacity. Consequently, the accuracy and reliability of predictions made with CVM can be significantly enhanced. This study focuses on the data augmentation techniques utilized in CVM applications found in the literature, presenting a detailed review of their effectiveness.

Keywords: Cervical Vertebrae Maturation, Growth Stage Classification, Data Augmentation Methods, Machine Learning.

INTRODUCTION

Orthodontic studies cover various diagnostic and treatment processes aimed at correcting teeth, jaw structure and facial aesthetics. The field of orthodontics is an important area for proper alignment of teeth, improvement of chewing function and protection of general oral health, and also takes into account aesthetic concerns (Uribe et al., 2014). Orthodontic treatment is typically carried out with braces, appliances, or various corrective devices. These devices help teeth and jaws to come to their correct positions over time. Orthodontic treatment processes are personalized according to the patient's age, dental condition and individual needs. Treatment planning begins with a detailed examination, X-ray images and modeling of teeth. While modern technologies allow the treatment process to be managed more effectively, digital simulations and 3D modeling provide patients with clearer information about the pre-treatment process (Tsichlaki et al., 2016). This encourages more active participation of patients in the treatment process and contributes to improved results.
Cervical vertebra maturation (CVM) stage determination is an important method for determining the developmental levels of individuals' neck vertebrae. This method requires a systematic approach that generally varies depending on age and evaluates the structural maturation characteristics of the vertebrae. Maturation stages start from the neonatal period, extending to childhood, adolescence and finally adulthood. Each stage is characterized by the closure of the growth plates of the vertebrae and changes in the bone structure (McNamara et al., 2018). The most common method for determining these stages is radiographic evaluation. X-ray images allow a clear examination of the structure and maturation status of the spine. Thus, progress is made in terms of both diagnosis and treatment planning (Lucchese et al., 2022). Determination of the CVM

stage is necessary for the evaluation of various factors affecting the spine health of individuals and the development of appropriate treatment and management strategies. In any special case or disease, it would be best to consult a specialist health professional when more information is needed (Ferrillo et al., 2021). The assessment of the CVM stage is also a crucial factor in the orthodontic treatment process. Assessing the CVM level offers insights into the factors influencing the development of teeth and jaws (Gabriel et al., 2009). Therefore, this information creates an effective decision-making mechanism in the orthodontic treatment process and contributes to the optimization of individuals' treatment results.

Data augmentation techniques are used to expand and diversify existing data sets. Especially in areas that work with limited data, the overall output and generalization capability of the model can be increased thanks to data augmentation methods. These methods are widely used especially in areas such as image processing, natural language processing, and medical data analysis (Shorten and Khoshgoftaar, 2019). Data augmentation involves creating different variations of the data, adding noise, or adding artificial examples to the data set. Data augmentation methods are of great importance in orthodontic studies (Liu et al., 2021). Since orthodontics is a branch of correction of teeth and jaw structure, patient data must be analyzed correctly. However, limited patient numbers or missing data situations may be encountered. Thanks to the data augmentation methods used in these cases, various dental structures and orthodontic situations can be simulated. Thus, better modeling and outcome estimates can be provided in clinical decision-making processes. In addition, data augmentation methods in orthodontic studies play an important role in both education and research processes (Cejudo Grano de Oro et al., 2022). Working with more data in clinical applications helps improve treatment results while also providing better solutions for individual patient needs. In this way, the effectiveness and reliability of orthodontic treatment processes are increased (Boswell et al., 2015). Because CVM applications typically utilize a limited set of X-ray images, these methods enhance the model's learning capacity by broadening both the variety and quantity of images used, whether directly or converted to digital data (Bezabh et al., 2024). In this way, the accuracy and reliability of the predictions obtained with CVM can be significantly improved. For this reason, this study focuses on the data augmentation techniques used in CVM applications in recent years in the literature and presents a meaningful review.

METHODOLOGY

The main important point of this study is to offer valuable insights into recent literature on CVM stage detection research that employs data augmentation techniques. For this reason, in this section, first of all, general scientific information is given about CVM and its stages, and then about data augmentation methods.

Cervical Vertebra Maturation (CVM) and Stages

CVM is a way that assesses the development and maturation stages of the cervical vertebrae. This evaluation is crucial for understanding individual growth and development. CVM serves as a significant indicator, particularly in orthodontic treatment planning and orthopedic assessments (Baccetti et al., 2005). Vertebral maturation provides information about the bone maturity of individuals, which helps in determining the timing and strategies of the treatment process. In addition, CVM allows for the prediction of potential problems that individuals may encounter during their growth periods (Cericato et al., 2015). CVM is generally divided into 6 main stages, and these stages are shown in Figure 1.

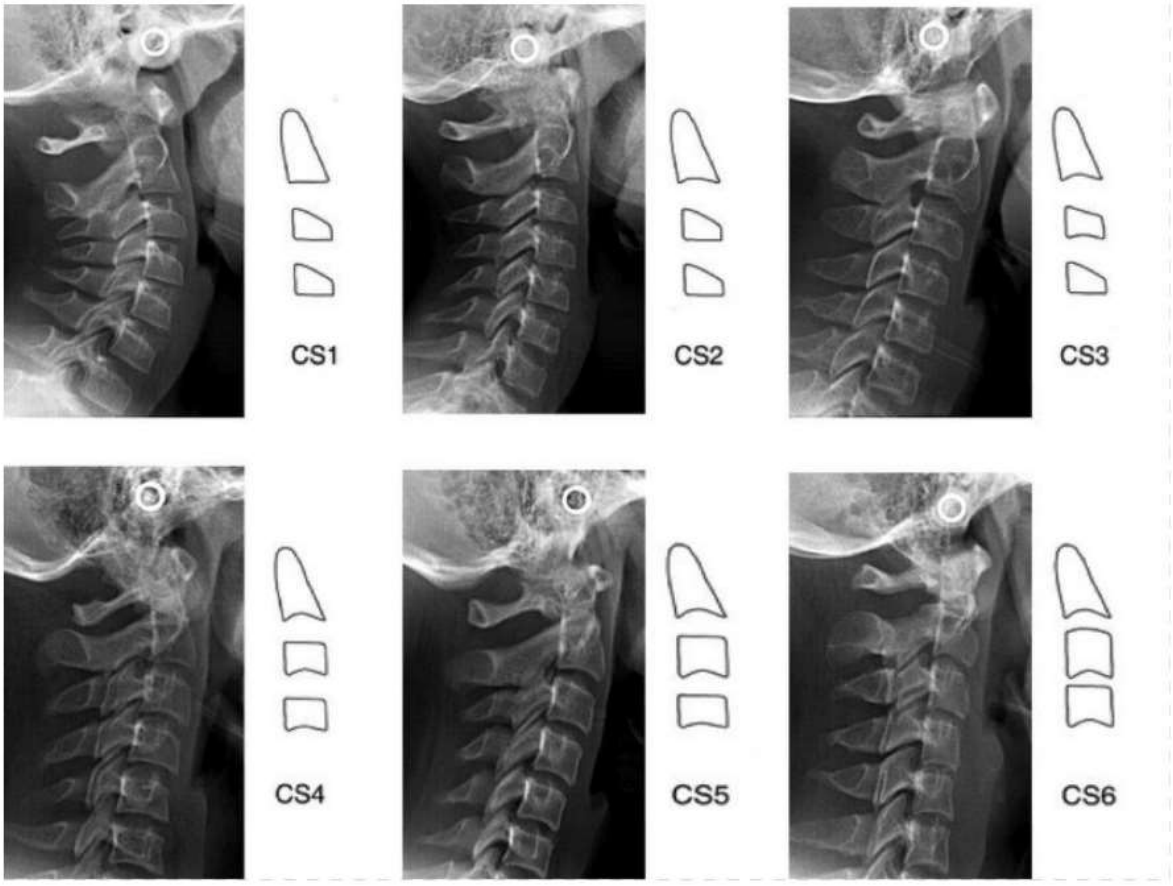


Figure 1. CVM stages (Oflaz and Görgülü, 2017)

These stages, shown in Figure 1, are listed according to the development level of the vertebrae (McNamara et al., 2018):

- *Stage 1 (Neonatal Period-CS1):* At this stage, the cervical vertebra bone structures are still in the developmental stage. The shape and structure of the vertebrae are not fully formed, therefore, the evaluations made at this stage are limited.
- *Stage 2 (Childhood Period-CS2):* At this stage, the growth of the vertebrae commences. The growth plates are still open, and the alterations in the shape and size of the vertebrae become noticeable. Also, the development of the teeth and jaw continues.
- *Stage 3 (Beginning of Puberty-CS3):* At this stage, the maturation process of the cervical vertebrae accelerates. The growth plates help the vertebrae gain a more distinct structure. In this stage, individuals generally experience their fastest physical growth periods.
- *Stage 4 (Mid-Adolescence-CS4):* At this stage, the maturation process of the vertebrae continues. The growth plates begin to close and significant changes are seen in the bone structure. This occurs in the middle of adolescence.
- *Stage 5 (Beginning of Adulthood-CS5):* At this stage, the maturation process of the vertebrae is completed. The growth plates have closed and the shape and size of the vertebrae have stabilized. In adults, cervical vertebrae maturity is fully achieved.
- *Stage 6 (Full Maturity-CS6):* At this final stage, all maturation processes of the cervical vertebrae are completed. At this stage, the individual's neck vertebrae show full development and no growth changes are expected.

Detection of CVM stage is very important in orthodontic treatment processes. Because CVM provides an understanding of the factors affecting the development process of teeth and jaws. Therefore, this information creates an effective decision-making mechanism in the orthodontic treatment process and contributes to the optimization of treatment results of individuals (Baccetti et al., 2005). Determination of CVM is usually done with radiographic evaluations. X-ray images

are used to examine the structure and maturation status of the spine. These images allow the determination of vertebral maturation stages. In addition, physical evaluations can be made with clinical examination and comparisons can be made with maturation standards in certain age groups (Nestman et al., 2011). As a result, accurate evaluation of CVM allows the management of patients' treatment processes in orthodontic treatment planning on a more conscious and scientific basis.

Techniques for Data Augmentation

Techniques for data augmentation employed to enhance the range of small and imbalanced datasets in machine learning, which is arm of artificial intelligence (AI). These methods help mitigate the risk of overfitting and improve the model's capacity to generalize. Although there are various methods for each data group, there are also data augmentation methods that can be used in common. For example, common methods used for image data include rotation, translation, shearing, scaling, and brightness and contrast adjustments. These methods allow the model to recognize images from different angles, lighting conditions, and various shapes (Shorten and Khoshgoftaar, 2019). For text data, there are techniques such as synonym replacement, word deletion, or paraphrasing. While these techniques allow texts to be interpreted in different ways, methods such as time shifting and adding noise for time series data enrich the data to analyze changes over time (Madnani and Dorr, 2010; Iwana and Uchida, 2021). In addition, the use of techniques such as synthetic data augmentation to increase minority class examples allows the model to learn more balanced in imbalanced data sets, while also contributing to the expansion of existing data sets by generating new and diverse examples (Moreno-Barea et al., 2020). These processes enhance the accuracy and reliability of the model, especially when managing limited data in fields like medical imaging or natural language processing. As a result, a meaningful data augmentation process can significantly improve the quality of the results to be obtained in applications, while allowing models to learn more comprehensively and robustly.

Data augmentation methods can significantly enhance model performance, particularly in situations with limited datasets. The methods specified can be employed to improve classification and prediction accuracy when determining the maturation stage of the cervical vertebrae. When the image data for CVM stage determination is obtained from medical images such as X-ray or MRI, data augmentation techniques can help overcome problems such as class imbalance (Chlap et al., 2021). Image-based data augmentation includes operations such as rotating, flipping, or cropping the cervical vertebra images. For example, when an X-ray image is rotated by a certain angle, it helps the model learn more variations by providing views of the vertebrae from different angles. This can enhance the model's generalization ability, particularly by increasing the heterogeneity of the data from patients in various positions. In addition, the robustness of the images to changes in lighting conditions can be increased by adjusting the brightness and contrast in the images. When cervical spine images are taken under different lighting conditions, using data augmentation methods to adapt the model to these conditions can be quite useful. Such techniques can enable the model to work more effectively with data from different imaging devices (Benjelloun and Mahmoudi, 2008). Time series data can be important in monitoring cervical spine development. Applying data augmentation procedures such as time shifting or adding noise to such data allows the model to better understand changes over time. Especially in cases requiring long-term monitoring, such methods increase the model's ability to predict future situations with past data (Kelleher et al., 2008). Finally, in cases where there is an imbalance in the number of data between the classes of the data used in the detection of CVM stages, increasing the minority class examples using techniques such as SMOTE can enable the model to learn in a more balanced way. Thus, more accurate and reliable results can be obtained, and a better decision-making mechanism can be created in medical diagnosis processes (Ishaq et al., 2021).

RESULTS

CVM stage determination is an important diagnostic and therapeutic process in pediatric orthopedics, as vertebral maturation plays a critical role in the evaluation of various orthopedic conditions as well as the growth and development processes of individuals. In this context, having adequate and balanced datasets is crucial for achieving accurate results. However, limited data often poses challenges in applying machine learning and deep learning methods. Data augmentation methods provide an effective solution to overcome these difficulties by enriching existing data sets. Image-based data augmentation techniques increase the generalization capability of the classifier and reduce the risk of overfitting by operations such as rotating cervical vertebra images, changing lighting conditions or adding various noises. At the same time, augmentation methods applied on many data used in studies provide the heterogeneity of the data, allowing the creation of a model that better represents different developmental stages. Therefore, the role of data augmentation methods in the determination of cervical vertebra maturation stage is of critical importance in supporting accurate diagnosis and treatment processes.

When reviewing recent studies in the literature on CVM stage detection and the application of data augmentation methods, several studies stand out. In one of these studies, Atici et al. (2022) applied deep learning techniques for the fully automatic determination of CVM stages. The researchers labeled a total of 1,018 cephalometric radiographs according to CVM phases and used the Aggregate Channel Features (ACF) object detection tool to crop and extract cervical vertebrae. Also MobileNetV2, ResNet101, and Xception were trained alongside a specially tailored deep Convolutional Neural Network (CNN) using directed edge-enhancing filters. To mitigate overfitting due to the limited training dataset, data augmentation methods were employed, including shifting each image right, left, up, and down, as well as rotating them clockwise and counterclockwise. With these methods, a total of 8371 images were generated from the original 761 training images and the class density distribution was preserved. The proposed model achieved the highest success in classifying the CVM stages into five classes with an accuracy rate of 84.63%, while the accuracies of the other models were 78.54%, 74.10% and 80.86%, respectively. The use of directed filters contributed to the increase in performance; when the filters were not used, the accuracy of the proposed CNN model dropped to 80.75%. In another study (2023), the same researchers developed a deep learning-based model for the supervised self-acting determination of CVM stages. In this research, 1018 cephalometric radiographs were annotated based on CVM phases and categorized by gender to help the model learn gender-specific features more effectively. The images were cropped using an object detection tool to automatically extract the cervical vertebrae. The proposed AggregateNet model was trained with directed edge-enhancing filters, and age data was incorporated into the image feature vector. Data augmentation methods, incorporating random translation, rotation, and automatic contrast adjustments, were employed to reduce the hazard of overfitting. The outputs demonstrated that AggregateNet outperformed other deep learning models, achieving 82.35% accuracy for women and 75.00% for men. In a separate study, Li et al. (2022) developed a fully automatic CVM classification method based on CNN, aiming to provide a valuable diagnostic tool for orthodontists. The study utilized cephalometric images of patients aged 5 to 18, creating a dataset grouped into six cervical stages (CS) by orthodontists. This dataset was seperated into 70% for training, 15% for validation, and 15% for testing. Four different CNN architectures—VGG16, GoogLeNet, DenseNet161, and ResNet152—were chosen as candidates for CVM analysis. To prevent overfitting, data augmentation methods such as random rotation (by a quarter of the image width), 15° clockwise and counterclockwise rotation, and adaptive histogram equalization techniques were applied. During each training cycle, 50% of the training dataset was randomly selected and augmented. The results indicated that the best-performing model on the test set was ResNet152, which achieved a mean AUC of 0.933 and an overall performance rate of 67.06%. The F1 score ranking was determined as CS6 > CS1 > CS4 > CS5 > CS3 > CS2, with the third (C3) and fourth (C4)

cervical vertebrae showing significant activation during the CNN's evaluation of the images. In another study, Kim et al. (2021) recommended deep learning models to forecest the CVM stage from lateral cephalograms. This research developed a step-by-step model for segmentation focused on the C2, C3, and C4 phases. Three types of CNN-based detection models were presented: a single-step model for CVM determination, a two-step model for region detection and CVM detection, and the thirth one that included region identification, cervical segmentation, and CVM determination. Also, 600 lateral cephalogram images divided into six stages, with the thirth model achieving the highest performance rate at 62.5%. Data augmentation methods employed included rotation, horizontal and vertical flipping, along with modifications to brightness, contrast, saturation, and hue. In another study, Makaremi et al. (2019) emphasized the efficacy of deep learning and AI tools in assessing the degree of CVM in orthodontics, emphasizing its importance for determining treatment timing using lateral X-ray radiographs. The researchers developed a CNN method to classify CVM into six stages, demonstrating its performance across various training, evaluation, and test images along with different preprocessing techniques. The model underwent cross-validation and is nearly ready for orthodontic application. The study also noted the impact of advancements such as graphic processing units (GPUs), data augmentation, corrected linear units, and deep network architectures that revolutionized the ImageNet competition in 2012, though specific data augmentation methods were not detailed. Shoari et al. (2024) utilized AI to predict mandibular growth stages based on CVM from lateral cephalometric radiographs. They evaluated a total of 200 individuals (108 females and 92 males), classifying them into three stages: pre-pubertal, pubertal, and post-pubertal, based on their mandibular length-growth rate. The study analyzed 663 images using a developed CNN architecture, where raw images were directly input into the model with only dimensionality reduction applied. Batch normalization and random dropout techniques were implemented to prevent overfitting. For data augmentation, images were rotated up to 20 degrees, shifted horizontally and vertically by 10%, and magnified by 10% for the ResNet network. The CNN designed in the study demonstrated high sensitivity and negative predictive value (NPV) in the pre-pubertal stage; however, the ResNet-18 model outperformed it with an overall accuracy of 87.5%. In another study, Noguchi et al. (2020) developed and evaluated a CNN-based model for bone segmentation in whole-body CT images. Employing a network based on U-Net architecture, three different datasets were prepared: in-house dataset containing 16,218 slices, secondary dataset containing 12,529 slices, and publicly available dataset containing 270 slices. Three data augmentation methods were evaluated to improve the performance of the network: conventional method, mixup, and random image cropping and patching (RICAP). The outputs show that the average Dice coefficient is 0.983 in the in-house dataset and 0.943 in the secondary dataset, which generally exceeds the previously reported results. Data augmentation methods facilitated the development of an accurate and resilient model using small datasets. In another study, Agarwal et al. (2022) developed an automatic method using machine learning classifiers to estimate the degree of CVM from cephalometric radiographs. Labeled cephalometric radiographs of 383 individuals between the ages of 10 and 36 were used, and data expansion and in situ data augmentation techniques were applied to eliminate data imbalance. Preprocessing techniques such as Sobel filters and Canny edge detectors and deep learning-based CNN architectures, pre-trained models such as ResNet-50 and VGG-19 were examined. As a result, models with six and eight convolution layers applied to 64 × 64 grayscale images achieved the highest accuracy, reaching 94%. Additionally, the ResNet-50 and VGG-19 models, trained with frozen layers, demonstrated successful performance with accuracies of 91% and 89%, respectively. In a different study, Seo et al. (2023) developed a deep learning method to detect bone age by segmenting cervical vertebrae from lateral cephalograms, aimed at monitoring children's growth and development. Images from 900 participants aged 4 to 18 years were processed using the DeepLabv3+ architecture for segmentation, while bone age was assessed via a regression model utilizing the Inception-ResNet-v2 architecture. The dataset was

allocated 80% for training and 20% for testing, incorporating five-fold cross-validation at each phase. The model reached an impressive mean performance output of 95.6%. Meanwhile, the regression model resulted in mean absolute error and root mean square error values of 0.300 and 0.390 years, each separately, for estimating bone age. Data augmentation techniques included rotating images between -7 and 7 degrees, scaling them horizontally and vertically between 80% and 120%, and shifting them horizontally and vertically by -5 to 5 pixels. Consequently, the suggested method was able to estimate bone age with a high degree of accuracy. Lastly, Mohemmed et al. (2022) created a novel deep learning model to evaluate the phase of CVM and detect growth spurts through the analysis of lateral cephalometric radiographs. A total of 890 cephalogram images were classified into six cervical stages and three growth degrees (pre-pubertal, pubertal, post-pubertal) by two orthodontists independently. The study employed a new transfer learning model, and the results were evaluated by the orthodontists. The model achieved a CVM diagnosis accuracy of 62.63% for the six-class classification and 75.76% for the three-class classification. Notably, a significant agreement was observed between the orthodontists and the AI model overall. While the AI model showed satisfactory performance output in identifying the CVM stage, it fell short of the accuracy achieved by expert observers. With enhancements in data sufficiency, this model is expected to support practicing dentists in the future. While data augmentation methods were applied, specific details about these methods were not provided.

As evidenced by numerous recent studies in the literature, data augmentation methods significantly impact CVM detection. These techniques are crucial for enriching existing datasets and enhancing the model's generalization ability. Specifically, techniques like rotation, shifting, and scaling—often used to enhance the output of deep learning models in situations with restricted data— assist in reducing the risk of overfitting and allow the model to generate more reliable predictions. In addition, creating various data sets that better represent different developmental stages provides benefits in clinical applications by ensuring the correct classification of CVM. As a result, the integration of data augmentation strategies offers significant gains in terms of both accuracy and reliability in CVM detection and guides future research.

REFERENCES

Agarwal, S., & Agarwal, S. (2022). Bone Age Assessment from Lateral Cephalograms Using Deep Learning Algorithms in the Indian Population. Indian Journal of Dental Research, 33(4), 402-407.

Atici, S. F., Ansari, R., Allareddy, V., Suhaym, O., Cetin, A. E., & Elnagar, M. H. (2022). Fully automated determination of the cervical vertebrae maturation stages using deep learning with directional filters. Plos one, 17(7), e0269198.

Atici, S. F., Ansari, R., Allareddy, V., Suhaym, O., Cetin, A. E., & Elnagar, M. H. (2023). AggregateNet: A deep learning model for automated classification of cervical vertebrae maturation stages. Orthodontics & Craniofacial Research, 26, 111-117.

Baccetti, T., Franchi, L., & McNamara Jr, J. A. (2005, September). The cervical vertebral maturation (CVM) method for the assessment of optimal treatment timing in dentofacial orthopedics. In Seminars in Orthodontics (Vol. 11, No. 3, pp. 119-129). WB Saunders.

Benjelloun, M., & Mahmoudi, S. (2008). X-ray image segmentation for vertebral mobility analysis. International journal of computer assisted radiology and surgery, 2, 371-383.

Bezabh, Y. A., Salau, A. O., Abuhayi, B. M., & Ayalew, A. M. (2024). Classification of cervical spine disease using convolutional neural network. Multimedia Tools and Applications, 1-17.

Boswell, J. F., Kraus, D. R., Miller, S. D., & Lambert, M. J. (2015). Implementing routine outcome monitoring in clinical practice: Benefits, challenges, and solutions. Psychotherapy research, 25(1), 6-19.

Cejudo Grano de Oro, J. E., Koch, P. J., Krois, J., Garcia Cantu Ros, A., Patel, J., Meyer-Lueckel, H., & Schwendicke, F. (2022). Hyperparameter Tuning and Automatic Image Augmentation for

Deep Learning-Based Angle Classification on Intraoral Photographs—A Retrospective Study. Diagnostics, 12(7), 1526.
Cericato, G. O., Bittencourt, M. A. V., & Paranhos, L. R. (2015). Validity of the assessment method of skeletal maturation by cervical vertebrae: a systematic review and meta-analysis. Dentomaxillofacial Radiology, 44(4), 20140270.
Ferrillo, M., Curci, C., Roccuzzo, A., Migliario, M., Invernizzi, M., & De Sire, A. (2021). Reliability of cervical vertebral maturation compared to hand-wrist for skeletal maturation assessment in growing subjects: A systematic review. Journal of back and musculoskeletal rehabilitation, 34(6), 925-936.
Gabriel, D. B., Southard, K. A., Qian, F., Marshall, S. D., Franciscus, R. G., & Southard, T. E. (2009). Cervical vertebrae maturation method: poor reproducibility. American Journal of Orthodontics and Dentofacial Orthopedics, 136(4), 478-e1.
Ishaq, A., Sadiq, S., Umer, M., Ullah, S., Mirjalili, S., Rupapara, V., & Nappi, M. (2021). Improving the prediction of heart failure patients' survival using SMOTE and effective data mining techniques. IEEE access, 9, 39707-39716.
Iwana, B. K., & Uchida, S. (2021). An empirical survey of data augmentation for time series classification with neural networks. Plos one, 16(7), e0254841.
Kelleher, M. O., Tan, G., Sarjeant, R., & Fehlings, M. G. (2008). Predictive value of intraoperative neurophysiological monitoring during cervical spine surgery: a prospective analysis of 1055 consecutive patients. Journal of Neurosurgery: Spine, 8(3), 215-221.
Kim, E. G., Oh, I. S., So, J. E., Kang, J., Le, V. N. T., Tak, M. K., & Lee, D. W. (2021). Estimating cervical vertebral maturation with a lateral cephalogram using the convolutional neural network. Journal of Clinical Medicine, 10(22), 5400.
Li, H., Chen, Y., Wang, Q., Gong, X., Lei, Y., Tian, J., & Gao, X. (2022). Convolutional neural network-based automatic cervical vertebral maturation classification method. Dentomaxillofacial Radiology, 51(6), 20220070.
Liu, J., Chen, Y., Li, S., Zhao, Z., & Wu, Z. (2021). Machine learning in orthodontics: Challenges and perspectives. Advances in Clinical and Experimental Medicine, 30(10), 1065-1074.
Lucchese, A., Bondemark, L., Farronato, M., Rubini, G., Gherlone, E. F., Giudice, A. L., & Manuelli, M. (2022). Efficacy of the cervical vertebral maturation method: a systematic review. Turkish Journal of Orthodontics, 35(1), 55.
Madnani, N., & Dorr, B. J. (2010). Generating phrasal and sentential paraphrases: A survey of data-driven methods. Computational Linguistics, 36(3), 341-387.
Makaremi, M., Lacaule, C., & Mohammad-Djafari, A. (2019). Deep learning and artificial intelligence for the determination of the cervical vertebra maturation degree from lateral radiography. Entropy, 21(12), 1222.
McNamara Jr, J. A., & Franchi, L. (2018). The cervical vertebral maturation method: A user's guide. The Angle Orthodontist, 88(2), 133-143.
Mohammad-Rahimi, H., Motamadian, S. R., Nadimi, M., Hassanzadeh-Samani, S., Minabi, M. A., Mahmoudinia, E., ... & Rohban, M. H. (2022). Deep learning for the classification of cervical maturation degree and pubertal growth spurts: A pilot study. Korean journal of orthodontics, 52(2), 112-122.
Moreno-Barea, F. J., Jerez, J. M., & Franco, L. (2020). Improving classification accuracy using data augmentation on small data sets. Expert Systems with Applications, 161, 113696.
Nestman, T. S., Marshall, S. D., Qian, F., Holton, N., Franciscus, R. G., & Southard, T. E. (2011). Cervical vertebrae maturation method morphologic criteria: poor reproducibility. American Journal of Orthodontics and Dentofacial Orthopedics, 140(2), 182-188.
Noguchi, S., Nishio, M., Yakami, M., Nakagomi, K., & Togashi, K. (2020). Bone segmentation on whole-body CT using convolutional neural network with novel data augmentation techniques. Computers in biology and medicine, 121, 103767.

Oflaz, M. U., & Görgülü, S. (2017). Ortodontide Büyüme ve Gelişimin Değerlendirilmesi ve Önemi. ADO Klinik Bilimler Dergisi, 8(2), 1571-1580.
Seo, H., Hwang, J., Jung, Y. H., Lee, E., Nam, O. H., & Shin, J. (2023). Deep focus approach for accurate bone age estimation from lateral cephalogram. Journal of Dental Sciences, 18(1), 34-43.
Shoari, S. A., Sadrolashrafi, S. V., Sohrabi, A., Afrouzian, R., Ebrahimi, P., Kouhsoltani, M., & Soltani, M. K. (2024). Estimating mandibular growth stage based on cervical vertebral maturation in lateral cephalometric radiographs using artificial intelligence. Progress in Orthodontics, 25(1), 28.
Shorten, C., & Khoshgoftaar, T. M. (2019). A survey on image data augmentation for deep learning. Journal of big data, 6(1), 1-48.
Tsichlaki, A., Chin, S. Y., Pandis, N., & Fleming, P. S. (2016). How long does treatment with fixed orthodontic appliances last? A systematic review. American journal of orthodontics and dentofacial orthopedics, 149(3), 308-318.
Uribe, F. A., Chandhoke, T. K., & Nanda, R. (2014). Individualized orthodontic diagnosis. Esthetics and Biomechanics in Orthodontics, 1.

TEMASSIZ YÜZ VE AĞIZ SICAKLIĞI TERMAL ÖLÇÜMLERİ ÜZERİNDEN ETNİK KÖKEN TESPİTİ

ETHNICITY DETECTION THROUGH NON-CONTACT FACE AND ORAL TEMPERATURE THERMAL MEASUREMENTS

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ÖZET

Tüm Dünyayı derinden sarsan COVID-19 gibi evrensel boyutta bulaşıcı ve son derece ölümcül olan bulaşıcı hastalıkların ortaya çıkması sonucunda temassız ölçümlerin önemi son yıllarda daha çok artmıştır. Farklı amaçlarla geliştirilen ve kullanılan birçok temassız ölçüm yöntemi bulunmaktadır. Ancak bunlardan özellikle son 10 yılda çok daha fazla ön plana çıkan araç kızılötesi termal kameralar olmuştur. Bulaşıcı hastalıkların ilk belirtileri arasında olan ve toplum içerisinde kendini belli eden yüksek vücut sıcaklığının tespitinde bu kameralar aktif olarak kullanılmaktadır. Ancak temaslı ölçümlere göre elde edilen verilerin güvenilirliğinin yüksek ve sapma oranlarının düşük olabilmesi için birçok araştırma yapılmıştır. Bunlardan bazıları ölçümlerin klinik verilerle karşılaştırılması sonucunda bu cihazların kalibrasyonu üzerine yapılırken bazıları da yapay zekâ tekniklerinin araştırmalarda aktif kullanılması olmuştur.

Bu çalışmada farklı olarak temassız ölçümlerin alındığı etnik farklılıkların sonuçlar üzerindeki etkisinin yapay zekâ teknikleri ile araştırılması olmuştur. Bu sayede ölçüm alınan bölgeler farklılık gösterebileceğinden klinik ölçümlere göre sapmaların en aza indirilmesi için kullanılan cihaza etnik köken seçim özelliğinin eklenmesi değerlendirilebilir. Bu amaç doğrultusunda PhysioNet veri tabanından alınan 33-özellikli kızılötesi termografi verileri kullanılmıştır. Bu verilerdeki denekler altı farklı etnik kökene ait olmasına rağmen bunlardan en çok sayıya sahip White, Asian, and Black/African-American olanlar kullanılmıştır. Bu gruplar önce üç-sınıflı sonra iki-sınıflı olarak Rastgele Orman algoritması ile analiz edilmiştir. Sonraki aşamada ise özellik seçme işlemi uygulanarak en az özellik ile maksimum performansa ulaşılması hedeflenmiştir. Sonuç olarak sırasıyla üç-sınıflı ve iki-sınıflı verilerden %54.69 ve %65.64 doğruluk oranları elde edilmiştir. Daha sonra ilgili veriler üzerinde Sarmal özellik seçme tekniği uygulanması sonucunda %59.75 ve %68.94 performans değerlerine ulaşılmıştır. Buna göre ilgili benzer cihazların üretim aşamasında menülerine etnik köken seçeneğinin eklenmesiyle daha etkin ve doğru ölçümlerin alınabileceği düşünülmektedir. Ayrıca araştırmacılara da bu alanda farklı bir perspektif sunularak yenilikçi çalışmaların yapılabileceği fikri ortaya konmuştur.

Anahtar Kelimeler: Termal Görüntüler, Vücut Sıcaklıkları, Yapay Zekâ, Temassız Ölçümler.

ABSTRACT
The rise of highly contagious and deadly infectious diseases like COVID-19, which have profoundly impacted the world, has led to an increased emphasis on non-contact measurements in recent years. There are many non-contact measurement methods developed and used for different purposes. However, infrared thermal cameras have been the most prominent tool in the last decade. These cameras are actively used in the detection of high body temperature, which is among the first symptoms of infectious diseases and manifests itself in society. Numerous studies have been conducted to ensure that the reliability of data obtained through contact measurements is high and the rate of deviations is low. While some of these were made on the calibration of these devices as a result of comparing the measurements with clinical data, some of them were actively used in researches.
This study uniquely focused on examining how ethnic differences influence the outcomes of non-contact measurements using artificial intelligence techniques. In this way, since the regions where the measurements were taken may differ, it can be evaluated to add an ethnicity selection feature to the device used to minimize deviations according to clinical measurements. For this purpose, 33-feature infrared thermography data taken from the PhysioNet database was used. Although the subjects in this data belong to six different ethnicities, the most numerous ones, White, Asian, and Black/African-American, were used. These groups were first analyzed with the Random Forest algorithm as three-class and then as two-class. In the next stage, the feature selection process was applied and the aim was to reach maximum performance with the least attributes. As a result, 54.69% and 65.64% accuracy rates were obtained from the three-class and two-class data, respectively. Later, as a result of the wrapper feature selection technique applied to the relevant data, 59.75% and 68.94% performance values were reached. Accordingly, it is thought that more effective and accurate measurements can be taken by adding the ethnicity option to the menus of similar devices during the production phase. In addition, the idea that innovative studies can be carried out by providing a different perspective to researchers in this field was put forward.

Keywords: Thermal Images, Body Temperatures, Artificial Intelligence, Non-Contact Measurements.

INTRODUCTION

High fever is among the first symptoms of many infectious and deadly diseases in the world, such as COVID-19 (Chiu et al., 2005; Goeijenbier, Van Kampen, Reusken, Koopmans, & Van Gorp, 2014; Huang et al., 2020; Shi et al., 2020). Early diagnosis of these diseases is extremely important in order to prevent their spread in society. Therefore, it has become inevitable to measure people's body temperatures remotely without contact for their rapid and high-accuracy detection. However, environmental conditions can often have distorting and misleading effects, especially on non-contact fever measurements, compared to contacts. In order to prevent or minimize such negative effects, computer systems, additional hardware devices, precise calibration of the devices used, and artificial intelligence techniques are used.
Human body temperatures can be different in different parts of the body. The part of the body where the temperature measurement is taken is important in disease diagnosis. However, almost all of the remote non-contact measurements are taken from the face area. Infrared thermographs (IRTs), also known as thermal cameras, are mostly used in taking these measurements, which are practical, fast and can measure many people at the same time (Chan, Cheung, Lauder, & Kumana, 2004; Ng & Acharya, 2009). Although measurements are taken with sensitive and low-error devices, different values can be obtained compared to traditional measurements. In this context, when the literature is examined, it is aimed to try to measure clinical real values with IRTs with the least error in the studies conducted (Purslow, 2008; Sullivan et al., 2021; Teran et al., 2012; Wang et al., 2021; Zhou et al., 2020).

In (Wang et al., 2021) researchers aimed to calibrate two different IRT systems by using several regression techniques for temperature measurements obtained from thermographic images. In this way, it was tried to obtain body measurements with the least deviation. In addition, the authors aimed to verify the results of the previous research study (Wang et al., 2021; Zhou et al., 2020). In (Teran et al., 2012), in order to investigate the effectiveness of the non-contact thermometer, body temperatures of infants and children, the youngest of whom was 1 and the oldest of whom was 48 months old, were compared with traditional methods. As a result, the highest correlation was obtained in rectal measurement (Teran et al., 2012). In another study (Zhou et al., 2020), the effects of the facial region where the measurements were taken via IRT images on diagnosis were investigated. Similarly to the others, the authors in (Mazdeyasna, Ghassemi, & Wang, 2023) investigated the effects of external factors affecting the measurement accuracy, this time via IRT data. In a similar study published by different researchers (Jerbi & Lee, 2024), the focus was on performing temperature measurements with the least error via thermal measurements without considering the environmental conditions and individual changes.

There are also studies on body temperature measurements that include artificial intelligence and machine learning. For example, in reference (Razmara, Khezresmaeilzadeh, & Jenkins, 2024), machine learning algorithms were used in high-accuracy temperature determination over IRT data, emphasizing non-contact temperature measurement, which has become more important especially during the Covid-19 period. In a similar study for the same purpose, this time Convolutional Neural Network was used as a technique (Srivastava, Pawan, & Rajan, 2022). In (Pacheco, de Sousa, da Silva Rodrigues, de Souza Sardinha, & Martello, 2020), a machine learning-based prediction system was developed to detect stress levels using thermal images. In summary, the common point in studies using artificial intelligence has generally been to contribute to more efficient and accurate reading of thermal data.

It is also useful to briefly review the literature in terms of ethnicity detection. In a study where data containing facial images of many people were presented to various deep learning algorithms, age and gender detection were also studied (Khurana et al., 2024). In another paper (Mohammad & Al-Ani, 2017), the authors focused on ethnicity detection by presenting eye biometrics of people to four different classification methods. In a similar study (Heng, Dipu, & Yap, 2018), face images were used again for the same purpose and these were presented to a hybrid deep learning model. Although similar studies generally used facial images for the same purpose, it is understood that the point where they differ from each other is the preferred method and algorithm.

As far as it was determined in the literature given above and in others, no research has been found on determining ethnicity through IRT data. For this reason, this study was carried out in order to provide direction and ideas to the literature and researchers advancing in this field. In this paper, ethnicity determination was aimed through contactless temperature data belonging to individuals (Wang et al., 2023; Wang et al., 2021). In the study where infrared thermography data was used, the determination of three different races, namely “White”, “Asian”, and “Black/African-American” was first analyzed with a 3-class and then a 2-class Random Forest machine learning algorithm. In addition, the Wrapper technique was applied on the data to achieve higher performance with fewer parameters. The study results support the acquisition of more sensitive and high-accuracy measurements thanks to the addition of the ethnicity option as continents to the menus of the relevant measurement devices. As a result, a different perspective was presented to scientists and manufacturers working in the field in the study.

MATERIALS AND METHODS

In this paper, the effect of ethnicity on non-contact measurements was investigated using artificial intelligence techniques. Within the scope of the study, research was conducted on 33-feature infrared thermography data taken from the PhysioNet database (Wang et al., 2023; Wang et al.,

2021). Random Forest (RF) and wrapper were used as machine learning algorithm and feature selection technique, respectively.

Dataset

The dataset used was obtained from 33-feature IRT images (Wang et al., 2023; Wang et al., 2021). It is stated in the relevant references (Wang et al., 2023; Wang et al., 2021) that two different IRT systems (IRT-1: FLIR Systems Inc.; IRT-2: Infrared Cameras Inc. (ICI)) were used to record the data, but this study conducted the research on the data belonging to the FLIR system. Data were obtained from a total of 1020 subjects using IRT-1 (Wang et al., 2023; Wang et al., 2021). In all of these data, four separate recordings were taken for each subject within 15 minutes. However, only the recordings taken from the first time were used in the study. The ethnicity information of these 1020 subjects were White, Black/African-American, Hispanic/Latino, Asian, Multiracial, and American Indian. However, in this study, data belonging to the first three ethnicities with the most subjects, “White”, “Asian”, and “Black/African-American”, were used.

Random Forest Classifier

In the literature, RF is one of the most frequently preferred algorithms by researchers in machine learning applications. The reasons for this are that RF is powerful, fast, and highly adaptable even to multi-featured data (Breiman, 2001; Devetyarov & Nouretdinov, 2010; Petkovic, Altman, Wong, & Vigil, 2018). This classifier, which creates forests containing randomly numbered trees, includes many decision trees in the system during the training phase (Edla, Mangalorekar, Dhavalikar, & Dodia, 2018). While random samples are taken from the training set for each tree in the system, the features are also randomly selected. In fact, since the diversity of the models in the system increases, the risk of overfitting on the result is also reduced (Breiman, 2001; Devetyarov & Nouretdinov, 2010). This method, which can obtain more reliable results, is both more robust against noisy data and resistant to negative outputs caused by incomplete data (Breiman, 2001; Devetyarov & Nouretdinov, 2010). Thanks to its powerful and highly accurate prediction outputs, RF, which has an important and wide range of applications, is used in many fields such as artificial intelligence applications, biomedical, medical, banking, natural sciences, and engineering. These important advantages have caused it to be preferred first in this study. Theoretical explanations, technical and mathematical infrastructure of the RF classifier are given in detail in reference (Breiman, 2001).

Wrapper Feature Selection Technique

Although the wrapper technique produces better performance outputs compared to other methods, its high computational cost in multi-feature data sets has been emphasized in many studies (Inza, Sierra, Blanco, & Larrañaga, 2002; Kohavi & John, 1997; Piao, Piao, Park, & Ryu, 2012). In classification problems, researchers mostly care about the ability of the system to classify the test data with high accuracy rather than the computational cost. Therefore, in this paper, the wrapper technique, which has been proven to be successful in increasing the output success, has been preferred in the feature selection stage.

This feature selection technique is used to determine the feature subset that increases the performance output among the existing features in order to increase the classification success of the artificial intelligence model used (Kohavi & John, 1997). In short, it is based on evaluating the various combinations of the features that constitute the data set size. This technique has some important basic features (Kohavi & John, 1997). The first of these is that it is a model-based system. In other words, it determines the feature combinations based on the success of the selected model by acting together with a specific algorithm such as decision trees, random forest, support vector machines. The second one performs training and testing processes for the relevant feature sets by trial and error. Finally, it uses performance evaluation criteria such as accuracy and F-measure for the selection process. The Wrapper method performs better for small or medium-sized and numerous data. This technique is disadvantageous for large data sets due to the high

computational cost (Inza et al., 2002; Kohavi & John, 1997; Piao et al., 2012). In this research, the best first algorithm was used for feature ranking and evaluation.

RESEARCH AND FINDINGS

In this study, some performance evaluation metrics were used to interpret the experimental trials properly. These are; accuracy (ACC), TP rate (TruePositive), FP rate (FalsePositive), precision, F-measure, and Receiver Operating Characteristic (ROC). Detailed explanations about these metrics are given in references (Landis, 1977; Ma, Guo, & Cukic, 2007; Powers, 2020; Saito & Rehmsmeier, 2015). In addition, 10-fold cross validation method was applied to separate the dataset from the training-test sets. Thus, all data were included in both training and testing, respectively, and the reliability of the obtained performance results was ensured.

Experimental Results

Within the scope of the experimental applications of this research paper, the data set was first carried out by taking the first two and three ethnic origin subjects with the highest number. Thus, in the first stage, 3-class and 2-class data sets were created. Then, these were submitted to the random forest classifier and the results in Table 1 were obtained.

Table 1. Experimental results for 3-class (White, Asian, and Black/African-American) and 2-class (White, and Asian) datasets

Number of data classes	ACC (%)	TP rate	FP rate	Precision	F-measure	ROC area
3-class	54.69	0.547	0.559	0.397	0.431	0.548
2-class	65.64	0.656	0.648	0.575	0.578	0.558

When Table 1 is examined, it will be seen that the performance outputs of the 2-class dataset are better. Accordingly, while the overall classification success was obtained as 54.69% for the 3-class, it was reached as 65.64% for the 2-class. When the results are evaluated in terms of precision, it is understood that the 2-class data produced a better output with a value of 0.575. In short, the performance outputs of the 2-class data were better in every metric.

In the next stage, the wrapper feature selection technique was used in order to obtain better results with fewer dimensions. As a result of this application, the features that improved performance were determined for both groups among the features specified in the sources from which the dataset was taken (Wang et al., 2023; Wang et al., 2021). Then, the new dimensional data was presented to the random forest classifier according to the selected features, provided that the number of data remained constant. The selected features and the obtained outputs as a result of this application are given in Table 2.

Table 2. Experimental results of wrapper application for 3-class (White, Asian, and Black/African-American) and 2-class (White, and Asian) datasets.

Number of data classes	Selected Features	ACC (%)	TP rate	FP rate	Precision	F-measure	ROC area
3-class	aveOralM T_atm Humidity Distance Cosmetics	59.75	0.598	0.407	0.571	0.567	0.683
2-class	aveOralF T_atm Humidity	68.94	0.689	0.477	0.670	0.674	0.683

When Table 2 is evaluated, it is seen that the positive effect of identifying and removing features that negatively affect system performance thanks to the feature selection process is observed. Accordingly, this number was reduced to five in the 3-class dataset of the 33-feature dataset and to three in the 2-class dataset. Thus, higher classification success was achieved with fewer dimensions. Since the reduction in dimensionality also relieves the computational complexity of classifier systems, faster and higher outputs can be obtained.

DISCUSSION AND CONCLUSION

In the universe we live in, many deadly infectious epidemic cases have occurred to date. It is known that almost all of them have high fever as their first and obvious symptoms. In fact, high fever is an indication that our body's defense mechanism is working and trying to get rid of the things that caused it. In dangerous epidemic periods, it is not possible to measure people's fevers by contact in environments where people live together. At the same time, since contact measurements are slow and carry the risk of infection, it is not right to prefer them especially in crowded environments. For these and similar reasons, the importance of non-contact measurements has increased along with their usage rates. There are many non-contact measurement techniques used for different purposes. Among these, infrared thermal cameras have been preferred more in recent years. However, as in every non-contact measurement tool, the error rate of the measurement values obtained in this can be high compared to clinical measurements. Therefore, in many studies in the literature, measurements taken without contact are compared with clinical data and the calibration of the relevant device is performed. However, since this is not always possible, artificial intelligence has begun to be used in recent years to perform this process faster and with high accuracy.

In this study, the effect of ethnic differences on the results of contactless measurements was investigated using machine learning technique. The 33-feature infrared thermography data used from the PhysioNet database (Wang et al., 2023; Wang et al., 2021) was obtained from subjects belonging to six different ethnicities. However, in this study, experimental trials were carried out on the first three ethnicities with the highest number. As a result of the first stage, 54.69% and 65.64% accuracy rates were obtained from three-class and two-class data, respectively. Then, feature selection technique was applied on these groups and new data sets with fewer dimensions were given to the classifier system. In this stage, 59.75% and 68.94% performance values were reached, respectively. This result proves the positive effect of feature selection on the results.

Thanks to this research, since the ethnic regions where measurements are taken may differ, companies can evaluate the addition of an ethnicity selection feature to the device used to minimize deviations according to clinical measurements. In this way, it is thought that more

effective and high-accuracy measurements can be taken for the relevant regions. In addition, a different perspective has been presented to researchers working in this field and manufacturing companies, and innovative ideas have been put forward for high-performance device measurements. Apart from these, different feature selection techniques, data augmentation, dimension change and machine learning algorithms can be tried in the future to further improve current performance outputs.

REFERENCES

Breiman, L. (2001). Random forests. *Machine learning, 45*, 5-32.

Chan, L.-S., Cheung, G. T., Lauder, I. J., & Kumana, C. R. (2004). Screening for fever by remote-sensing infrared thermographic camera. *Journal of travel medicine, 11*(5), 273-279.

Chiu, W., Lin, P., Chiou, H., Lee, W., Lee, C., Yang, Y., et al. (2005). Infrared thermography to mass-screen suspected SARS patients with fever. *Asia Pacific Journal of Public Health, 17*(1), 26-28.

Devetyarov, D., & Nouretdinov, I. (2010). *Prediction with confidence based on a random forest classifier.* Paper presented at the Artificial Intelligence Applications and Innovations: 6th IFIP WG 12.5 International Conference, AIAI 2010, Larnaca, Cyprus, October 6-7, 2010. Proceedings 6.

Edla, D. R., Mangalorekar, K., Dhavalikar, G., & Dodia, S. (2018). Classification of EEG data for human mental state analysis using Random Forest Classifier. *Procedia computer science, 132*, 1523-1532.

Goeijenbier, M., Van Kampen, J., Reusken, C., Koopmans, M., & Van Gorp, E. (2014). Ebola virus disease: a review on epidemiology, symptoms, treatment and pathogenesis. *Neth J Med, 72*(9), 442-448.

Heng, Z., Dipu, M., & Yap, K.-H. (2018). *Hybrid supervised deep learning for ethnicity classification using face images.* Paper presented at the 2018 IEEE International Symposium on Circuits and Systems (ISCAS).

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., et al. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet, 395*(10223), 497-506.

Inza, I., Sierra, B., Blanco, R., & Larrañaga, P. (2002). Gene selection by sequential search wrapper approaches in microarray cancer class prediction. *Journal of Intelligent & Fuzzy Systems, 12*(1), 25-33.

Jerbi, O., & Lee, S. (2024). *Thermal Imaging Body Temperature Estimation Independent of Environmental Conditions and Individual Variations.* Paper presented at the 2024 18th International Conference on Ubiquitous Information Management and Communication (IMCOM).

Khurana, Y., Gupta, S., Sood, A., Gupta, D., Sagar, K., & Shivani. (2024). Leveraging Computer Vision for Gender, Age, and Ethnicity Prediction Using Deep CNN *Data Science and Artificial Intelligence for Digital Healthcare: Communications Technologies for Epidemic Models* (pp. 25-43): Springer.

Kohavi, R., & John, G. H. (1997). Wrappers for feature subset selection. *Artificial intelligence, 97*(1-2), 273-324.

Landis, J. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*.

Ma, Y., Guo, L., & Cukic, B. (2007). A statistical framework for the prediction of fault-proneness *Advances in Machine Learning Applications in Software Engineering* (pp. 237-263): IGI Global.

Mazdeyasna, S., Ghassemi, P., & Wang, Q. (2023). Best Practices for Body Temperature Measurement with Infrared Thermography: External Factors Affecting Accuracy. *Sensors, 23*(18), 8011.

Mohammad, A. S., & Al-Ani, J. A. (2017). *Towards ethnicity detection using learning based classifiers.* Paper presented at the 2017 9th Computer Science and Electronic Engineering (CEEC).

Ng, E. Y.-k., & Acharya, R. U. (2009). Remote-sensing infrared thermography. *IEEE Engineering in Medicine and Biology Magazine, 28*(1), 76-83.
Pacheco, V. M., de Sousa, R. V., da Silva Rodrigues, A. V., de Souza Sardinha, E. J., & Martello, L. S. (2020). Thermal imaging combined with predictive machine learning based model for the development of thermal stress level classifiers. *Livestock science, 241*, 104244.
Petkovic, D., Altman, R., Wong, M., & Vigil, A. (2018). *Improving the explainability of Random Forest classifier–user centered approach.* Paper presented at the Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing.
Piao, Y., Piao, M., Park, K., & Ryu, K. H. (2012). An ensemble correlation-based gene selection algorithm for cancer classification with gene expression data. *Bioinformatics, 28*(24), 3306-3315.
Powers, D. M. (2020). Evaluation: from precision, recall and F-measure to ROC, informedness, markedness and correlation. *arXiv preprint arXiv:2010.16061*.
Purslow, C. (2008). Clinical Implications for Thermography in the Eye World: A short History of Clinical Ocular Thermography. *Image Modeling of the Human Eye; Acharya, UR, Ng, YKE, Suri, JS, Eds*, 301-315.
Razmara, P., Khezresmaeilzadeh, T., & Jenkins, B. K. (2024). Fever Detection with Infrared Thermography: Enhancing Accuracy through Machine Learning Techniques. *arXiv preprint arXiv:2407.15302*.
Saito, T., & Rehmsmeier, M. (2015). The precision-recall plot is more informative than the ROC plot when evaluating binary classifiers on imbalanced datasets. *PloS one, 10*(3), e0118432.
Shi, H., Han, X., Jiang, N., Cao, Y., Alwalid, O., Gu, J., et al. (2020). Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *The Lancet infectious diseases, 20*(4), 425-434.
Srivastava, D. K., Pawan, S., & Rajan, J. (2022). *An Automated Approach for Screening COVID-19 from Thermal Images Using Convolutional Neural Network.* Paper presented at the MICCAI Workshop on Medical Image Assisted Blomarkers' Discovery.
Sullivan, S. J., Rinaldi, J. E., Hariharan, P., Casamento, J. P., Baek, S., Seay, N., et al. (2021). Clinical evaluation of non-contact infrared thermometers. *Scientific reports, 11*(1), 22079.
Teran, C., Torrez-Llanos, J., Teran-Miranda, T., Balderrama, C., Shah, N., & Villarroel, P. (2012). Clinical accuracy of a non-contact infrared skin thermometer in paediatric practice. *Child: care, health and development, 38*(4), 471-476.
Wang, Q., Zhou, Y., Ghassemi, P., Chenna, D., Chen, M., Casamento, J., et al. (2023). Facial and oral temperature data from a large set of human subject volunteers: PhysioNet.
Wang, Q., Zhou, Y., Ghassemi, P., McBride, D., Casamento, J. P., & Pfefer, T. J. (2021). Infrared thermography for measuring elevated body temperature: clinical accuracy, calibration, and evaluation. *Sensors, 22*(1), 215.
Zhou, Y., Ghassemi, P., Chen, M., McBride, D., Casamento, J. P., Pfefer, T. J., et al. (2020). Clinical evaluation of fever-screening thermography: impact of consensus guidelines and facial measurement location. *Journal of Biomedical optics, 25*(9), 097002.

MICROBIOTA MODULATION AS THERAPEUTIC APPROACH IN THE NEUROPATHIC PAIN IN DOG WITH SPINAL CORD INJURY: IMPACT OF POLENOPLASMIN

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Background Studies have demonstrated the presence of gut dysbiosis (alterations in gut bacterial homeostasis) secondary to spinal cord injury in dogs. The dysbiosis is thought to impair recovery by decreasing the production of short-chain fatty acids which play a role in suppressing inflammation within the central nervous system.

Objective Therefore, targeting gut dysbiosis could have significant therapeutic value in the management of spinal cord injury. The purpose of this study is to determine if gut dysbiosis occurs in dogs with spinal cord injury. Another area of potential intervention interest is in situations of spinal injury where there is an urgent need to generate new neurons. To arrive at these observations, the authors examined how Polenoplasmin and diet solve paralysis in dogs.

Materials and methods The most common cause of spinal problems in dogs is trauma. We are currently assessing whether indoles can also stimulate formation of neurons in dogs with paralysis.

Results We found that gut microbes that metabolize tryptophan-an essential amino acid-secrete small molecules called indoles, which stimulate the development of new brain cells in dogs, also demonstrated that the indole-mediated signals elicit key regulatory factors known to be important for the formation of new neurons.

Conclusion This study is another intriguing piece of the puzzle highlighting the importance of lifestyle factors and diet. The link between the health of the microbiome and the health of the brain shows how microorganisms in the gut solve paralysis, gut microbe secreted molecule linked to formation of new nerve cells in paralyzed dogs.

Keywords: gut dysbiosis, indole, paralyzed dog, Polenoplasmin.

NECİP FAZIL KISAKÜREK'İN DÜŞÜNCE DÜNYASINDA AHLAK

MORALITY IN NECİP FAZIL KISAKÜREK'S WORLD OF THOUGHT

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ÖZET
Necip Fazıl Kısakürek yirminci yüzyılda yaşamış olan şair, yazar ve düşünce adamlarından biridir. Onun çalışmalarında üzerinde durmuş olduğu temalar: ahlak, felsefe, din, dindarlık, batılılaşma, aşk, insan, medeniyet ve hakikat arayışıdır. Bu bağlamda çalışma onun din ile tasavvuf düşüncesi bağlamında ahlaka nasıl bir yer verdiği ile alakalıdır. Çalışmanın amacı ise Necip Fazıl Kısakürek'in felsefesinde ahlakın mahiyeti ne olduğunu tanımlamaktır. Ona göre hakikatin "niçin"leri önünde, ruhun ve hareketleri bakımından "nasıl"ları ahlaktır. Hakikat karşısında ruhun bürüneceği tavır ve eda melekesi ahlak, ruhun başlıca sıfatı ve hadiselerin ruhta kıymet hükmüdür. İçimizde ve dışımızda olan her şeyin ulvi ölçüsü ahlaktır. Bu minvalde araştırmamızda onun felsefesinde ahlak kavramı neliği üzerinde bir tartışma yürütülmüştür. .

Anahtar Kelimeler: Necip Fazıl Kısakürek, Felsefe, Ahlak, Hakikat, Din.

ABSRACT
Necip Fazıl Kısakürek is one of the poets, writers and thinkers who lived in the twentieth century. He wrote works of poetry, theater, religion, metaphysics and philosophy. The themes he focused on in these works are religion, piety, morality, westernization, love, humanity, civilization and the search for truth. In this context, the study is about how he gives a place to morality in the context of religion and Sufi thought. The aim of the study is to define what the nature of morality is in Necip Fazıl Kısakürek's philosophy. According to him, before the "whys" of truth, the "hows" of the soul and its movements are morality. Morality is the attitude and the capacity of behavior that the soul will adopt in the face of reality, the main attribute of the soul and the value judgment of events in the soul. Morality is the supreme measure of everything that happens inside and outside of us. In this respect, in our research, a discussion was conducted on the concept of morality in his philosophy. .

Keywords: Necip Fazıl Kısakürek, Philosophy, Morality, Truth, Religion,

GİRİŞ

Necip Fazıl Kısakürek Türk İslam düşüncesinin ve edebiyatının önemli bir düşünce adamıdır. Kuşkusuz Onun Türk İslam düşüncesine birçok alanda katkısı olmuştur. Bu anlamda şiir, tiyatro, roman, hikâye, tarih, felsefe, din ve sanat alanlarına ilişkin çalışmaları görülmektedir. Edebi fikirleri çerçevesinde konu ettiği temalar genel anlamda insanın ve toplumun inşa olması noktasında önem taşımaktadır. N. Fazıl Kısakürek eserlerinde insanı merkeze alıp düşüncelerini insanın yaratıcısı ile olan ilişkisindeki hallerine dikkat çeker. Bu bağlamda ahlakın insan için önemli bir değer olduğunu hatırlatarak insanı kâmil olma yoluna bu değerin önemine işaret eder.
Necip Fazıl'ın fikirlerinin olgunlaşmasında kuşkusuz hocası Abdulhakim Arvasi'nin rolü büyüktür. 1934 senesine gelindiğinde Kısakürek'in dünyaya bakışı ve sanat görüşünü kökten değiştirecektir. Bu tanışma fırsatı Kısakürek'e yepyeni bir dünyanın kapılarını açacaktır. Hocası ile

tanışma onun yaşamının dönüm noktası olmuş ve sanat, din, tasavvuf ve mistik düşüncelere daha yoğunlaştırmıştır (Şanlı, 2011). Bizde çalışmamızın sınırı olarak Necip fazıl Kısakürek'in ahlak görüşleri ile sınırlı tuttuk. Şairin düşüncelerinden hareketle ahlakın mahiyeti hakkında önemli bilgiler verdik. Bu bağlamda onun insan ile yaratıcısı arasındaki ahlaki ilişkilerin nasıl olmasına ilişkin yorumlarına başvurduk.

ARAŞTIRMALAR VE BULGULAR

Necip Fazıl Kısakürek edebi metinlerinde kendine özgü üslubuyla çeşitli kanallar yoluyla birçok konuda görüşlerini ortaya koymuştur. Felsefe, Edebiyat ve Din bağlamında kaleme almış olduğu çalışmalar onun ne kadar derin bir düşünce adamı olduğunu da göstermiştir. Mevcut çalışmalar düşünürün sadece din ve tasavvufi bağlamındaki görüşlerinin şiir ya da düz metinlerde aktarıldığına ilişkin tespitleri olmuştur. Çalışmamız spesifik anlamda Kısakürek'in ahlaka ilişkin görüşlerinin ortaya konulması açısından önem taşımaktadır. Ahlaki kaidelere bağlı kalmanın insanın Allah ile olan ilişkisini belirlediğini ve ahlakın benliğin gelişiminde önemli bir değer olduğu anlaşılmıştır. Yine bu anlamda Hümanizm kavramı üzerine yapılan tartışmalara binaen Fazıl'ın Batı ve Doğu insanı arasındaki farklılığın ne olduğuna ilişkin görüşleri tespit edilmiştir. Araştırmamızda Fazıl'ın ahlak görüşü hudut bilinerek Doğu ve İslam düşüncesinde ahlakın konumu belirmemiştir.

1.NECİP FAZIL KISAKÜREK'İN DÜŞÜNCE DÜNYASINDA AHLAK

"Hakikatin "niçin?"leri önünde, ruhun tavır ve hareketleri bakımından "nasıl?"ları, ahlaktır. Hakikat karşısında ruhun bürüneceği tavır ve eda melekesi olan ahlak, ruhun başlıca sıfatı ve hadiselerin ruhta kıymet hükmüdür. İçimizde ve dışımızda olan her şeyin ulvî ölçüsü ahlaktır. Ahlaka fikir öncülük ettiği kadar, fikre de ahlak yol gösterir. Fikrin gösterdiği sebepten ahlak doğduğu gibi, ahlakın doğuşundan fikir sebep kazanır. Öyle ki ikisini de, içici, birbirini muhit (kuşatıcı) ve birbiriyle muhat (kuşatılmış) sayabiliriz. Adeta fikrin "niçin?"lerini, ahlakın "nasıl?"ları içinde buluyoruz. Davanın en sağlam ifadesi şu ki, ruh bütün melekeleriyle el ele, bir anda buluyor, ruh bulduktan sonra fikir öne geçiyor, peşinden ahlâk zuhura geliyor; hakikatteyse hangisinin ve neyin önde olduğu belirsiz kalıyor"[53] (Kısakürek, 2022).

Necip Fazıl'a göre herhangi bir davranışın veya bir davranış sebebiyle oluşan duygunun iyi veya kötü olması hakkındaki kararı ancak ve ancak ahlak verebilir. Yani ahlak iyi ile kötüyü ayırt etmeye yarayan bir duygu ve düşünce dünyasıdır (Kısakürek, 2010). Necip Fazıl'a göre ahlak bir zorunluluktur. Bunu *Çerçeve 2* isimli eserinde balığın suya veya ağacın toprağa muhtaç olması gibi insanın da ahlaka muhtaç olduğunu dile getirerek belirtmiştir (Kısakürek, 2010). Kısakürek'e göre ahlakın iki kaynağı vardır:

1. Din
2. Felsefi Mezhepler (Kısakürek, 2022).

Yukarıda Kısakürek her ne kadar ahlakın kaynağını din ve din yerinde felsefi mezhepler olarak görse de onun için ahlakın kaynağını bire indirmenin doğru olacağı fikri vardır. Söz konusu ona göre bu kaynak ise din 'dir (Kısakürek, 2022).

"Necip Fazıl'a göre bütün ilişkilerin temel yapı taşı ahlaktır ve ahlak yoksunluğu ilişkilerdeki sorunların temel sebebidir. Burada bahsi edilen ilişki insanlar veya toplumlar arası ilişkiler olabileceği gibi, aynı zamanda insanın kendi iç muhasebesini yapmasındaki temel ölçü de ahlaktır. İnsanın sahip olduğu huzur da Necip Fazıl'a göre ahlak anlayışı ile ilişkilidir. Ahlak Necip Fazıl'a göre sadece ilişkilerin değil, aynı zamanda insanın da temelidir. O'nun anlayışına göre insanı insan yapan parçalardan biri olan ruh ancak ahlak ile var olabilir. Necip Fazıl'a göre ruhun var olmasını sağlayan sırlar ve mucizeler ahlakı oluşturan temel yapıtaşlarından bazılarıdır ve ahlaktaki

[53] https://www.barandergisi.net/islam-ve-ahlak-necip-fazil-kisakurek.

parçaların eksikliği bütünlükten yoksun bir ruha ve bu sebeple de insanlıktan yoksun insanlara yol açar. Necip Fazıl ahlakın insanlar tarafından belirlenmiş kurallar çerçevesinde olmadığını iddia etmiş ve ahlakın aslında dinin özü olarak anılmasında dahi bir sıkıntı bulunmayacağını belirtmiştir" (Kısakürek, 1999)

Necip Fazıl Kısakürek ahlak başta olmak üzere diğer alanlarda da dinin nüfuz ettiğini *Çile* adlı eserinde şöyle dile getirir: "Dinin olmadığı yerde hiçbir şey yoktur; yokluk bile yok. Şiir ve sanatsa hiç yok" (Kısakürek, 2000). Bu minvalde dinin, Necip Fazıl'ın düşünce dünyasının temelinde önemli bir yer edindiğini söyleyebiliriz.

Kısakürek tasavvufi anlamda "çile çekmiş" bir insan değildir. Onun çilesi dünyayı sorgulama, gerçeği arama ve "mutlak hakikate yani Allah'a ulaşma yolunda çekilen "metafizik bir çile"dir. Bu çile, Necip Fazıl"ın hayatı anlamaya ve sorgulamaya başlaması ile gençlik yıllarında ortaya çıkan ve bütün hayatını kaplayan çetin bir çiledir. Tasavvufî manada çile, "nefisi dizginlemeyi, içte derinleşmeyi, şahsî kemalâtı" hedefleyen içe dönük, edilgen bir çileyken Necip Fazıl"ın çilesi daha dışa dönük, daha aktif, daha sorgulayıcı ve daha üretken bir çiledir. Bilhassa hocası Abdülhakîm Arvâsî ile tanışıncaya kadar çetin bir çile ve ruhî hafakan süreci yaşayan Necip Fazıl, bu dönemden sonra daha üretken olmuş, değişik türlerde birçok eser vermiştir. (Şanlı, 2011).

Necip Fazıl ahlak konusunda kendisine rehber edindiği kişi Hz Muhammed'dir. Kısakürek, hocası Apdulhakim Arvasi'nin *Tasavvuf Bahçeleri* adlı çalışmasını sadeleştirip onu yayınlar. Bu eserde Hz. Muhammed'in "Ben üstün ahlâk değerlerini tanımlamak için gönderildim." hadisinden hareketle peygamberin (genel manada peygamberlerin) gönderiliş amacının yüksek ahlâkı tamamlamak ve onu insan fıtratına yerleştirmek olduğu vurgulanır. Yine tasavvufun gayelerinden biri de, insanı olumsuz ahlâkî özellikler ve her türlü niteliksiz vasıflardan arındırıp onların yerine iyi ahlâk ve üstün insanî vasıfları ikâme etmektir. Tasavvuf yoluna bağlı insanların nihaî gayesinin, "mahlûkatın en faziletlisi olan Allah Resulüne her yönüyle tam anlamıyla uymak ve onun manevî mirasına sahip çıkmaktır (Arvasi, 2009) Bu anlamda Kısakürek'e göre ahlaki anlamda Batı ile Doğu insanı arasında belirgin bir fark olduğuna dikkat çekmiştir.

Fazıl2a göre Batı dünyası maddi anlamda zaferini elde etmiş olmasına karşın ruhu hep eksik kalmıştır. Doğu ise maddi darlığın pençesinde çile çekerek savunmasız bir duruma düşmüştür. Kısakürek'e göre Doğunun esas rengi ve mutlak gayesi İslam'dır. Doğu'nun ruhu ise tasavvuftur. Kısakürek'in *Batı Tefekkürü ve İslâm Tasavvufu* eseri incelendiğinde Batılı düşünce ile İslam düşüncesi arasında farklı bir biçimine işaret ettiğini görürüz. Bu farklılık kuşkusuz kendisini insan anlayışında göstermektedir. Bu bağlamda İslam'ın ve tasavvufun insan anlayışı ile Batı'nın hümanist anlayışının uyuştuğunu söylemek mümkün gözükmemektedir. Batı düşüncesinin insanı özgür insan değildir. Bu insan tipi kendisini sınırlandırmış her türlü bağdan kurtulduğunu sanmaktadır. Batı insanı maddiyatın kölesi olmuş ve semavi bağlarından da kopmuştur. Bunun sonucunda kutsallığın Tanrı'da olmadığını merkeze kendisini koyarak yaşamaya çalışmaktadır. Dolayısıyla hümanizm, şimdilerde yansıtıldığı gibi yalnızca "insancıl" ya da "insan seven" anlamına sahip bir felsefe değildir. Bu felsefenin çıkış noktasına bakıldığında bu husus açıkça anlaşılmaktadır. Bu nokta, Batılı anlayış ile İslam tasavvufunun insanı konumlandırılışında farklılaştığı temel noktadır. İslam tasavvuf düşüncesinde, insan Allah ile bağ kurabilmektedir ve dönüşü de yine Allah'adır. Dünyada bulunmasının İlahî bir amacı olan insan, Allah'ın koyduğu sınırları dikkate almakla yani Allah'ın istediği vasıfta bir yaşam sürdürmekle sorumludur (Ay, 2024).

Necip Fazıl Kısakürek'e göre Batı her ne kadar refah konumda kendisini görse de din ve ahlak konusunda oldukça eksiktir. Çeşitli felsefi mezheplerle kendisini avunmaya çalışan Batı, İslam'ın ahlakından eksik kalmıştır. Bu minvalde metafizik dünyası hep karanlıktır. Batı dünyası ahlak konusunda inşa olmadıkça daima hep eksik kalacaktır. Bu eksiklik Batı dünyasının diğer yaşam alanlarına da sirayet edecektir (Kısakürek, 2022).

Kısakürek tarihsel akış içinde ahlakın konumunu şöyle belirler: "Bütün dünyaya bütün tarih boyunca hâkim gerçek ahlâk telâkkileri, bâtıl veya hak, hakikî din ahlâklarından baka bir ey

olamadı. Batıda mitolocya ve Hıristiyanlık ahlâkı, Doğuda da kendi mitolocyalarından sonra Müslümanlık ahlâkı… Bugünkü Garp ahlâkının temeli, üstünde bin bir ahlâk dâvasının karıncalanmasına rağmen sadece ve daima Hıristiyanlıktır ve Garpta hiçbir inkılâp hareketi bu ahlâkın kökünü baltalayamamıştır. Bizim ahlâkımızsa, baştanbaşa müstesna bir ahlâk manzumesinden ibaret Müslümanlık ahlâkıdır ki, eski çağlarda ham ve kaba softa bu ahlâkın sâf ve hâlis imân cephesini kurutmuş yeniçağlarda da Avrupalıya körü körüne hayran, (modern) inkâr yobazı bu ahlâkın öz kaynağını yıkmış; inkılâp dedikleri de kendi içinden yeni bir ahlâk telâkkisi getirmeyince, bugünkü ahlâk faciamız doğmuştur" (Kısakürek, 2002). Bu bağlamda Necip Fazıl Kısakürek ahlak konusunda dikkat çekmiş olduğu konu İslam ahlakı ile alakalıdır. Kısakürek şunu der: "olmuş ve olabilecek ahlak kaynağımız İslam ahlakıdır. Biz ise bunu anlayamadık hâlbuki anlaşılacak şey buydu. Bir zamanalar ne olduysak İslam ahlakın hürmetine olduk. Ancak daha sonra bu ahlaktan kopmamızla birlikte karanlığa gömülmüş olduk. İslam Ahlakı dünyanın tek kâmil ve esas ahlakıdır. Biz Tanzimat'tan önce ham ve kaba softa, Tanzimat'tan sonra da aynı seciyenin tersi ahmak ve şahsiyetsiz Garp taklitçisi olduğumuzdan bu ahlakı yitirdik. Bunu göremedik; görülecek olan buydu; görülecek olan budur" (Kısakürek, 2022).

SONUÇ

Necip Fazıl Kısakürek Türk düşüncesinin en önemli fikir adamlarından birisidir. Onun çalışmalarına baktığımız zaman din, ahlak ve tasavvuf gibi konularda yazılar yazdığını görmekteyiz. Özellikle ahlak konusunda önemli açıklamalarda bulunan Fazıl, ahlakın kaynağı olarak dini görmektedir. Fazıl'ın eserleri incelendiğinde din, diğer tüm alanlara sirayet eden bir değer olarak anlaşılmıştır. Bu bağlamda Batı insanın bu değerden yoksun kalması onu karanlığa sürüklemiştir. Her ne kadar iktisadi anlamda tüm boşluklarını doldurduğunu zanneden Batı aslında İslam ahlakından mahrum kaldığı için hep eksik kalmıştır. Kısakürek'in düşünce dünyasına Allah ile bağını ve ahlakını kuvvetlendirmek isteyen insan ancak var olabilir. Aksi takdirde insan hep varoluşu krizleri yaşar.

Kısakürek'in ahlak konusunda dikkat çekmiş olduğu diğer konu modernleşme adına ahlaki değerimizden taviz vermemizdir. Ona göre Batılılaşma hareketleri neticesinde İslam ahlakından kopmamız bizi gaflete sürüklemiştir. Bu sorunun bilincinde olmamak ve ona göre yaşamak ise Kısakürek'e göre daha ahlaksızlıktır. Ona göre bir an önce İslam dininin esaslarına ve ahlaki kaidelerine bağlı kalınarak tekrardan kâmil insan olabilmenin yollarını aramalıyız. Bunun içinde çile çekmeliyiz. Kısakürek'e göre bu çile Allaha ulaşma yolundaki çiledir. Ancak bu çilenin sonunda bilincimizi ve yaşantımızı İslam ahlakı ile inşa ettiğimizde mutlu ve huzurlu olabiliriz.

KAYNAKLAR

Arvasi, Abdülhakîm. (2009), Tasavvuf Bahçeleri, Büyük Doğu Yayınları, (sadeleştiren: Necip Fazıl Kısakürek), İstanbul.

Ay, Kevser. (2024). Necip Fazıl Kısakürek'e Göre Doğu ile Batı Arasında İnsanın Mahiyeti, Akademik Sosyal Araştırmalar Dergisi, Cilt:2, sayı 1, Haziran.

Kısakürek, Necip Fazıl. (1999). Batı Tefekkürü ve İslam Tasavvufu, Büyük Doğu Yayınları, İstanbul.

Kısakürek, Necip Fazıl. (2000). Çile. Büyük Doğu Yayınları, 42. Baskı, İstanbul.

Kısakürek, Necip Fazıl. (2010). Çerçeve 2, Büyük Doğu yayınları, İstanbul.

Kısakürek, Necip Fazıl. (2022). İdeolocya Örgüsü, Büyük Doğu Yayınları, 36. Baskı, İstanbul.

Şanlı, Ramazan. (2011). Necip Fazıl Kısakürek'te Din Duygusu ve Tasavvuf, Yüksek Lisans Tezi, Isparta.

İnternet Erişim: https://www.barandergisi.net/islam-ve-ahlak-necip-fazil-kisakurek. 01.10.2024.

APPRAISING THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOAL NUMBER THREE OF HEALTHY LIVING FOR ALL BY ASSESSMENT OF ROLE OF PHYSICAL ACTIVITY IN OBESITY RISK DETERMINANTS, PREVENTION AND MANAGEMENT AMONG UNDERGRADUATE STUDENTS IN A TERTIARY INSTITUTE IN NIGERIA

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ABSTRACT

The aim of this study was appraising The United Nations Sustainable Development Goal Number Three of healthy living for all by assessment of role of physical activity in obesity risk determinants, prevention and management among undergraduate students in a tertiary institute in Nigeria
. Methodologically, this study was conducted at Edo State University Uzairue to investigate strategies for risk determinants, preventing and managing obesity among undergraduate students in a tertiary institute in Nigeria. Descriptive research design and simple random sampling technique were used and a sample size of two hundred and seven (207) respondents were recruited. Data was collected using a structured questionnaire and analyzed using descriptive and inferential statistics, with $p<0.05$.
The results were that a significant portion 74(42.5%) classified as having low physical activity, 57(32.8%) having a sedentary lifestyle, 16(9.2%). A significant majority 71(40.8%) strongly agrees that alcohol consumption and smoking impacts on overweight. A significant portion 62(35.6%) agrees that diabetes is a health risk associated with obesity. A significant majority 70(40.2%) agrees that arthritis is a health risk associated with obesity. A significant majority 80(45.9%) strongly agrees that improving physical activity can reduce the risk of obesity. There was statistically significant association on the belief that increased physical activity among undergraduate students will lead to a significant reduction in obesity rates and contribute to its prevention. In conclusion, the study identified a high prevalence o f obesity a m o n g s u r v e y e d students, emphasizing the need for targeted interventions.

Keywords: United Nations Sustainable Development Goal number three , Obesity, Physical activity, Management, Prevention, Undergraduate students in Edo State University Uzairue

INTRODUCTION

According to the United Nations Sustainable Development Goal number three, Healthy Living for all, by 2030, end the epidemics of AIDS, tuberculosis, malaria and other communicable diseases(United Nations Sustainable Development Goal, 2015). Globally, obesity has surfaced as a serious public health issue that affects people of all periods, including undergraduate scholars (Adeloye et al. 2021). Today's Western society is undergoing rapid change, the majority of children no longer engage in everyday physical activity due to modern culture and society. Obesity is adding at an intimidating rate throughout the world (Kumari, Shukla and Acharya, 2022). Technological advances in modern society have contributed to a sedentary lifestyle that has changed the phenotype of children from that of 20 years ago (Ogden et al. 2018). Children today weigh more and have a higher body mass index (BMI) than their peers of just a generation earlier (Ogden et al. 2018). Behaviorally, most children fail to engage in vigorous- or moderate-intensity physical activity for the recommended 60 minutes or more each day, with as many as one-third reporting no physical activity in the preceding 5 days (Center for Disease Control and Prevention, 2020).Obesity is defined as abnormal or inordinate fat accumulation that presents a threat to health. It's a condition characterized by an abnormally inordinate position of body fat.

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, SEX, AGE AND SOCIOECONOMIC STATUS

Various studies suggest that men are more active than women when it comes to recreational physical activity (Talaei et al. 2018). Various reasons have been cited for the difference in physical activity levels between men and women. They said women face a variety of barriers in participating in physical activity, including time, care needs, low socioeconomic status, body image, safety, urban planning, and pre-existing health conditions (Okafor et al. 2022). Some women face multiple challenges when trying to stay active. Women often cite lack of time as a barrier to participating in physical activity (Okafor et al. 2022). Many factors influence a woman's body image, including expectations and pressures from family, colleagues, media, and society. Both women and men are under social pressure to achieve ideal physical condition (Jiotsa et al. 2021).
Based on physical activity recommendations, all age groups should minimize the amount of time spent sitting during the day (Pate et al. 2018).

THE RELATIONSHIP BETWEEN OBESITY AND HIGH BLOOD PRESSURE

The Body Mass Index (BMI) was developed by Adolphe Quetelet in Belgium in the mid-19th century (1850) to identify a simple screening parameter that describes an individual's weight as a function of height (Zierle-Ghosh and Jan, 2022). In the 20th century, when many societies experienced unprecedented prosperity in history and excessive weight gain and obesity were associated with many diseases, it became popular to use his BMI as a health risk factor for the general population (Lin and Li,
2021). Obesity and overweight are associated with chronic non-communicable diseases such as hypertension, type 2 diabetes, coronary artery disease, chronic kidney disease, cancer, dyslipidemia, and arthritis. Obese patients are more prone to hypertension, and hypertensive patients are more likely to gain weight (Amira and Sokunbi, 2022). Several medical studies have shown a link between obesity and high blood pressure. Obesity has been shown to lead to increased cardiac output, blood volume and arterial

resistance (Ulasi and Ijeoma, 2020).

THEORETICAL FRAMEWORK

Social Cognitive Theory (SCT) is a psychological theory that explains how people acquire and maintain behaviors through the interaction of personal, environmental, and behavioral factors.
Personal Factors: These include individual beliefs, attitudes, and self-perceptions.

Environmental Factors:
Behavioral Factors:

Observational Learning: SCT highlights the influence of observing others on behavior change. People learn from role models and peers who engage in physical activity.

Self-Efficacy: Self-efficacy refers to an individual's belief in their own ability to successfully perform a behavior. In the context of physical activity, if an undergraduate student has high self-efficacy for engaging in regular exercise, they are more likely to
overcome obstacles and maintain a physically active lifestyle.

EMPIRICAL REVIEW

Chukwuonye *et al.* (2022) conducted a study on Prevalence of overweight and obesity in Nigeria. Result revealed that the estimated prevalence of overweight and obesity was 27.6%, and14.5% respectively. The prevalence of overweight among men and among women was 26.3% and 28.3% respectively and, the prevalence of obesity among men and women was 10.9% and 23.0% respectively. Davies (2021) examined the estimating the prevalence of overweight and obesity in Nigeria in 2020: a systematic review and meta-analysis. Targeted public health response to obesity in Nigeria is relatively low due to limited epidemiologic understanding.

RESEARCH METHODOLOGY

Research Design

For this study, the survey research design was adopted. This research design provides a quickly efficient and accurate means of assessing information about a population of interest. It intends to study role of physical activity in obesity management and prevention among undergraduate students in Edo state University Uzariue.

Setting of the Study

The setting of the study is Edo State University Uzairue, an environment located in Iyamho, local government area of Etsako west, Edo State.

It was further amended as Edo University Iyamho (Amendment Law 2016).

Population of the Study

The total number of 400 level and 500 level students at Edo State University is four hundred and twenty-seven (427) and it is from this target population that a sample size will be determined.

Sample and Sampling Techniques

The researcher used Taro Yamane's formula to determine the sample size from the population and a simple random sampling technique were used.

Taro Yamane's formula is given as;

$$n = \frac{N}{1+N(e)2}$$

Where N = Population of study (427)
n = Sample size (?)
e = Level of significance at 5% (0.05)
1 = Constant

.: $n=427/1 + 427(0.05)2= 427/1+427(0.0025) = 427/1+1.067$ $n=427/2.067\approx207$

The sample size therefore is 207 respondents.

Instrument for data collection

Data for this study was collected with the use of a well-structured questionnaire which was designed to elicit information on role of physical activity in obesity management and prevention among undergraduate students in Edo state University Uzariue.

The questionnaire consists of two sections

Section A: Demographic Background of Respondents

Section B: Awareness of Obesity and its Risks

Validity of Instrument

The questionnaire was given to the supervisor for necessary corrections to be made (face validity) before it was distributed to the subjects

Reliability of Instrument

The questionnaire was administered to the subject in test and retest to check the consistency of the instrument. The coefficient obtained was 0.81.

Method of Data Collection

After permission was granted from the head of department Nursing science Edo state university Uzairue, Edo state. The researcher met with the students to seek their consent and explained the aim of the study as well as their involvement in the study. The questionnaire was administered to the subject and collected within the period of a week.

Method of Data Analysis

Data collected will be analyzed using frequency table, percentage and mean score analysis while the nonparametric statistical test (Chi- square) was used to test the formulated hypothesis using SPSS (statistical package for social sciences). Haven gathered the data through the administration of questionnaire, the collected data will be coded, tabulated and analyzed using SPSS statistical software according to the research question and hypothesis. In order to effectively analyze the data collected for easy management and accuracy, the chi square method will be used for test of independence. Chi square is given as:

$$X2 = \sum (o-e)2/e$$

Where X2 = chi square
O = observed frequency
e = expected frequency

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Level of confidence / degree of freedom
When employing the chi – square test, a certain level of confidence or margin of error has to be assumed. More also, the degree of freedom in the table has to be determined in simple variable, row and column distribution, degree of freedom is: df = (r-1) (c-1)
Where; df = degree of freedom r = number of rows
c = number of columns.
In determining the critical chi _ square value, the value of confidence is assumed to be at 95% or 0.95. a margin of 5% or 0.05 is allowed for judgment error.

Ethical Considerations

The subjects were informed that their responses will be treated with utmost confidentiality and anonymity.

Limitations Of The Study

Self-Reported Data*:*

One limitation of the study is the reliance on self-reported data. Self-reporting can introduce recall bias and social desirability bias, potentially impacting the accuracy of the information collected. Future studies may benefit from incorporating objective measures of physical activity, such as accelerometers, to mitigate these biases.

Sample Selection:

The study was conducted exclusively within the confines of Edo State University, Uzairue. Consequently, the findings may not be fully generalizable to other universities or broader populations. Future research could employ a more diverse and geographically varied sample to enhance the external validity of the findings.

RESULTS

Table 1 showing Age Distribution

Age Group	**Frequency**	**Percentage**
15-19	16	9.3%
20-24	87	50%
25-29	63	36.1%
30 and above	8	4.6%
Total	**174**	**100**

Interpretation and Analysis: The majority of respondents 87(50%) fall within the age group of 20-24 indicating a predominantly youthful demographic.

Table 2 Showing Academic Level of Respondents

Academic Level	**Frequency**	**Percentage**
400 Level	73	42%
500 Level	101	58%
Total	**174**	**100**

Interpretation and Analysis: The distribution of academic levels among respondents shows that 73(42%) are in their fourth year and 101(58%) are in their fifth year.

Table 3 showing Religion Distribution of Respondents

Religion	**Frequency**	**Percentage**
Christian	86	49.4%
Islam	84	48.3%
Traditional	4	2.3%
Total	**174**	**100**

Interpretation and Analysis: The distribution of religion among respondents shows that 86(49.4%) are Christians, 84(48.3%) are Islams and 4(2.3%) are traditionalists.

Table 4 showing Physical Activity Level of Respondents

Physical Activity Level	**Frequency**	**Percentage**
Sedentary	57	32.8%
Low	74	42.5%
Moderate	16	9.2%
High	27	15.5%
Total	**174**	**100**

Interpretation and Analysis: The distribution of physical activity levels among respondents is varied, with a significant portion 74(42.5%) classified as having low physical activity, 57(32.8%) having a sedentary lifestyle, 16(9.2%) having moderate physical activity and 27(15.5%) having high physical activity.

pretation and Analysis: A significant majority 97(55.9%) agrees that physical activity helps to promote weight loss 14(7.7%).

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Table 7 showing I include physical activity in my daily routine.

Response	**Frequency**	**Percentage**
Strongly Disagree	25	14.4%
Disagree	24	13.8%
Neutral	20	11.5%
Agree	60	34.5%
Strongly Agree	45	25.8%
Total	**174**	**100**

Interpretation and Analysis: A significant majority 60(34.5%) agrees, 45(25.8%)

strongly agrees, 25(14.4%) strongly disagrees, 24(13.8%) disagrees and 20(11.5%) were neutral that they include physical activity in their daily routine.

Table 8 showing Age is a contributing factor that impact on overweight and obesity?

Response	Frequency	Percentage
Strongly Disagree	15	8.7%
Disagree	50	28.7%
Neutral	20	11.5%
Agree	63	36.2%
Strongly Agree	47	27%
Total	**174**	**100**

Interpretation and Analysis: A significant portion 63(36.2%) of respondents agrees, 15(8.7%) strongly disagrees, 50(28.7%) disagrees, 20(11.5%) were neutral and 10(5.7%) strongly agrees that age is a contributing factor that impacts on overweight and obesity.

Table 9 showing Gender is a contributing factor that impact on overweight and obesity

Response	Frequency	Percentage
Strongly Disagree	13	7.5%
Disagree	30	17.2%
Neutral	21	12.1%
Agree	63	36.2%
Strongly Agree	47	27%
Total	**174**	**100**

Interpretation and Analysis: A significant majority 63(36.2%) agrees, 47(27%) strongly agrees, 13(7.5%) strongly disagrees, 30(17.2%) disagrees and 21(12.1%) were neutral that they believe gender is a contributing factor that impacts on overweight and obesity.

Table 10 showing Alcohol consumption and smoking impact on overweight and obesity ?

Response	**Frequency**	**Percentage**
Strongly Disagree	19	10.9%
Disagree	20	11.5%
Neutral	35	20.1%
Agree	29	16.7%
Strongly Agree	71	40.8%
Total	**174**	**100**

Interpretation and Analysis: A significant majority 71(40.8%) strongly agrees that alcohol consumption and smoking impacts on overweight and obesity while 19(10.9%) strongly disagrees, 20(11.5%) disagrees, 35(20.1%) were neutral and 29(16.7%) agrees.

Table 11 showing Cancer is a potential health risk associated with obesity

Response	**Frequency**	**Percentage**
Strongly Disagree	61	35.1%
Disagree	53	30.5%
Neutral	15	8.6%
Agree	11	6.3%
Strongly Agree	34	19.5%
Total	**174**	**100**

Interpretation and Analysis: A significant portion 61(35.1%) strongly disagrees, 53(30.5%) disagrees, that cancer is a potential health risk associated with obesity.

Table 12 showing Diabetes is a health risk associated with obesity

Response	**Frequency**	**Percentage**
Strongly Disagree	25	14.4%
Disagree	36	20.7%
Neutral	13	7.5%
Agree	62	35.6%
Strongly Agree	38	21.8%
Total	**174**	**100**

50

Interpretation and Analysis: A significant portion 62(35.6%) agrees, 25(14.4%) strongly disagrees, 36(20.7%) disagrees, 13(7.5%) were neutral and 38(21.8%) strongly agrees that diabetes is a health risk associated with obesity.

Table 13 showing Arthritis is a health risk associated with obesity

Response	**Frequency**	**Percentage**
Strongly Disagree	2	1.1%
Disagree	23	13.2%
Neutral	17	9.8%
Agree	70	40.2%
Strongly Agree	64	36.8%
Total	**174**	**100**

Interpretation and Analysis: A significant majority 70(40.2%) agrees, 2(1.1%) strongly disagrees that arthritis is a health risk associated with obesity.

Table 14 showing I believe that improving physical activity can reduce the risk of obesity.

Response	Frequency	Percentage
Strongly Disagree	7	4%
Disagree	12	6.9%
Neutral	3	1.7%
Agree	72	41.4%
Strongly Agree	80	45.9%
Total	**174**	**100**

Interpretation and Analysis: A significant majority 80(45.9%) strongly agrees, 7(4%) strongly disagrees, 12(6.9%) disagrees that improving physical activity can reduce the risk of obesity, thus reinforcing the belief in the role of exercise in obesity prevention and management.

Table 15 Showing Distribution Of Respondents By Age On Whether They Agree/Believe That Increased Physical Activity Among Undergraduate Students Will Lead To A Significant Reduction In Obesity Rates And Contribute To Its Prevention

Age	Yes	No	Total
15-19	10	6	16
20-24	82	5	87
25-29	51	12	63
30 and above	7	1	8
TOTAL	150	24	174

TABLE 16: TESTING RESEARCH HYPOTHESIS

O	E	O-E	(O-E)2	(O-E)2/E
10	13.79	-3.8	14.44	1.05
82	75	7	49	0.65
51	54.31	-3.31	10.96	0.20
7	6.9	0.1	0.01	0.001
6	2.21	3.89	14.44	6.5
5	12	-7	49	4.08
12	8.7	3.3	10.89	1.25
1	1.1	0.1	0.01	0.01

$X^2C=13.74$

Degree of freedom (Df) = (number of row-1) × (number of column-1) Df = (2-1) × (4-1) = 3
Level of significance: 0.05
Decision rule: reject the null hypothesis H_0 if the p value is less than the level of significance. Accept the null hypothesis if otherwise. The table above revealed the chi-square value to be 13.74, the degree of freedom =3 and level of significance at 0.05=7.815. Therefore, since the calculated value of chi- square is greater than the table value of chi-square, we reject the null hypothesis (H_O).

What are the perceived benefits of physical activity in obesity management
This was answered using Table 5-7, this study uncovered the perceived benefits of physical activity in obesity management among the students. Majority of respondents 67(38.4%) agrees that physical activity helps to reduce the risk of heart
disease. The fact that majority of respondents agrees that physical activity helps reduce

the risk of heart disease is significant. This is crucial for obesity management because it underscores the importance of exercise as a preventive measure.
What are the perceived factors that impact overweight and obesity:
This was answered using Table 8-10. A significant portion 63(36.2%) of respondents agree that age is a contributing factor that impacts on overweight and obesity. This highlights a significant awareness that age can play a role in weight-

related issues. In reality, as people age, metabolic changes and lifestyle factors can influence their weight, making it a valid concern.

What are the potential health risks associated with Obesity:

This was answered using Table 11-14. A significant portion 61(35.1%) strongly disagrees that cancer is a potential health risk associated with obesity,it's important to note that there is a well-established link between obesity and several types of cancer, including breast, colon, and kidney cancer. The awareness of this connection is lower
among the respondents. A significant majority 62(35.6%) agrees that diabetes is a health risk associated with obesity. This perception is accurate as obesity is a major risk factor for type 2 diabetes. The awareness of this link is relatively high among the respondents.

RECOMMENDATIONS

Building upon our findings, the researchers offer the following recommendations :

i. **Comprehensive Health Education Programs**: Edo State University, Uzairue, should establish comprehensive health education programs tailored to undergraduate students. These programs should encompass not only the physical benefits of regular activity but also its impact on mental health, stress reduction, and overall quality of life.

ii. **Improved Campus Facilities**: The university should invest in and promote access to on-campus recreational and fitness facilities. Creating an environment that encourages physical activity can significantly contribute to healthier lifestyles among students.

REFERENCES

Adegoke, O., Ozoh, O.B., Odeniyi, I.A., Bello, B.T., Akinkugbe, A.O., Ojo, O.O., Agabi, O.P. and Okubadejo, N.U., (2021). Prevalence of obesity and an interrogation of the correlation between anthropometric indices and blood pressures in urban Lagos, Nigeria.*international journal public health.* 11(1):3522.

Adeloye, D., Ige-Elegbede, J. O., Ezejimofor, M., Owolabi, E. O., Ezeigwe, N., Omoyele, C., Mpazanje, R. G., Dewan, M. T., Agogo, E., Gadanya, M. A., Alemu, W., Harhay, M. O., Auta, A., and Adebiyi, A. O. (2021). Estimating the prevalence of overweight and obesity in Nigeria in 2020. *Annals of medicine.* 53(1):495–507.

Adeniran, O.S., Okpara, I.C., Adeniyi, O.S. and Jimoh, A.K., (2019). Hypertension prevalence in an urban and rural area ofNigeria .*Journal of Medicine and Medical science.*4(4):149-154.

Adeniyi, O. F., Fagbenro, G. T., and Olatona, F. A. (2019). Overweight and Obesity Among School-aged Children and Maternal Preventive Practices against Childhood Obesity in Select Local Government Areas of Lagos, Southwest, Nigeria. *International journal of MCH and AIDS. 8(1), 70–83.*

Afsheen, S., Daniel, B., Aayush, V. and Steven, K. M. (2023). The importance of exercise for glycemic control in type 2 diabetes. *American Journal of Medicine*.
2667(9):100031

Aghaji, M.N. (2020). Doctors' lifestyle in Enugu, Nigeria. *East African Medical Journal.* 77(9) 480-484.

Agu, N., Okeke, K., Echendu, S., Onubogu, C., Ebenebe, J., Ulasi, T., Uchefuna, N., Ifezulike, C., Odita, A. and Ezeogu, J. (2023) Socio-Demographic Factors Associated with Obesity among Adolescents in Secondary School in Onitsha, South East Nigeria. *Open Journal of Endocrine and Metabolic Diseases.*
13: 85-106.

Alotaibi, T., Almuhanna, R., Alhassan, J., Alqadhib, E., Mortada, E., and Alwhaibi, R. (2020). The Relationship between Technology Use and Physical Activity among Typically-Developing Children. *BMC Healthcare* .8(4):488.

Amira C.O., Sokunbi DOB. and Sokunbi A. (2022). The Prevalence of Obesity and Its Relationship with Hypertension In an Urban Community. *International Journal of Medicine and Biomedical research.*1(2):104-110.

Anekwe, C. V., Jarrell, A. R., Townsend, M. J., Gaudier, G. I., Hiserodt, J. M., and Stanford, F. C. (2020). Socioeconomics of Obesity. *Journal of environmental research and public health.*9(3):272–279.

Aparicio-Martinez, P., Perea-Moreno, A. J., Martinez-Jimenez, M. P., Redel-Macías, M. D., Pagliari, C., and Vaquero-Abellan, M. (2019). Social Media, Thin-Ideal, Body Dissatisfaction and Disordered Eating Attitudes: An Exploratory Analysis. *International journal of environmental research and public health.*16(21): 4177

Arzu, D., Tuzun, E.H. and Eker, L. (2018). Perceived barriers to physical activity in University Students. *Journal Sports Sc Med.* 5(4):615-620.

Baghdan (2021) . The associations between alcohol intake and cardiometabolic risk in African-origin adults spanning the epidemiological transition. *BMC Public Health.* 4;21(1):2210.

Barber, T. M., Hanson, P., Weickert, M. O., and Franks, S. (2019). Obesity and Polycystic Ovary Syndrome: Implications for Pathogenesis and Novel Management Strategies. Clinical medicine insights Reproductive healthBern, Switzerland. 3:1179

Bhuiyan, M.U., Zaman, S. and Ahmed, T. (2018). Risk Factors Associated with Overweight and Obesity among Urban School Children and Adolescents in Bangladesh: A Case-Control Study. *BMC Pediatrics.*13, 72.

Ceccato, V., Gaudelet, N. and Graf, G. (2022). Crime and safety in transit environments. *Public Transport.* 14:105–153

Centers for Disease Control and Prevention 2020. The Physical Activity Guidelines for Americans. *Journal of environmental research and public health.*9(3):231

Christensen, P., Meinert Larsen, T., Westerterp-Plantenga, M., Macdonald, I., Martinez, J. A., Handjiev, S., Poppitt, S., Hansen, S., Ritz, C., Astrup, A., Pastor-Sanz, L., Sandø-Pedersen, F., Pietiläinen, K. H., Sundvall, J., Drummen, M., Taylor, M. A., Navas-Carretero, S., Handjieva-Darlenska, T., Brodie, S., Silvestre, M. P. and Raben, A. (2018). Men and women respond differently to rapid weight loss: Metabolic outcomes of a multi-centre intervention study after a low-energy diet in 2500 overweight, individuals with pre-diabetes (PREVIEW). *Diabetes, obesity & metabolism*, *20*(12):2840–2851.

Dumith, S.C., Hallal, P.C., Reis, R.S. and Kohl, H.W. (2021). Worldwide prevalence of physical inactivity and its association with human development index in 76 countries.*Prev Med.* 53(1-2): 24-28.

Elizabeth, A., and Larry, D. (2019). Physical activity, exercise, and chronic diseases: A brief review *Sports Medicine and Health Science.* 3(10):2666-3376.

Elmesmari, R., Martin, A., Reilly, J. J., and Paton, J. Y. (2018). Comparison of accelerometer measured levels of physical activity and sedentary time between obese and non-obese children and adolescents: a systematic review. *BMC pediatrics.*18(1):106.

Fawwaz, M.Y. and Tawfeg, A.E. (2018). Overweight and Obesity among Health Workers at WahdaHospital-Derna-Libya. *Science Journal of Medicine and Clinical Trials*.23 (117): 1-5.

Gutin I.(2018). In BMI We Trust: Reframing the Body Mass Index as a Measure of Health. *Journal of Social theory and health.*16(3):256–271.

Hemmingsson, E. (2018). Early Childhood Obesity Risk Factors: Socioeconomic Adversity, Family Dysfunction, Offspring Distress, and Junk Food Self- Medication. *Current obesity reports.* 7(2):204–209

Hyde, E., Greene, M. E., and Darmstadt, G. L. (2020). Time poverty: Obstacle to women's human rights, health and sustainable development. *Journal of global health.*10(2):020313

Ijoma, U.N., Chime, P., Onyekonwu, C., Ezeala-Adikaibe, B.A., Orjioke, C., Anyim, O.B., Onodugo, O.D., Aneke, E., Nwatu, C.B., Young, E., Mbadiwe, N., Ekenze, O.S., Okoye, J.U., Abonyi, M., Ulasi, I.I., Mbah, A. and Ono- dugo, P.N. (2019) Factors Associated with Overweight and Obesity in an Urban Area of South East Nigeria. *Nigerian Journal of Public Health.*10:735-749.

Iloh, G.U.P., Amadi A.N., Nwankwo BO. and Ugwu V.C. (2021). Obesity in adult Nigerians: a study of its pattern and common primary co-morbidities in a rural a Mission General Hospital in Imo State, South Eastern Nigeria 2011. *Nigerian Journal of Clinical Practice.* 14(2): 212-218.

Irum, N., Aisha, S., Muahmaad, N., Ghulam, M.H., Midassar, H. and Muhammad, S. (2022). Effect of Exercise and Obesity on Human Physiology. *School Bulletin.* 8(1): 17-24.

Ijoma, U.N., Chime, P., Onyekonwu, C., Ezeala-Adikaibe, B.A., Orjioke, C., Anyim, O.B., Onodugo, O.D., Aneke, E., Nwatu, C.B., Young, E., Mbadiwe, N., Ekenze, O.S., Okoye, J.U., Abonyi, M., Ulasi, I.I., Mbah, A. and Ono- dugo, P.N. (2019). Factors Associated with Overweight and Obesity in an Urban Area of South East Nigeria. *Food and Nutrition Sciences. 10:*735-749

Jiotsa, B., Naccache, B., Duval, M., Rocher, B., and Grall-Bronnec, M. (2021). Social Media Use and Body Image Disorders. *International journal of environmental research and public health.* 18(6): 2880.

Kumari, S., Shukla, S., and Acharya, S. (2022).Childhood Obesity: Prevalence and Prevention in Modern Society. *Cureus.* 14(11):31640.

Lin x and Li H. (2021). Obesity: Epidemiology, Pathophysiology, and Therapeutics. Frontiers in endocrinology. *Journal of physiology. 2(14)*: 706978.

Lister, N.B., Baur, L.A., Felix, J.F. (2023). Child and adolescent obesity. *Nat Rev Dis Primers.* 9:23.

Lovell, G.P., Ansari, W. and Parker, J.K. (2020). Perceived exercise benefits and barriers of non-exercising female University students in United Kingdom. *International Journal of Environmental Research Public Health*. 7:784-798.

Mailey E.L., Huberty J,Dinkel D. and McAuley E. (2020).Physical activity barriers and facilitators among working mothers and fathers. *BMC Public Health journal* .14(24): 657.

Malm, C., Jakobsson, J., and Isaksson, A. (2019). Physical Activity and Sports-Real Health Benefits. *A Review with Insight into the Public Health of Sweden*. 7(5):127.

Mills, K.T, Stefanescu, A. and He. J (2020). The global epidemiology of hypertension. *Nat Rev Nephrol.* 16(4):223-237.

Muluvhu, T. C., Monyeki, M. A., Strydom ,G. L., and Toriola, A. L. (2019). Relationship between obesity and blood pressure among employees in the Vhembe district municipality of Limpopo Province, South Africa. *Cardiovascular Journal* .23;30(6):361-368.

Nose, H., Morikawe, M., Yamazaki, T., Nemoto, K., Okazaki, K. and Masuki, S. (2019). Beyond Epidemiology: field studies and the physiology laboratory as The whole World. *Journal of physiology.* 587(23):5569-5575.

Nystoriak, M. A., and Bhatnagar, A., (2018). Cardiovascular Effects and Benefits of

Exercise. *Front Cardiovascular Med.*28;5:135.
Ogden, C. L., Carol, M. D. and Flegal, K.,M. (2018). Prevalence of Childhood and Adult Obesity in the United States. *The Journal of the American Medical Association.* 311(8):806-814.
Ogunbode ,A.M., Ladipo, M., Ajayi, I.O., and Fatiregun, A. A.(2021). Obesity: An emerging disease. *Niger Journal Clinical Practice.* 14:390-394.
Okafor, U. B., and Goon, D. T. (2022). Uncovering Barriers to Prenatal Physical Activity and Exercise Among South African Pregnant Women. *Frontiers in public health. 1*0:697386.
Okazaki, K, Goto, M., and Nose H.(2019). Protein and carbohydrate supplementation increases aerobic and thermoregulatory capacities. *Journal of physiology.* 587(23):5559-5568.
Okoh, B.A.N and Alikor, E.A.D.(2019). Childhood Hypertension and Family History Of Hypertension In Primary School Children In Port Harcourt. *Niger Journal of Paediatrics.* 40 (2): 184 –188.
Olubayo-Fatiregun M.A., Ayodele R.B., and Olorunishola H.K.(2018). Health, fitness, and physical activity; a key to enhancing wellness for all ages in building a vibrant Nation. *Journal of Humanities and Social Sciences.* 2(1): 77-87.
Omuemu, V.O., Okojie, O.H., and Omuemu, C.E. (2018). Awareness of high blood pressure status, treatment and control in a rural community in Edo State, Nigeria. *Journal of Clinical Practice*.10:208-212.
Onyechi, U.A., and Okolo, A.C. (2018). Prevalence of obesity among undergradu-ate students, living in halls of residence, University of Nigeria, Nsukka Campus, Enugu State. *Animal Research Int.* 5(3): 928-931
Otinwa, G., Boluwaji, J., Toba, B., Habeeb, O., and Musiliu, O. (2023). Eating habits and nutrition status of Nigerian school children in rural and urban areas. *Heliyon Journal.* 7(9): 17564.
Panuganti, K.K, Nguyen, M. and Kshirsagar, R.K. (2022). Obesity and its risks. *Journal of Clinical Practice*. 10:8-21
Park, J. H., Moon, J. H., Kim, H. J., Kong, M. H., and Oh, Y. H. (2020). Sedentary Lifestyle: Overview of Updated Evidence of Potential Health Risks. *Korean journal of family medicine. 41*(6):365–373.
Pate, R.R., Pfeiffer, K.A., Trust, S.G., Ziegler, P. and Dowda, M.(2018). Physical activity among children attending preschools. *Journal of Pediatrics*.114(1):1255-1262.
Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D.
A., George, S. M., and Olson, R.D. (2018). The Physical Activity Guidelines for Americans. *JAMA. 3*20(19): 2020–2028.
Purnell, J.Q .(2018). Definitions, Classification and Epidemiology of Obesity. *Journal of the American Association of Nurse Practitioners.* 29(1): S3–S14.
Saouza, M., Rivera I.R, Silva M.A.M and Carvaldho A.(2020). Relationship of Obesity with High Blood Pressure In Children And Adolescents. *Arquivos Brasileiros de Cardiologia*.94(6): 714-719.
Shri N., Singh S. and Singh A. (2023). Prevalence and Predictors of Combined Body Mass Index and Waist Circumference Among Indian Adults. *International Journal Public Health. 68*:1605595.
Spinelli, S., & Monteleone, E. (2021). Food Preferences and Obesity. *Journal Endocrinology and metabolism*. 36(2):209–219.
Talaei, M., Rabiei, K., Talaei, Z., Amiri, N., Zolfaghari, B., and Kabiri, P. (2018). Physical activity, sex, and socioeconomic status. *Journal of public health.*9(1): 51-60
Tazuk, K. (2022). Physician health: A Review of Lifestyle Behaviors and Preventive Health Care among Physicians . *British Colombia Medical Journal.* 54 (8): 419-

423
Tian, D. and Meng, J. (2019). Exercise for Prevention and Relief of Cardiovascular Disease: Prognoses, Mechanisms, and Approaches. *Oxid Med Cell Longev.* 2(6):234
Tiwari, A., and Balasundaram, P. (2023).Public Health Considerations Regarding Obesity. *International journal of environmental research and public health*. 6(21): 417.
Uchendu, C., Windle, R., and Blake, H. (2020). Perceived Facilitators and Barriers to Nigerian Nurses' Engagement in Health Promoting Behaviors: A Socio- Ecological Model Approach. *International journal of environmental research and public health. 17*(4):1314.
Ulasi I. and Ijeoma O.D.(2020). A community based study on hypertension and cardiometabolic syndrome in semi urban and rural community in Nigeria. *BMCHealth services research.* 10:71.
United Nations Sustainable Development Goals. Available at https://sdgs.un.org/goals#history . Accessed on February 27, 2024.
United Nations Sustainable Development Goals. Available at https://sdgs.un.org/2030agenda . Accessed on February 27, 2024.
Van-der-Sande M., Walraven G., Milligan P. ,Banya W., Ceesay S.M., and Nyan O.A. (2021).Family History: An Opportunity for Early Interventions and Improved Control of Hypertension, Obesity and Diabetes. *Bulletin of the World Health Organization*.79: 321–328.
Zierle-Ghosh A. and Jan A. (2022). Physiology and Body Mass Index. *International Journal of Clinical Research*. 11(1):22.

FOTOKATALİZÖR TASARIMI VE FOTOKATALİTİK PARÇALANMA VERİMLİLİĞİNİ ETKİLEYEN PROSES PARAMETRELERİ

PHOTOCATALYST DESIGN AND PROCESS PARAMETERS AFFECTING PHOTOCATALYTIC DEGRADATION EFFICIENCY

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Özet
Küresel sanayileşmenin bir sonucu olarak, toksik maddelerin su ortamlarına salınması önemli ölçüde artmıştır. Mikroorganizmalar, deniz yaşamı ve insanlar, özellikle dünya çapında yılda 810.000 ton renkli pigment üreten boya endüstrisinden kaynaklanan atık sulardan önemli ölçüde zarar görmektedir. Çalışmalara göre, boyaların %10-20'si su sistemlerine deşarj edilmektedir. Bu boyalar, aromatik ve son derece kararlı bileşenler oldukları için uzun bir süre boyunca suda parçalanmazlar. Bu maddelerin mutajenik ve kanserojen özelliklere sahip olduğu bilinmektedir. Deşarj ortamına bırakılmadan önce arıtılmaları ekolojik hayatın sürdürülebilirliği için zorunludur. Mikrodalga bozunumu, adsorpsiyon, iyon değişimi, fotokataliz ve elektrokimyasal prosedürler gibi bir dizi yaklaşım, atık sudan zararlı bileşenleri arıtımı sürecinde kullanılan proseslerdir. Özellikle, fotokatalitik degradasyon, yüksek giderim verimliliği, hızlı oksidasyon süreci, düşük maliyeti ve toksisite eksikliği nedeniyle atık suyu arıtmanın daha etkili bir yöntemidir. Bu yöntemin enerji ve çevre sorunları için çevre dostu ve uzun vadeli umut vadeden bir çözüm olduğu düşünülmektedir. Son zamanlarda fotokatalitik degradasyon sürecinde kullanılmak üzere etkili fotokatalizörlerin geliştirilmesine yönelik birçok araştırma yürütülmüştür. Etkin ve verimli kullanımları için yeterli fotobozunma performansına sahip, görünür ışıkta aktif fotokatalizörlerinin geliştirilmesi bilimsel insanlarının odak noktası olmuştur. Bu çalışmada, literatürdeki mevcut deneysel çalışmalar ışığında hazırlanan mini derleme ile araştırmacılara finansal olarak uygulanabilir ve işlevsel olarak etkili fotokatalizörler, fotobozunmayı etkileyen parametreler ve fotokatalizörlerin gelecek perspektifi sunulmaya çalışılmıştır.

Anahtar Kelimeler: Fotokatalitik degradasyon, katalizör tasarımı, bozunma verimi, süreç parametreleri

Abstract
As a result of global industrialization, the release of toxic substances into the aquatic environment has increased significantly. Microorganisms, marine life, and humans are significantly harmed by wastewater, especially from the dye industry, which produces 810,000 tons of colored pigments annually worldwide. According to studies, 10-20% of dyes are discharged into water systems. These dyes do not decompose in water for a long time because they are aromatic and extremely stable components. It is known that these substances have mutagenic and carcinogenic properties.

Their treatment before being released into the discharge environment is essential for the sustainability of ecological life. Several approaches such as microwave degradation, adsorption, ion exchange, photocatalysis, and electrochemical procedures are processes used in the process of purifying harmful components from wastewater. In particular, photocatalytic degradation is a more effective method of purifying wastewater due to its high removal efficiency, rapid oxidation process, low cost, and lack of toxicity. This method is considered to be an environmentally friendly and long-term promising solution for energy and environmental problems. Recently, many studies have been conducted to develop effective photocatalysts for use in photocatalytic degradation processes. The development of visible light active photocatalysts with sufficient photodegradation performance for their effective and efficient use has been the focus of scientists. In this study, a mini-review prepared in the light of existing experimental studies in the literature was tried to present financially viable and functionally effective photocatalysts, parameters affecting photodegradation, and future perspectives of photocatalysts to researchers.

Keywords: Photocatalytic degradation, catalyst design, degradation efficiency, process parameters

1. GİRİŞ

Küresel sanayileşme ile birlikte toksik bileşiklerin su ekosistemlerine deşarj edilmesi, özellikle boya endüstrisinden kaynaklanan atık suların ciddi çevresel sorunlara yol açmasına neden olmuştur. Boya endüstrisinden kaynaklanan atık sular, mikroorganizmalara, su canlılarına ve insanlara zararlı olabilecek bileşenler içerir. Özellikle bazik, asidik, azo, reaktif ve direkt boyalar gibi ticari boyalar, biyolojik olarak parçalanamayan ve suda kalıcı olan aromatik bileşenler içermektedir. Bu durum, boyaların su ekosistemleri üzerindeki uzun vadeli etkilerini daha da karmaşık hale getirmektedir (Ragavendran vd. 2023; Danish vd. 2021; Tran vd. 2023). Boyaların suda uzun süre bozunmadan kalmaları ve 1 mg/L'nin üzerindeki konsantrasyonların bile su ortamlarında ciddi biyolojik süreçleri olumsuz etkilemesi, etkili arıtma yöntemlerinin geliştirilmesini gerektirir. Suda yüksek boya konsantrasyonları fotosentezi, solunum süreçlerini ve diğer biyolojik aktiviteleri olumsuz etkileyebilir. Boyaların yanı sıra fenolik bileşikler, pestisitler ve herbisitler gibi toksinler, canlı sistemler üzerinde büyük tehlikeler oluşturarak mutajenik etkiler yapabilir ve organlarda kötü huylu büyümelere neden olabilir (Singh vd. 2023; Shanaah vd. 2023). Bu sebeplerle, atık suyun fizikokimyasal özelliklerine dayalı olarak değerlendirilen su kalitesi, çözünmüş ve askıda katı maddeler, kimyasal ve biyolojik oksijen ihtiyacı, renk ve bulanıklık gibi parametrelerle izlenmektedir (Younis vd. 2021; Noman vd. 2020). Son yıllarda, atık sulardan bu toksik bileşiklerin uzaklaştırılması için çeşitli yöntemler geliştirilmiştir. Mikrodalga bozunması, adsorpsiyon, iyon değişimi, fotokataliz ve elektrokimyasal yöntemler bunlardan bazılarıdır (Liu vd. 2023; Zhou vd. 2022; Zhang vd. 2023; Yu vd. 2023). Bu yöntemler içinde fotokataliz, yüksek verimlilik, düşük maliyet ve çevre dostu yapısı nedeniyle oldukça ilgi görmüştür. Fotokataliz yöntemi, su arıtma süreçlerinde daha sürdürülebilir ve yeşil bir çözüm olarak öne çıkmaktadır. Fotokataliz yöntemi, fotokatalizörlerin yapısal ve optik özelliklerinin geliştirilmesi ile daha etkili hale getirilebilir. Fotojenere edilen elektron-delik çiftlerinin ömrünü uzatmak, yüzey yüklerinin hareketini artırmak ve yük taşıyıcı rekombinasyonunu azaltmak bu yöntemlerin verimliliğini artırmaktadır. Son yıllarda yapılan araştırmalar, pratik uygulamalar için görünür ışıkta aktif ve yüksek performansa sahip fotokatalizörler geliştirmeye odaklanmıştır. Bu fotokatalizörlerin spektral özelliklerinin görünür bölgeye genişletilmesi, fotokatalitik süreçlerin etkinliğini artırırken maliyet açısından da uygulanabilir çözümler sunmaktadır (Chen vd. 2023). Fotokatalizörlerin performansının artırılması, çevre dostu ve enerji verimli atık su arıtma süreçleri için kilit bir yaklaşım olarak görülmektedir. Araştırmacılar, fotokataliz teknolojisini daha etkili ve yaygın hale getirmek için çalışmalarını sürdürüyor.

2. FOTOKATALİTİK PROSESLER

2.1. KATALİZÖR TASARIMI

Geçiş metali-iyon katkılaması: Fotokatalizörlerin geçiş metali iyonlarıyla katkılanması, onların yapısal, optik, manyetik, morfolojik ve fotokatalitik özelliklerini önemli ölçüde iyileştirmekte ve bu malzemelerin çok çeşitli uygulama alanlarında kullanılmasını sağlamaktadır (Wahid vd. 2023). Geçiş metalleri (örneğin Mn, Fe, Co, Ni ve Cu), fotokatalizörlerin elektronik yapısını değiştirerek, optoelektronik özelliklerini optimize eder ve ışığa tepkilerini kırmızıya kaydırır. Bu tür katkılamalar, gaz algılama, optoelektronik cihazlar, enerji depolama, biyosensörler, güneş pilleri ve fotokataliz cihazları gibi alanlarda geniş uygulama potansiyeline sahip hale getirir (Attri vd. 2023). Geçiş metali iyonlarının katkılaması, fotokatalizörlerin emisyon fotolüminesans (PL) spektrumlarını azaltarak, yük taşıyıcıların (elektronlar ve delikler) rekombinasyon oranını düşürmeye yardımcı olur. Bu da fotokatalitik aktivitenin artmasına neden olur. Geçiş metallerinin eşsiz d elektron yörüngeleri, fotokatalizörlerin fotodegradasyon işlemi sırasında fotojenere yük taşıyıcılarının yakalanmasını kolaylaştırır. Böylece bu metaller, fotokatalizörlerde hem yük taşıyıcılarının ayrılmasını hızlandırarak hem de reaksiyonları katalizleyerek bozunma süreçlerini daha etkin hale getirir.

Nadir toprak metal iyonu katkılaması: Nadir toprak metalleri ile katkılandırılmış fotokatalizörler, kirleticilerin bozunma etkinliğini artırmak için etkili bir strateji olarak öne çıkmaktadır. Bu metaller, fotokatalizörlerin yüzeyinde fonksiyonel gruplar aracılığıyla kirleticilerle etkileşime girerek daha yüksek bozunma performansı sağlar. Nadir toprak metallerinin f-orbitalleri, Lewis bazları ile kompleksler oluşturarak kirletici moleküllerle güçlü bağlar kurabilir ve bu da fotokatalitik reaksiyonların etkinliğini artırır. Ayrıca, bu metaller fotojenere elektronlar üreterek ve elektron-delik rekombinasyonunu önleyerek fotodegradasyon süreçlerinde önemli roller üstlenirler (Nguyen vd. 2023; Ismael vd. 2023). Bu katkılama yöntemi, fotokatalizörlerin yapısal stabilitesini sağlamada, parçacıkların topaklanmasını önlemede ve termal stabiliteyi artırmada da faydalıdır. Nadir toprak metallerinin fotokatalizörlere eklenmesi, katalizör nanoparçacıklarının büyümesini engelleyerek onların daha küçük ve etkin yüzey alanına sahip olmasını sağlar. Bu da fotokatalitik aktivitenin artmasına yol açar (Guan vd. 2023; Pervaiz vd. 2022). Lantanitler (örneğin Ce, La, Nd, Pr, Eu, Sm, Dy, Gd, Ho, Yb, Er) ile katkılandırılmış fotokatalizörler, geniş çapta incelenmiştir. Bu elementler, f-orbitalleri ile fotokatalizörler arasındaki etkileşimler sayesinde yük taşıyıcılarının daha verimli ayrılmasına katkıda bulunur ve kirletici moleküllerin fotokatalistin yüzeyine adsorpsiyonunu artırır. Bu tür nadir toprak metali katkılamaları, fotokatalizörlerin bozunma performansını iyileştirirken, aynı zamanda katalizörün yüzey zenginleşmesine ve partiküllerin büyüme sürecinin kontrol edilmesine de katkıda bulunur (Li vd. 2022).

Metal olmayan katkılama: Fotokatalizörlerin etkinliğini sınırlayan temel faktörlerden biri, foton kaynaklı yük taşıyıcılarının (elektronlar ve delikler) hızlı bir şekilde rekombine olmasıdır. Bu durum, fotokatalitik reaksiyonların verimliliğini düşürür çünkü rekombinasyon, yük taşıyıcılarının redoks reaksiyonlarına katılmadan kaybolmasına neden olur. Bu sorunun üstesinden gelmek için, fotokatalizörlerde rekombinasyon merkezlerinin azaltılması kritik önem taşır. Metalik olmayan anyonlar kullanılarak bu merkezlerin baskılanması, fotokatalitik performansı artıran etkili bir stratejidir. Periyodik tablonun P bloğundaki metalik olmayan elementler (örneğin B, C, N, F, P ve S), fotokatalizörlerin performansını iyileştirmek amacıyla yaygın olarak katkı maddesi olarak kullanılır. Özellikle daha hafif elementler (N, C, B gibi) kullanıldığında, bu elementler, bant aralığında yeni ara enerji seviyeleri (bant içi durumlar) oluşturur. Bu seviyeler, fotokatalizörün daha geniş bir dalga boyu aralığındaki ışığı absorbe etmesine olanak tanır. Ayrıca, bu hafif elementler, daha düşük atom numaralarına sahip oldukları için, daha yüksek enerji seviyelerine (örneğin 2p durumu) katkıda bulunurlar. Bu durum, fotokatalizörün ışığı daha etkin bir şekilde

emmesini sağlar. Metalik olmayan anyonların yüksek iyonlaşma enerjileri ve elektronegatiflikleri, onların elektronlarla kuvvetli kovalent bağlar oluşturabilmelerine imkân tanır. Böylece fotokatalizörlerin yapısında kararlılık sağlanır. Fotonlar tarafından uyarıldığında, elektronlar değerlik bandından (VB) iletkenlik bandına (CB) geçer, geride delikler bırakır. Bu delikler, fotokatalitik süreçlerde redoks reaksiyonlarına katılarak kirleticilerin ayrışmasını sağlar. Anyonların katkısı ile oluşan izole bant içi durumlar, elektron-delik rekombinasyonunu azaltarak fotokatalitik aktiviteyi artırır. Ek olarak, metalik olmayan anyonların katkısıyla fotokatalizör ışınlandığında, elektronlar bu bant içi safsızlık seviyelerinden CB'ye uyarılır ve safsızlık seviyelerinde eşdeğer miktarda delik oluşur. Bu elektronlar ve delikler, reaksiyon sırasında çeşitli yollarla yakalanarak fotokatalizörün yük taşıyıcı ayrımında önemli bir rol oynar ve böylece fotokatalitik reaksiyonun hızını ve verimliliğini artırır (Soliman vd. 2022; Cako vd. 2023).

Soy metal birikimi: Au ve Ag gibi yaygın soy metaller, fotokatalitik işlemlerde kullanıldıklarında ışıkla etkili bir şekilde etkileşime girerler ve fotokatalitik aktiviteyi artırabilirler. Bunun nedeni, bu metallerin lokalize yüzey plazmon rezonansı (LSPR) fenomenini sergilemesidir. LSPR, metal nanoparçacıklarının (NP'ler) yüksek dalga boylarındaki ışığı emmesini sağlar, bu da fotokatalizörlerin ışıkla etkileşimini genişleterek görünür ışık aralığında fotokatalitik performansı iyileştirir. Altın (Au) ve gümüş (Ag) gibi soy metallerin yanı sıra rutenyum (Rh), platin (Pt) ve paladyum (Pd) gibi diğer soy metaller de fotokatalizörler için araştırılmıştır, ancak daha nadir kullanılırlar (Chinnabathini vd. 2023; Chidambaram vd. 2022). LSPR mekanizması, metal NP'lerin ışığı absorbe etmesini sağlayarak fotokatalitik reaksiyonlara katkıda bulunur. Soy metallerin bu özelliği, özellikle fotokatalitik performansı artırmada önemli bir rol oynar. Fotokataliz süreçlerinde plazmonik nanoparçacıkların (NP'ler) katkısı dört temel LSPR bozunma mekanizması ile açıklanabilir (Liu vd 2022):

1. **Birinci mekanizma:** UV ışık kaynağının etkisi altında sadece fotokatalizör uyarılırken, metal NP'ler ışığı emebilir veya emmeyebilir, dolayısıyla bu durumda LSPR aktif değildir. Yani fotokatalizör LSPR olmaksızın çalışır.
2. **İkinci mekanizma:** Görünür ışıkla yapılan ışınım, yalnızca metal NP'lerin LSPR durumuna uyarılmasını sağlar. Bu durumda, metal NP'ler fotokatalizörü doğrudan uyarmaz; bunun yerine LSPR yoluyla ışık enerjisini emer ve enerji transferi sağlar.
3. **Üçüncü mekanizma:** Hem UV ışığı hem de görünür ışık kaynağı aynı anda hem fotokatalizörü hem de metal NP'leri uyarır. Bu ikili uyarım mekanizması, metal NP'lerin ve fotokatalizörlerin rezonans tepe noktalarının çakışmasını gerektirir. Bu tür bir çakışma, fotokatalitik etkinliği daha da artırabilir.
4. **Dördüncü mekanizma:** Metal NP'lerin LSPR sayesinde görünür ışıkla uyarılması sağlanırken, fotokatalizör UV ışığı tarafından uyarılır. Bu durumda, hem metal NP'ler hem de fotokatalizörler farklı ışık aralıklarında uyarılarak daha geniş bir ışık spektrumunda etkinlik sağlanır.

Bu mekanizmalar, soy metallerin fotokatalizörlerle birleştirilmesinde plazmonik NP'lerin rolünü ve LSPR'nin fotokatalitik performansı nasıl artırabileceğini açıklamaktadır. Bu stratejiler, görünür ışıkta fotokatalitik aktivitenin artırılması açısından büyük bir potansiyele sahiptir ve sürdürülebilir enerji uygulamaları ve çevre dostu teknolojiler için önemli bir yaklaşım olarak kabul edilmektedir.

Yüzey aşılama: Cu(II), Cr(III), Fe(III) ve Ce(III) gibi elementlerin fotokatalizörlere yüzey aşılanması, fotokatalitik performansı artıran önemli bir teknik olarak öne çıkmıştır (Nascimento vd. 2022; Ashar vd. 2021). Bu elementler, arayüzey yük transferi (IFCT) mekanizmaları aracılığıyla fotokatalizörlerdeki yük taşıyıcılarının rekombinasyonunu azaltarak fotokatalitik reaksiyonların etkinliğini artırma potansiyeline sahiptir. Araştırmalar, bu elementlerin sığ tuzaklar olarak işlev gördüğünü ve bu sayede yük taşıyıcılarının ömrünü uzattığını göstermiştir (Gao vd 2023). Yüzey aşılanmış metalik iyonlar, hem fotojenlenmiş elektronların tüketilmesini sağlar hem de derin değerlik bandı (VB) deliklerinin oksidasyon süreçlerine katılmasına olanak tanır. Bu sayede fotokatalizörlerin ışığa duyarlılığı, daha kısa dalga boylarından daha uzun dalga boylarına

doğru genişler, bu da fotokatalitik etkinliğin artmasına yol açar. Yüzey aşılanmış fotokatalizörler tarafından kullanılan mekanizmalar, geleneksel metal katkılı fotokatalizörlerden farklıdır. Bu mekanizmalar, elektronların fotokatalistin VB'sinden fotojenlenmiş IFCT'ye dayalı olarak yüzeyde birikmiş metalik nanokümelere transferini içerir. Aşılanmış geçiş metali nanokümeleri, elektron alıcıları olarak önemli roller oynar. Bu nanokümeler, hızlı foto kaynaklı yük ayrımını başlatarak yük taşıyıcıların rekombinasyonunu azaltır. IFCT işlemi sırasında, fotojenlenmiş elektronlar indirgeme yolları aracılığıyla O_2'yi indirgerken, yüksek oksidasyon potansiyeline sahip delikler O_2 üretebilir. Bu süreç, reaktif OH radikallerinin oluşumunu sağlar. OH radikalleri, su molekülleriyle reaksiyona girerek kirleticilerin bozunmasına doğrudan katkıda bulunur. Bu, fotokatalitik işlemlerde etkin kirletici giderimi sağlayan önemli bir mekanizmadır (Alam vd. 2018).

Boya duyarlılığı: Boyaların fotokatalitik duyarlılığı sırasında, organik boya molekülleri fotokatalizör yüzeyine adsorbe edildiğinde ve ışıkla uyarıldığında fotokatalizörün iletkenlik bandı (CB) veya değerlik bandında (VB) fotojenere elektronlar ve delikler birikir. Bu süreç, Sakata-Hiramoto-Hashimoto (SHH) mekanizması olarak bilinir (Chiu vd. 2019). SHH modeline göre, ışığa duyarlılık, fotokatalizörün türüne ve fotoyla indüklenen elektron transferine bağlıdır (Zhang vd. 2020). Bu modelde, fotokatalizörün ve adsorbe olmuş boya molekülünün ışıkla etkileşimi sonucunda kirleticilerin bozunma reaksiyonları gerçekleşir. n-tipi fotokatalizörlerde, Fermi enerji seviyesi CB'ye daha yakındır, bu da yüzeydeki boş durumların katkısıyla elektronların CB'ye aktarılmasını sağlar. p-tipi fotokatalizörlerde ise, eğer organik boya molekülünün en yüksek işgal edilmiş moleküler yörüngesi (HOMO) yeterince düşükse, Fermi enerji seviyesi VB'ye daha yakın olur ve bu durumda VB'den delik enjeksiyonu gerçekleşir (Reginato vd. 2020). Bu farklı mekanizmalar, fotokatalitik aktiviteyi ve fotokatalizör seçimini etkileyen temel unsurlardır. Işıkla uyarılan boya molekülleri, fotokatalizör yüzeyine adsorbe olduğunda elektronların CB'ye enjeksiyonu hızla gerçekleşir. Bu işlem sırasında boya molekülü katyonik bir radikale dönüşür ve elektronlar fotokatalizörün iletkenlik bandına geçer. Elektronlar CB boyunca hareket eder ve oksijen (O_2) molekülleri ile reaksiyona girerek süperoksit radikalleri ($O_2^{\cdot -}$) oluşturur. Bu radikaller, boya moleküllerinin bozunmasına neden olan bir radikal zincir reaksiyonu başlatır (Guo vd. 2020).

Ortak doping (Eşkatkı): Ortak doping, fotokatalizörlerin optik ve yapısal özelliklerini iyileştirmek için önemli bir teknik olarak kabul edilmektedir. Bu yaklaşım, fotokatalizörlerin bant aralıklarını düzenleyerek, görünür ışık aralığında daha yüksek dalga boylarına doğru ışık soğurma yeteneğini artırır ve fotokatalitik performansı geliştirir. Katkılama, atomik iyonların fotokatalizörün kristal kafesine dahil edilmesini içerir ve bu, kristal yapısında önemli değişikliklere yol açar. Ancak, tek başına katkılama, fotokatalizörlerin fotodegradasyon aktivitesini iyileştirirken, aynı zamanda kısmen doldurulmuş safsızlık bantları nedeniyle yük taşıyıcı rekombinasyonunu artırabilir. Bu nedenle, ortak katkılama, fotokatalitik süreçlerde daha verimli hale gelmek için tercih edilen bir strateji haline gelmiştir (Brindha vd. 2017). Ortak doping, metal-metal, metal-ametal ya da ametal-ametal kombinasyonları şeklinde uygulanarak fotokatalitik performansı iyileştirebilir (Wang vd. 2020; Manojkumar vd. 2022). Bu tür bir doping, fotokatalizörün optik tepkisini daha uzun dalga boylarına, yani kırmızıya kaydırarak fotokatalitik reaksiyonlarda daha geniş bir ışık spektrumunu kullanmasına olanak tanır. Aynı zamanda, ortak dopingin yük taşıyıcı rekombinasyon oranını baskılayarak fotojenere elektron ve deliklerin ömrünü uzattığı bilinmektedir. Bu özellik, fotokatalizörlerin ışık altında daha yüksek verimle çalışmasını sağlar. Teorik olarak, iki veya daha fazla atomun ortak doping olarak dahil edilmesi, kristal yapıda kararsız grupların oluşumunu önleyebilir ve katkı maddesinin çözünürlüğünü artırarak fotokatalizörlerin yapısal kararlılığını iyileştirebilir. Böylece rejeneratif merkezlerin oluşumu engellenir ve fotokatalizörün etkinliği artırılır. Ortak dopingin bu şekilde kullanılması, tek katkılı fotokatalizörlere kıyasla daha verimli sonuçlar verir, çünkü anyonlar ve katyonlar üzerinde daha fazla kontrol sağlar ve optik özellikleri iyileştirir.

2.2. FOTOKATALİTİK BOZULMAYI ETKİLEYEN PARAMETRELER

Işık Yoğunluğu, Işınlama Süresi ve Dalga Boyu: Fotokatalitik bozunma süreçlerinde ışık yoğunluğu, ışınlama süresi ve dalga boyu gibi parametreler, kirleticilerin detoksifikasyonunu doğrudan etkileyen kritik faktörlerdir. UV ve görünür ışık (UV/vis) altında çalışabilen fotokatalizörlerin tasarımı üzerine yapılan çalışmalar, bu parametrelerin optimize edilmesinin fotokatalizörlerin verimliliğini artırmada önemli olduğunu göstermiştir (Ahmadi vd. 2023). Işık yoğunluğu, fotokatalitik reaksiyonlar üzerinde önemli bir etkiye sahiptir. Artan ışık yoğunluğu, daha fazla fotonun fotokatalizöre çarpmasını sağlar ve böylece daha fazla elektron-delik çiftinin oluşturulmasına yol açar. Bu durum, reaktif oksijen türleri (ROS) gibi kirletici maddelerin bozunmasında önemli olan radikallerin üretimini artırır. Araştırmalar, ışık yoğunluğunun 0-20 mW/cm² aralığında kirletici giderme oranını doğrusal olarak artırdığını ortaya koymuştur (Alkaykh vd. 2020; Dong vd. 2018). Ancak, ışık yoğunluğu ~25 mW/cm²'nin üzerine çıktığında, bozunma oranı ışık yoğunluğunun kareköküyle orantılı olarak artmaya başlar (Rafiq vd. 2021). Bu fenomen, aşırı ışık yoğunluğunun fotokatalizörde doygunluk etkisi yaratması ve bu nedenle daha fazla fotonun etkin bir şekilde kullanılamaması ile açıklanabilir (Gupta vd. 2017). Elektron-delik rekombinasyonu, fotokatalitik verimliliği sınırlayan temel sorunlardan biridir. Düşük ışık yoğunluklarında, elektron-delik çiftlerinin rekombinasyon hızı daha yüksek olabilir, bu da reaktif oksijen türlerinin oluşumunu azaltarak kirleticilerin bozunmasını yavaşlatır. Işık yoğunluğunun artırılması, daha fazla elektron ve deliğin ayrılmasını sağlayarak rekombinasyonu azaltır ve fotodegradasyon oranını artırır. Ancak, aşırı yüksek yoğunluklarda, bu etkinin sınırlı olduğu ve bozunma oranının yoğunluğun artmasıyla daha az arttığı gözlenmiştir. Dalga boyu da fotokatalitik verimlilik üzerinde önemli bir etkiye sahiptir. Daha uzun dalga boyundaki ışık, fotokatalizörlerin elektron-delik ayrılmasını kolaylaştırabilir ve böylece katalitik performansı artırabilir. Bu durum, görünür ışıkta aktif fotokatalizörlerin geliştirilmesine yönelik çalışmaları teşvik etmektedir, çünkü bu fotokatalizörler, güneş ışığının daha geniş bir spektrumundan yararlanarak enerji verimliliğini artırabilir.

Süre: Atık sudaki organik kirleticilerin fotokatalitik olarak tamamen arıtılması süresi, bozunma dinamikleri üzerinde önemli bir etkiye sahiptir. Araştırmalar, fotokatalizörlerin foto bozunma verimliliğinin, ışınlama süresi ile orantılı olarak arttığını göstermiştir. Bu eğilim, kirletici moleküller ve fotokatalizör yüzeyi arasındaki etkileşimlerin zamanla daha etkili hale gelmesiyle açıklanabilir. Işınlama süresi arttıkça, kirleticilerin fotokatalizör yüzeyine adsorpsiyonu ve yük taşıyıcılarının (elektronlar ve delikler) fotokatalitik reaksiyonlara katılımı daha verimli hale gelir. Bu süreçte, reaktif oksijen türleri (ROS) ve diğer radikallerin oluşumu da artar, bu da kirletici maddelerin daha fazla parçalanmasını sağlar. Kirletici moleküller ile fotokatalizör yüzeyi arasındaki bu etkileşimlerin güçlenmesi, fotodegradasyon sürecini hızlandırır ve daha yüksek bozunma verimliliği ile sonuçlanır. Özetle, fotokatalitik arıtma süreçlerinde ışınlama süresi önemli bir parametredir ve sürenin artırılması, kirletici maddelerin fotokatalizör yüzeyiyle daha uzun süre etkileşime girmesini sağlayarak fotodegradasyon verimliliğini önemli ölçüde artırır. Bu etkileşimler, atık sulardaki organik kirleticilerin etkili ve tamamen arıtılması için kritik rol oynar (Salama vd. 2018; Kumar vd. 2017).

pH: pH, kirleticilerin fotokatalitik bozunmasında önemli bir faktördür ve fotokataliz sürecinin verimliliğini çeşitli şekillerde etkileyebilir. pH, fotokatalizörlerin yüzey yükünü doğrudan etkileyerek kirleticilerin yüzeye adsorpsiyonunu ve dolayısıyla fotodegradasyon sürecini değiştirir (Lee vd. 2018). Genel olarak, fotokatalizör yüzeyi alkali bir ortamda negatif yüklü olurken, asidik ortamda pozitif yüklü hale gelir. Fotokataliz sürecinde pH'ın bozunma üzerindeki etkisi üç temel mekanizmayla açıklanabilir:

- **Pozitif deliklerle doğrudan oksidasyon**: Fotokatalizörün değerlik bandındaki (VB) pozitif delikler, kirleticilerin oksidasyonuna yol açar. pH, bu deliklerin reaktivitesini ve kirleticilerin yüzeye olan bağlanma kuvvetini etkileyebilir.
- **OH radikallerinin aktivitesi**: pH, OH^- iyonlarının miktarını etkiler. Alkali koşullarda, OH^- iyonlarının fotokatalizör yüzeyinde OH radikalleri (·OH) üretimi için reaktif olması daha olasıdır. Bu radikaller, kirleticilerin oksidasyonunu hızlandıran güçlü oksidanlardır.
- **CB'deki elektronlar tarafından doğrudan indirgeme**: Fotokatalizörün iletkenlik bandındaki (CB) elektronlar, kirleticilerin indirgenmesinde rol oynar. pH, bu elektronların reaktivitesini ve kirletici moleküllerle etkileşimini etkileyebilir.

Fotokatalizör yüzeyindeki yükler, çözeltinin pH'ına bağlı olarak **sıfır yük noktası (PZC)** kavramıyla açıklanır (Zyoud vd. 2023). PZC, fotokatalizör yüzeyinin nötr olduğu pH değerini temsil eder. PZC'nin altında, fotokatalizör yüzeyi pozitif yüklüdür; üstünde ise negatif yüklü hale gelir. Kirleticinin katyonik veya anyonik olmasına bağlı olarak, pH değerinin PZC'ye göre ayarlanması, fotokatalizör yüzeyindeki adsorpsiyon davranışını önemli ölçüde etkiler:

- **Katyonik kirleticiler**: PZC'nin altında pozitif yüklü fotokatalizör yüzeyi ile katyonik kirleticiler arasında itici bir kuvvet oluşur, bu da kirleticilerin yüzeye adsorpsiyonunu ve dolayısıyla fotodegradasyon oranını azaltır. Ancak, PZC'nin üzerinde, fotokatalizör yüzeyi negatif yüklü hale gelir ve katyonik kirleticiler daha iyi adsorbe edilerek fotodegradasyon verimliliği artar.
- **Anyonik kirleticiler**: Pozitif yüklü fotokatalizör yüzeyine sahip asidik ortamlar, anyonik kirleticilerin daha güçlü adsorpsiyonunu sağlar. Bu, fotodegradasyonun daha etkili olmasına katkıda bulunur.

Çeşitli çalışmalar, katyonik kirleticilerin alkali ortamda, anyonik kirleticilerin ise asidik ortamda daha yüksek fotokatalitik aktiviteye sahip olduğunu göstermiştir. Bu, pH'ın fotokatalitik süreçlerde optimize edilmesi gerektiğini ve çözeltinin pH'ının, hedef kirleticilerin doğasına ve fotokatalizörün yüzey özelliklerine göre ayarlanmasının önemini ortaya koymaktadır (Yang vd. 2017).

Fotokatalizör Yükü: Kirleticilerin fotodegradasyon sürecinde fotokatalizör yükünün artması, daha fazla aktif bölgenin yüzeye çıkmasına neden olarak bozunma hızını artırabilir. Bunun sebebi, fotokatalizör yükünün artmasıyla birlikte yüzeyde daha fazla reaksiyon merkezi oluşması ve bu bölgelerde üretilen OH radikallerinin kirletici maddelerin bozunmasına katkı sağlamasıdır. OH radikalleri, kirleticilerin oksidasyonu ve fotokatalitik süreçteki ana reaktif türlerden biridir (Mai vd. 2022). Ancak, fotokatalizör yükü belirli bir seviyenin üzerine çıktığında, parçacıkların topaklaşması meydana gelebilir. Bu durum, fotokatalizör yüzeyinin bir kısmının foton absorpsiyonu için erişilemez hale gelmesine ve fotodegradasyon performansında düşüşe yol açabilir (Rahman vd. 2022). Fotokatalizörün yükünün optimum seviyenin üzerinde artması, fotonların çözeltide yayılmasına ve fotokatalizör yüzeyine ulaşmasının zorlaşmasına neden olabilir. Bu da reaksiyonun etkinliğini azaltır. Bu yüzden, fotokataliz sürecinde kullanılacak fotokatalizör konsantrasyonunun optimize edilmesi, mevcut fotonların maksimum şekilde absorbe edilmesini sağlamak açısından kritik öneme sahiptir (Anju Chanu vd. 2019).

Fotokatalist yüklemesi: Fotokatalist yüklemesinin sulu sistemlerdeki kirleticilerin fotodegradasyonu üzerindeki etkisi, çeşitli çalışmalarda değerlendirilmiş ve fotokatalizör miktarının reaksiyonun başlangıç hızını doğrudan etkilediği bulunmuştur. Fotokatalizör miktarı arttıkça, daha fazla aktif yüzey alanı sunulduğundan, başlangıç reaksiyon hızı da artar. Bu durum, fotokatalizör yüklemesinin kirletici moleküllerle etkileşime giren aktif bölgelerin sayısını artırmasıyla açıklanabilir. Ancak, bu çalışmalar aynı zamanda fotokatalizör yüklemesinin optimize edilmesi gerektiğini vurgulamaktadır. Fotokatalizör yükü belirli bir seviyenin üzerine çıktığında, parçacıklar arasındaki topaklanma ve fotonların dağılması nedeniyle fotokatalitik verimlilik azalabilir. Bu yüzden, kirleticilerin etkili bir şekilde uzaklaştırılabilmesi için fotokatalizör yüklemesinin belirli bir optimum seviyede tutulması gerekir. Aşırı düşük veya yüksek yüklemeler, reaksiyon hızını ve verimliliği olumsuz etkileyebilir (Chen vd. 2020; Wen vd. 2023). Bu

bağlamda, optimal fotokatalizör yüklemesi, sulu sistemde kirleticilerin etkili bir şekilde uzaklaştırılmasını sağlamak için kritik bir parametredir ve her sistem için özel olarak belirlenmelidir. Bu optimizasyon, fotokatalizörün verimliliğini artırmak ve reaksiyon hızını maksimize etmek için gereklidir.

Fotokatalizör nanoparçacıklarının (NP'ler) şekli ve boyutu: Fotokatalizör nanoparçacıklarının (NP'ler) şekli ve boyutu, fotokatalitik performansı doğrudan etkileyen kritik parametreler olarak kabul edilir (Zhou vd. 2011). Daha küçük nanoparçacıkların, fotokatalitik reaksiyonlarda genellikle daha yüksek verimlilik gösterdiği bilinmektedir. Bunun temel sebepleri, daha büyük bir yüzey alanına sahip olmaları ve bu sayede daha fazla aktif bölge sunarak kirleticilerin yüzeye adsorpsiyonunu artırmalarıdır. Ayrıca, daha küçük NP'ler iç elektron-delik rekombinasyonunu azaltarak fotokatalitik süreçlerde yük taşıyıcı ayrımını daha verimli hale getirirler. Fotokatalitik malzemeler genellikle inorganik katılar olduğundan, kristal yapıları X-ışını kırınımı (XRD) analizi kullanılarak değerlendirilebilir. XRD analizinde elde edilen zirvelerin keskinliği, malzemenin kristal yapısını gösterirken, zirve genişliği parçacık boyutunu temsil eder (Hu vd. 2017; Zhou vd. 2018). Daha geniş zirveler, küçük parçacık boyutlarını, daha dar zirveler ise daha büyük kristallerin varlığını işaret eder. Bu bağlamda, nanoparçacık boyutunun ve şeklinin XRD analizi ile doğru bir şekilde belirlenmesi, fotokatalizörlerin performansını anlamak açısından önemlidir. Nanoparçacık boyutunu küçültmenin iki temel avantajı vardır (Danish vd. 2021);

- **Elektron-delik rekombinasyonunun azalması**: Daha küçük boyutlar, elektron-delik çiftlerinin rekombine olmasını zorlaştırır, bu da fotokatalitik verimliliği artırır.
- **Yüzeydeki aktif bölgelerin artması**: Daha küçük NP'ler, daha fazla yüzey alanı sunar, bu da kirletici moleküllerle daha fazla temas ve dolayısıyla daha etkili bozunma sağlar.

Yakın zamanda yapılan çalışmalar, fotokatalizör parçacıklarının küçültülmesinin, kirleticilerin bozunma hızını artırdığını göstermiştir (Moreno vd. 2021). Bu artış, yüzey alanının artmasıyla doğru orantılıdır. Ancak, nanoparçacıkların boyutunun ve şeklinin optimize edilmesi, fotokatalitik performansı maksimize etmek için gereklidir, çünkü aşırı küçük boyutlar bazı durumlarda nanoparçacıkların topaklanmasına neden olabilir ve bu da fotokatalitik verimliliği olumsuz etkileyebilir.

Çözünmüş oksijen miktarı: Çözünmüş oksijen, kirleticilerin fotokatalitik bozunma süreçlerinde kritik bir rol oynar. Fotokatalitik reaksiyonlar sırasında, oksijenin uyarılmış elektronları yakalayan bir elektron temizleyici olarak işlev görmesi, elektron-delik rekombinasyonunu önler ve böylece fotokatalitik verimliliği artırır. Bu mekanizma, reaktif oksijen türlerinin (ROS) üretimini teşvik eder, özellikle süperoksit radikalleri ($O_2^{\cdot -}$) ve hidroksil radikalleri (·OH) gibi türler, kirleticilerin oksidasyonunda önemli rol oynar. Çözünmüş oksijenin fotokatalitik reaksiyonlar üzerindeki etkisi, kirleticilerin bozunma performansını iki temel yolla iyileştirebilir (Ren vd. 2023; Xue vd. 2022).

- **Rekombinasyonun önlenmesi**: Çözünmüş oksijen, fotokatalizörün yüzeyine ulaşan uyarılmış elektronları yakalayarak elektron-delik çiftlerinin rekombinasyonunu önler. Bu sayede daha fazla elektron, reaktif oksijen türlerinin oluşumuna katılır ve bozunma süreçleri hızlanır.
- **Reaktif oksijen türlerinin (ROS) üretimi:** Oksijenin katılımı, fotokatalizör yüzeyinde ROS üretimini artırır. Özellikle süperoksit radikalleri ($O_2^{\cdot -}$) ve hidroksil radikalleri (·OH) gibi türler, organik kirleticilerin oksidatif bozunmasına katkı sağlar. Bu radikaller, kirleticilerin yapısını bozarak mineralizasyon sağlar ve onları zararsız ürünlere dönüştürür.

Sıcaklık: Reaksiyon sıcaklığındaki değişiklikler, fotokatalitik süreçlerin verimliliği üzerinde önemli bir etkiye sahiptir. Artan sıcaklık, çözeltide kabarcıkların oluşumunu teşvik ederek fotokatalitik aktiviteyi artırabilir (Chen vd. 2021). Kabarcıklar, fotokatalizör yüzeyine daha fazla reaktif madde ulaşmasını sağlayarak reaksiyon hızını yükseltir. Bununla birlikte, yüksek sıcaklıklar, özellikle 80°C'nin üzerindeki sıcaklıklar, fotokataliz sürecinde olumsuz etkilere de yol açabilir. Artan sıcaklık, elektron-delik çiftlerinin hızla yeniden birleşmesine neden olur, bu da fotokatalitik verimliliği azaltır. Yüksek sıcaklık, kirleticilerin fotokatalizör yüzeyine adsorpsiyonunu zorlaştırabilir, bu da kirletici moleküllerin yüzeye bağlanmasını engelleyerek

bozunma sürecini yavaşlatır. 80°C'nin altındaki sıcaklıklar, adsorpsiyon hızını artırarak kirleticilerin fotokatalizör yüzeyine daha etkili bir şekilde bağlanmasına yardımcı olur. Ancak, sıcaklık 0°C'nin üzerine düştüğünde, görünür aktivasyon enerjisi yükselir ve bu da reaksiyonun daha fazla enerji gerektirmesine yol açar. Bu nedenle, çok düşük sıcaklıklar fotokatalitik verimliliği azaltabilir. Optimum sıcaklık aralığı: Yapılan araştırmalara göre, kirleticilerin fotokatalitik bozunması için en uygun sıcaklık aralığı 20-80°C olarak kabul edilmektedir. Bu aralıkta, hem reaksiyon hızını artıracak kadar yüksek sıcaklık sağlanır hem de adsorpsiyon ve yük taşıyıcı rekombinasyonu gibi olumsuz etkiler minimize edilir (Vel´azquez vd. 2017). Yüksek sıcaklıklar, fotokatalitik bozunma hızını artırabilir. Örneğin, Wang ve çalışma arkadaşları polietilen, polipropilen ve polistiren gibi polimerlerin fotokatalitik bozunmasını incelemiş ve sıcaklık artışının foto-bozunma hızını artırdığını gözlemlemişlerdir. Bu, özellikle yüksek sıcaklıklarda reaktif oksijen türlerinin (ROS) üretiminin artmasıyla açıklanabilir, bu da fotokatalitik reaksiyonların hızlanmasına katkıda bulunur (Pill vd. 2021).

Kirletici Miktarı: Kirleticilerin sulu ortamdaki miktarı, fotokatalitik bozunma hızını doğrudan etkileyen önemli bir faktördür. Fotokataliz reaksiyonlarının hızı, genellikle kirleticilerin konsantrasyonu ile doğru orantılıdır, ancak belirli bir noktada bu ilişki tersine dönebilir. Kirletici konsantrasyonunun artmasıyla birlikte fotokatalizör yüzeyine daha fazla kirletici molekülü adsorbe edilir. Bu durum, yüzeyde daha fazla reaksiyon merkezi oluşmasına olanak tanır, bu da başlangıçta fotodegradasyon hızını artırabilir. Ancak, kirletici konsantrasyonu çok yüksek olduğunda, fotokatalizör yüzeyine ulaşan foton sayısı azalır. Bu azalma, fotonların kirletici moleküller tarafından emilmesi veya yüzeyi tamamen kaplayan kirletici moleküller nedeniyle fotokatalizör yüzeyinin aktif bölgelerine fotonların erişiminin engellenmesinden kaynaklanır. Sonuç olarak, reaksiyon verimliliği ve bozunma performansı düşer (Selvaraj vd. 2021; Javaid vd. 2019; Gonz´alez vd. 2023).

Heterojen fotokataliz: Heterojen fotokataliz, sulu süspansiyonlardan kirleticilerin uzaklaştırılması için en etkili ve çevre dostu yöntemlerden biridir. Ancak, fotokatalizörlerin kullanımında karşılaşılan temel sorunlardan biri, hızlı elektron-delik rekombinasyonu nedeniyle düşük foto kuantum verimliliğidir. Ayrıca, bazı fotokatalizörler geniş bant aralıklarına sahip olduklarından, görünür ışık altında etkin bir şekilde çalışamazlar. Bu nedenle, fotokatalizörlerin görünür ışık altında daha etkili çalışabilmesi ve rekombinasyon oranını düşürmek için çeşitli stratejiler geliştirilmiştir. Fotokatalizörlerin performansını artırmaya yönelik stratejilerden biri katkılamadır. Metal ve metal olmayan iyonlarla katkılama, fotokatalizörlerin elektron-delik rekombinasyon oranını azaltarak verimliliğini artırabilir. Katkılamanın temel amacı, fotokatalizörün optik özelliklerini iyileştirerek ışığın absorpsiyonunu artırmaktır. Bu, bant aralığının kırmızıya kaymasına yol açar, yani daha uzun dalga boylu (düşük enerjili) fotonlar tarafından uyarılabilir hale gelir. Bu sayede fotokatalizörler, görünür ışık altında daha etkin hale gelir ve kirleticilerin bozunma oranı artar (Li vd. 2023; Zhao vd. 2023).

Rekombinasyon: Elektron-delik çiftlerinin rekombinasyonu, fotokatalitik reaksiyonların verimliliğini olumsuz etkileyen önemli bir süreçtir. Fotokataliz sırasında uyarılan elektronlar ve delikler, redoks reaksiyonlarına katılmadan önce yeniden birleşirse, bu süreç ürün üretmez ve fotokatalitik etkinlik azalır. Rekombinasyon, fotokatalitik giderim oranını düşürür ve redoks işlemlerinin verimliliğini sınırlar. Rekombinasyon hızını ölçmek zor olabilir çünkü bu süreç doğrudan bir ürün üretmez. Ancak, rekombinasyon hızını tahmin etmek için foto soğurma oranından elde edilen elektron ve deliklerin katıldığı toplam reaksiyon hızının çıkarılması kullanılabilir. Bu, fotokatalitik sistemde oluşan elektron-delik çiftlerinin ne kadarının redoks reaksiyonlarına katıldığını ve ne kadarının rekombinasyona uğradığını anlamaya yardımcı olur (Perumal vd. 2023)

2.3. MEVCUT ZORLUKLAR

Kirletici maddelerin fotokatalitik bozunması, çevre dostu bir çözüm olarak umut vadetse de, bu yaklaşımın geniş çaplı uygulanmasını engelleyen çeşitli zorluklar bulunmaktadır. Bu zorluklar, hem fotokatalizör tasarımındaki karmaşıklıklardan hem de gerçek dünya uygulamalarında karşılaşılan teknik sınırlamalardan kaynaklanmaktadır. Bu engellerin aşılması için disiplinler arası araştırmalar ve yenilikler gereklidir. Mevcut zorluklar şu şekilde özetlenebilir (Lee vd. 2023):

- **Seçicilik ve Verimlilik**: Fotokatalitik reaksiyonlarda yüksek seçicilik ve verimlilik elde etmek hala zordur. Fotokatalizörlerin kirleticilere karşı sınırlı seçicilik göstermesi, düşük reaksiyon hızlarıyla birleştiğinde eksik bozunma veya istenmeyen yan ürünlerin oluşmasına yol açabilir. Fotokatalizörlerin daha seçici hale getirilmesi ve yan ürün oluşumunun önlenmesi kritik öneme sahiptir.
- **Fotokatalist Tasarımı**: Fotokatalizörlerin uygun bant aralıklarına, yüksek yüzey alanına ve foto-korozyona dayanıklı olmasına yönelik tasarımlar karmaşıktır. Yüksek verimli ve istikrarlı fotokatalizörlerin geliştirilmesi için malzeme bilimi konusunda derinlemesine bilgi gerekmektedir.
- **Maliyet ve Ölçeklenebilirlik**: Fotokatalizörlerin büyük ölçekli uygulamalara geçmesi, nadir ve pahalı malzemelerin kullanılması nedeniyle sınırlıdır. Bu yüzden uygun maliyetli ve ölçeklenebilir sentez yöntemlerinin geliştirilmesi gerekmektedir.
- **Reaktör Tasarımı ve Işık Kaynakları**: Fotokatalitik reaktörlerin optimize edilmesi, ışığın düzgün dağıtılmasını ve reaktanların etkili kütle transferini sağlamak açısından zordur. Ayrıca, işletme maliyetlerini azaltmak için sürdürülebilir ışık kaynakları (güneş ışığı veya LED) kullanılmalıdır.
- **Matris Etkileri**: Gerçek dünyadaki atık su, toprak veya hava kirliliği gibi kompleks matrisler, fotokatalitik işlemlere müdahale edebilir. Bu matrisler, kirleticilerin fotokatalizör yüzeyine adsorpsiyonunu engelleyebilir ve reaksiyon verimliliğini düşürebilir.
- **Bozunma Yolları ve Yan Ürünler**: Kirleticilerin fotokatalitik bozunma yollarının tam olarak anlaşılması önemlidir. Eksik bozunma, toksik ara ürünlerin veya yan ürünlerin oluşmasına neden olabilir, bu yüzden yan ürünlerin dikkatli bir şekilde incelenmesi gerekmektedir.
- **Kinetik ve Reaksiyon Mekanizmaları**: Fotokatalitik süreçlerin kinetik ve reaksiyon mekanizmalarının detaylı bir şekilde anlaşılması, katalizörlerin optimize edilmesi için gereklidir. Farklı kirleticiler için uygun mekanizmaların belirlenmesi karmaşık ve zorlu bir süreçtir.
- **Çeşitli Kirleticilere Uygulanabilirlik**: Fotokataliz, her tür kirletici için aynı derecede etkili olmayabilir. Farklı kimyasal yapılara sahip kirleticiler, özel tasarımlar ve farklı reaksiyon koşulları gerektirir. Fotokatalizörlerin bu çeşitliliklere adapte edilmesi bir zorluktur.
- **Uzun Süreli Kararlılık**: Fotokatalizörlerin uzun vadeli kararlılığı, özellikle zorlu çevre koşullarında bozulmalarını önlemek açısından önemlidir. Zamanla aktivitelerini kaybetmeyen kararlı fotokatalizörler geliştirmek, teknolojinin pratik uygulamaları için kritik bir gerekliliktir.
- **Düzenleme Engelleri**: Fotokatalitik teknolojinin daha büyük ölçekli uygulamalara geçişi sırasında güvenlik, çevresel etki ve standardizasyonla ilgili düzenleyici zorluklar ortaya çıkabilir. Bu sorunlar, disiplinler arası işbirliklerini ve yasal düzenlemelere uygun çözümler geliştirmeyi gerektirir.

Bu zorlukların üstesinden gelmek, fotokatalizin çevresel kirlilikle mücadelede tam potansiyelini ortaya çıkarmak için gereklidir. Fotokatalitik süreçlerin daha verimli ve yaygın hale gelmesi, bu sorunlara yönelik yenilikçi çözümler ve sürekli araştırmalarla mümkün olacaktır.

2.4. ÇEVRESEL UYGULAMALARA YÖNELİK FOTOKATALİSTLERDE GELECEKTEKİ EĞİLİMLER

Fotokataliz, kimyasal reaksiyonları yönlendirmek için ışığı kullanan ve çevresel sorunları çözme potansiyeline sahip bir süreç olarak büyük ilgi görmeye devam etmektedir. Sürdürülebilirliğe olan talebin artmasıyla birlikte, fotokatalizörlerin çevresel amaçlarla geliştirilmesi ve uygulanmasına

yönelik gelecekteki eğilimler, daha etkili ve sürdürülebilir çözümler sunmaktadır. Bu bağlamda, dikkat çekici bazı eğilimler şunlardır (Lee vd. 2023):

- **Gelişmiş Nanomateryallerin Kullanımı**: Kuantum noktaları, metal-organik çerçeveler (MOF'lar) ve grafen gibi iki boyutlu malzemeler, yüksek yüzey alanı, verimli yük taşıyıcı ayrımı ve ayarlanabilir bant aralıkları gibi avantajlar sunarak fotokatalitik verimliliği artırma potansiyeline sahiptir. Bu tür nanomateryallerin sentezi ve kullanımı, daha etkili ve performans odaklı fotokatalizörlerin geliştirilmesine olanak sağlayacaktır.
- **Plazmonik Nanopartiküller ve LSPR**: Plazmonik nanopartiküller, özellikle altın ve gümüş gibi metaller, yerel yüzey plazmon rezonansı (LSPR) sayesinde ışık emilimini ve katalitik aktiviteyi artırabilir. Bu nanopartiküllerin geleneksel fotokatalizörlerle entegrasyonu, ışık kaynaklarından daha fazla yararlanmayı ve çevresel uygulamalarda daha yüksek performans elde etmeyi mümkün kılar.
- **Karbon Bazlı Malzemeler**: Karbon noktaları, karbon nitrür ve grafen bazlı kompozitler gibi karbon tabanlı malzemeler, uygun maliyetleri ve çevresel stabiliteleri ile ön plana çıkar. Bu malzemeler, pahalı ve nadir elementlere olan bağımlılığı azaltarak sürdürülebilir ve uygun maliyetli fotokatalizörler için güçlü adaylardır.
- **Bant Yapılarının Tasarlanması**: Fotokatalizörlerin bant yapılarını katkılama, alaşımlama veya hetero yapılanma yoluyla optimize etmek, güneş spektrumunun daha geniş bir aralığında ışık absorpsiyonu sağlayarak fotokatalitik aktiviteyi artırabilir. Bu yaklaşım, özellikle görünür ışık altında yüksek verimlilik sağlayarak fotokatalizörlerin pratik uygulamalarda kullanımını teşvik eder.

- **Ortak Katalizörlerin Entegrasyonu**: Soy metaller veya yarı iletken katkılar gibi yardımcı katalizörlerin fotokatalizör yüzeylerine eklenmesi, yük taşıyıcı ayrımını ve genel fotokatalitik performansı iyileştirebilir. Bu sinerjik sistemler, fotokatalitik reaksiyonlarda daha fazla verimlilik ve kararlılık sağlayarak çevresel uygulamalara katkıda bulunur.
- **Yapay Zeka ve Makine Öğrenimi**: Yapay zeka (AI) ve makine öğrenimi (ML), yeni fotokatalitik malzemelerin keşfi ve tasarımında devrim niteliğinde bir rol oynamaktadır. Bu hesaplamalı yaklaşımlar, malzeme özelliklerini hızlı bir şekilde analiz ederek daha verimli ve özelleştirilmiş fotokatalizörlerin geliştirilmesini hızlandırabilir.
- **Enerji Dönüşümü ve Depolama**: Fotokatalizörlerin sadece kirletici maddelerin giderilmesinde değil, aynı zamanda enerji dönüşümü ve depolama uygulamalarında da önemli bir rol oynayacağı öngörülmektedir. Su ayrıştırma ve CO_2 azaltma gibi süreçler, temiz yakıt ve kimyasalların üretiminde fotokatalizörlerin kullanımını mümkün kılacaktır.

Bu eğilimler, fotokataliz teknolojisinin gelecekteki gelişimini şekillendirecek ve çevresel sürdürülebilirlik ile enerji yönetimi alanlarında daha geniş çaplı çözümlerin hayata geçirilmesine olanak tanıyacaktır. Fotokatalizörlerin geliştirilmesi, çevre dostu ve ölçeklenebilir teknolojilerle daha temiz bir dünya için önemli bir araç haline gelecektir.

3. SONUÇLAR

Bu inceleme, endüstriyel proseslerden kaynaklanan su kirleticilerinin etkili bir şekilde bozunması amacıyla geliştirilen yeni nesil fotokatalizör tasarımlarını açıklamaktadır. Fotokatalizörlerin ışığa tepkisini artırmak ve fotojenere edilen elektron-delik çiftlerinin ömrünü uzatmak için çeşitli stratejiler önerilmiştir. Bu stratejilerden biri, fotokatalizörlerin spektral aralığını görünür ışık bölgesine genişleterek daha verimli hale getirilmesidir. Aynı zamanda, heteroeklemler gibi uygun bant aralığı yapılarına sahip fotokatalizörlerin üretilmesi, daha geniş dalga boyu aralıklarına tepki veren ve böylece daha yüksek fotokatalitik aktivite gösteren malzemelerin geliştirilmesi açısından etkili bir yöntem olarak kabul edilmektedir. Fotokatalizörlerin bant kenarları, redoks

reaksiyonlarında yüksek potansiyele sahip olmalı ve fotodegradasyon hızını artırmak için radyasyon yoğunluğu optimize edilmelidir. Fotokatalitik süreçte yüzey yük özellikleri, pH etkisiyle doğrudan bağlantılıdır ve bu da pHzpc (sıfır yük noktası) kavramıyla açıklanmaktadır. Fotokatalizörlerin yüzeyinde biriken yüklerin pH'a göre nasıl değiştiği, reaksiyonların verimliliğini önemli ölçüde etkiler. Kirleticilerin etkili bir şekilde parçalanması için fotokatalizörün optimal dozu belirlenmelidir; aşırı yüksek fotokatalizör yüklemeleri ise ışığın dağılmasına neden olarak foton emilimini azaltabilir ve fotokatalitik verimliliği düşürebilir. Ayrıca, fotokatalitik reaksiyonların sıcaklık aralığının da optimize edilmesi önemlidir. Araştırmalar, fotokatalitik bir reaktörde kirleticilerin etkin bir şekilde uzaklaştırılması için ideal sıcaklık aralığının 20–80°C olduğunu göstermektedir. Bu sıcaklık aralığında fotokatalitik aktivite maksimum düzeye çıkar, ancak aşırı sıcaklık artışı fotokatalizörlerin yapısal bütünlüğüne zarar verebilir.

Sonuç olarak, fotokatalizör tasarımının temel ilkelerini anlamak, atık su kirleticilerinin arıtılmasında araştırmacılara yol gösterici olabilir. Geliştirilen yeni stratejiler, su kirleticilerinin fotokataliz yoluyla daha verimli ve sürdürülebilir bir şekilde bozundurulması için önemli adımlar sunmaktadır. Fotokatalizörlerin mekanizmalarının daha derinlemesine anlaşılması, bu teknolojinin atık su arıtma gibi çevresel uygulamalarda daha yaygın kullanılmasına olanak sağlayacaktır.

4. KAYNAKLAR

Ahmadi, M., Alavi, S. M., & Larimi, A. (2023). UV–vis light responsive Bi2WO6 nanosheet/TiO2 nanobelt heterojunction photo-catalyst for CO2 reduction. *Catalysis Communications*, *179*, 106681.

Alam, U., Khan, A., Bahnemann, D., & Muneer, M. (2018). Synthesis of iron and copper cluster-grafted zinc oxide nanorod with enhanced visible-light-induced photocatalytic activity. *Journal of Colloid and Interface Science*, *509*, 68–72.

Ashar, Bhatti, I. A., Jilani, A., Mohsin, M., Rasul, S., Iqbal, J., Shakoor, M. B., Al-Sehemi, A. G., Wageh, S., & Al-Ghamdi, A. A. (2021). Enhanced solar photocatalytic reduction of Cr(VI) using a (ZnO/CuO) nanocomposite grafted onto a polyester membrane for wastewater treatment. *Polymers*, *13*, 4047.

Attri, P., Garg, P., Chauhan, M., Singh, R., Sharma, R. K., Kumar, S., Lim, D. K., & Chaudhary, G. R. (2023). Metal doped BiOCl nano-architectures (M-BiOCl, M = Ni, Mo, Cd, Co) for efficient visible light photocatalytic and antibacterial behaviour. *Journal of Environmental Chemical Engineering*, *11*, 109498.

Brindha, T., & Sivakumar, T. (2017). Visible active N, S co-doped TiO2/graphene photocatalysts for the degradation of hazardous dyes. *Journal of Photochemistry and Photobiology A: Chemistry*, *340*, 146–156.

Cako, E., Dudziak, S., Głuchowski, P., Trykowski, G., Pisarek, M., Borzyszkowska, A. F., Sikora, K., & Zielinska-Jurek, A. (2023). Heterojunction of (P, S) co-doped g-C3N4 and 2D TiO2 for improved carbamazepine and acetaminophen photocatalytic degradation. *Separation and Purification Technology*, *311*, 123320.

Chen, J., Zhang, X., Shi, X., Bi, F., Yang, Y., & Wang, Y. (2020). Synergistic effects of octahedral TiO2-MIL-101(Cr) with two heterojunctions for enhancing visible-light photocatalytic degradation of liquid tetracycline and gaseous toluene. *Journal of Colloid and Interface Science*, *579*, 37–49.

Chen, Y., Li, R., Yang, L., Wang, R., Li, Z., Li, T., Liu, M., Ramakrishna, S., & Long, Y. (2023). Synergistic effects of magnetic Z-scheme g-C3N4/CoFe2O4 nanofibres with controllable morphology on photocatalytic activity. *Nanomaterials*, *13*, 1142.

Chen, Y. W., & Hsu, Y. H. (2021). Effects of reaction temperature on the photocatalytic activity of TiO2 with Pd and Cu cocatalysts. *Catalysts*. https://doi.org/10.3390/catal11080966.

Chidambaram, S., Baskaran, B., Ganesan, M., Muthusamy, S., Alavandar, S., Muthusamy, S., Pandiyan, S., & Panchal, H. (2022). One pot synthesis of Ag-Au/ZnO nanocomposites: A multi-junction component for sunlight photocatalysis. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, *44*, 758–770.

Chinnabathini, V. C., Dingenen, F., Borah, R., Abbas, I., van der Tol, J., Zarkua, Z., D'Acapito, F., Nguyen, T. H. T., Lievens, P., Grandjean, D., Verbruggen, S. W., & Janssens, E. (2023). Gas phase deposition of well-defined bimetallic gold-silver clusters for photocatalytic applications. *Nanoscale*, *15*, 6696–6708.

Danish, M., & Muneer, M. (2021). Facile synthesis of highly efficient co@ZnSQDs/g-C3N4/MWCNT nanocomposites and their photocatalytic potential for the degradation of RhB dye: Efficiency, degradation kinetics, and mechanism pathway. *Ceramics International*, *47*, 13043–13056.

Danish, M., & Muneer, M. (2021). Novel ZnSQDs-SnO2/g-C3N4 nanocomposite with enhanced photocatalytic performance for the degradation of different organic pollutants in aqueous suspension under visible light. *Journal of Physics and Chemistry of Solids*, *149*, 109785.

Dong, C., Lu, J., Qiu, B., Shen, B., Xing, M., & Zhang, J. (2018). Developing stretchable and graphene-oxide-based hydrogel for the removal of organic pollutants and metal ions. *Applied Catalysis B: Environmental*, *222*, 146–156.

Gao, Q., Li, W., Liu, P., Wang, Q., & Yang, Y. (2023). Interfacial structures and reactivities of CeO2/Cu(111) catalyst with strong interfacial interaction and charge transfer. *Applied Surface Science*, *607*, 155118.

Guan, P., Yang, B., Liu, J., Yin, H., Jiang, J., Sui, L., & Yang, S. (2023). Synthesis of novel rare-earth cerium doped C3N4 nanocomposites for boosting photocatalytic H2 evolution. *Chemical Physics Letters*, *811*, 140222.

Guo, G., Guo, H., Wang, F., France, L. J., Yang, W., Mei, Z., & Yu, Y. (2020). Dye-sensitized TiO2@SBA-15 composites: Preparation and their application in photocatalytic desulfurization. *Green Energy & Environment*, *5*, 114–120.

Gupta, V. K., Saravanan, R., Agarwal, S., Gracia, F., Khan, M. M., Qin, J., & Mangalaraja, R. V. (2017). Degradation of azo dyes under different wavelengths of UV light with chitosan-SnO2 nanocomposites. *Journal of Molecular Liquids*, *232*, 423–430.

Hu, X., Hu, X., Tang, C., Wen, S., Wu, X., Long, J., Yang, X., Wang, H., & Zhou, L. (2017). Mechanisms underlying degradation pathways of microcystin-LR with doped TiO2 photocatalysis. *Chemical Engineering Journal*, *330*, 355–371.

Ismael, M. (2023). Environmental remediation and sustainable energy generation via photocatalytic technology using rare earth metals modified g-C3N4: A review. *Journal of Alloys and Compounds*, *931*, 167469.

Javaid, R., & Qazi, U. Y. (2019). Catalytic oxidation process for the degradation of synthetic dyes: An overview. *International Journal of Environmental Research and Public Health*, *16*, 2066.

Lee, E. J., Lee, J. W., Lee, J., Min, H. K., Yi, J., Song, I. K., & Kim, D. H. (2018). Ag-(Mo-W)/ZrO2 catalysts for the production of propylene oxide: Effect of pH in the preparation of ZrO2 support. *Catalysis Communications*, *111*, 80–83.

Lee, D. E., Kim, M. K., Danish, M., & Jo, W. K. (2023). State-of-the-art review on photocatalysis for efficient wastewater treatment: Attractive approach in photocatalyst design and parameters affecting the photocatalytic degradation. *Catalysis Communications*, 106764.

Li, J., Chu, B., Xie, Z., Deng, Y., Zhou, Y., Dong, L., Li, B., & Chen, Z. (2022). Mechanism and DFT study of degradation of organic pollutants on rare earth ions doped TiO2 photocatalysts prepared by sol-hydrothermal synthesis. *Catalysis Letters*, *152*, 489–502.

Li, Z., Zhang, L., Wang, L., Yu, W., Zhang, S., Li, X., & Zhai, S. (2023). Engineering the electronic structure of two-dimensional MoS2 by Ni dopants for pollutant degradation. *Separation and Purification Technology*, *314*, 123637.
Liu, M., Kang, Q., Xie, Z., Lu, L., & Dai, K. (2022). Heterostructure nanocomposite with local surface plasmon resonance effect enhanced photocatalytic activity-a critical review. *Journal of Physics D: Applied Physics*, *55*, 043002.
Liu, X. Q., Yan, X. H., Liang, J., Kuang, H. X., & Xia, Y. G. (2023). Microwave assisted free radical degradation of Schisandra polysaccharides: Optimization, identification and application. *International Journal of Biological Macromolecules*, *237*, 124107.
Mai, X. T., Bui, D. N., Pham, V. K., Nguyen, T. H. L., Nguyen, T. T. L., Chau, H. D., & Tran, T. K. N. (2022). Effect of CuO loading on the photocatalytic activity of SrTiO3 for hydrogen evolution. *Inorganics*, *10*, 130.
Manojkumar, P., Premchand, C., Lokeshkumar, E., Subrahmanyam, C., Viswanathan, A., Krishna, L. R., & Rameshbabu, N. (2022). Development of immobilised sunlight active W-Mo/Mo-V/V-W co-doped TiO2 photocatalyst by plasma electrolytic oxidation. *Journal of Alloys and Compounds*, *919*, 165781.
Moreno, Y. P., da Silva, W. L., Stedile, F. C., & Radtke, C. (2021). Micro and nanodomains on structured silica/titania photocatalysts surface evaluated in RhB degradation: Effect of structural properties on catalytic efficiency. *Applied Surface Science Advances*, *3*, 100055.
Nascimento Nunes, B., Bahnemann, D. W., & Patrocinio, A. O. T. (2022). Efficient photocatalytic H2 evolution by hexaniobate nanosheets grafted with copper nanoclusters. *ChemPhotoChem*, *6*, e202100272.
Nguyen, L. T. T., Nguyen, H. T. T., Nguyen, L. T. H., Duong, A. T. T., Nguyen, H. Q., Ngo, V. T. M., Vu, N. V., Nguyen, D. T. C., & Van Tran, T. (2023). Efficient and recyclable Nd3+-doped CoFe2O4 for boosted visible light-driven photocatalytic degradation of Rhodamine B dye. *RSC Advances*, *13*, 10650–10656.
Noman, M., Shahid, M., Ahmed, T., Niazi, M. B. K., Hussain, S., Song, F., & Manzoor, I. (2020). Use of biogenic copper nanoparticles synthesized from a native *Escherichia* sp. as photocatalysts for azo dye degradation and treatment of textile effluents. *Environmental Pollution*, *257*, 113514.
Perumal, V., Uthrakumar, R., Chinnathambi, M., Inmozhi, C., Robert, R., Rajasaravanan, M. E., Raja, A., & Kaviyarasu, K. (2023). Electron-hole recombination effect of SnO2-CuO nanocomposite for improving methylene blue photocatalytic activity in wastewater treatment under visible light. *Journal of King Saud University - Science*, *35*, 102388.
Pervaiz, E., Farrukh, S., & Yang, M. (2022). Catalytic adsorptive removal of toxic compounds from water using motifs of Ce doped Co3O4/RGO nanohybrids. *Cleaner Engineering and Technology*, *7*, 100417.
Pill, D., Wiesen, P., & Kleffmann, J. (2021). Temperature dependencies of the degradation of NO, NO2 and HONO on a photocatalytic dispersion paint. *Physical Chemistry Chemical Physics*, *23*, 9418–9427.
Ragavendran, C., Kamaraj, C., Jothimani, K., Priyadharsan, A., Kumar, D. A., Natarajan, D., & Malafaia, G. (2023). Eco-friendly approach for ZnO nanoparticles synthesis and evaluation of its possible antimicrobial, larvicidal and photocatalytic applications. *Sustainable Materials and Technologies*, *36*, e00597.
Rahman, K. H., & Kar, A. K. (2022). Influence of catalyst loading on photocatalytic degradation efficiency of CTAB-assisted TiO2 photocatalyst towards methylene blue dye solution. *Bulletin of Materials Science*, *45*, 1–10.
Rafiq, Ikram, M., Ali, S., Niaz, F., Khan, M., Khan, Q., & Maqbool, M. (2021). Photocatalytic degradation of dyes using semiconductor photocatalysts to clean industrial water pollution. *Journal of Industrial and Engineering Chemistry*, *97*, 11–128.

Reginato, G., Zani, L., Calamante, M., Mordini, A., & Dessì, A. (2020). Dye-sensitized heterogeneous photocatalysts for green redox reactions. *European Journal of Inorganic Chemistry*, *2020*, 899–917.
Ren, Q., Liu, J., Yang, Z., & Yang, Q. (2023). Boosting transformation of dissolved oxygen to superoxide radical: Function of P25. *Water Environment Research*, *95*, e10898.
Selvaraj, V., Karthika, T. S., Mansiya, C., & Alagar, M. (2021). An over review on recently developed techniques, mechanisms and intermediate involved in the advanced azo dye degradation for industrial applications. *Journal of Molecular Structure*, *1224*, 129195.
Shanaah, H. H., Alzaimoor, E. F. H., Rashdan, S., Abdalhafith, A. A., & Kamel, A. H. (2023). Photocatalytic degradation and adsorptive removal of emerging organic pesticides using metal oxide and their composites: Recent trends and future perspectives. *Sustainability*, *15*, 7336.
Singh, S. K., Mishra, P. K., & Upadhyay, S. N. (2023). Recent developments in photocatalytic degradation of insecticides and pesticides. *Reviews in Chemical Engineering*, *39*, 225–270.
Soliman, A. I. A., Abdel-Wahab, A. M. A., & Abdelhamid, H. N. (2022). Hierarchical porous zeolitic imidazolate frameworks (ZIF-8) and ZnO@N-doped carbon for selective adsorption and photocatalytic degradation of organic pollutants. *RSC Advances*, *12*, 7075–7084.
Tran, H. D., Nguyen, D. Q., & Do, P. T. (2023). Kinetics of photocatalytic degradation of organic compounds: A mini-review and new approach. *RSC Advances*, *13*, 16915–16925.
Velázquez, J. J., Fernández-González, R., Díaz, L., Pulido Melián, E., Rodríguez, V. D., & Núnez, P. (2017). Effect of reaction temperature and sacrificial agent on the photocatalytic H2-production of Pt-TiO2. *Journal of Alloys and Compounds*, *721*, 405–410.
Wahid, F., Ali, S., Ismail, P. M., Raziq, F., Ali, S., Yi, J., & Qiao, L. (2023). Metal single atom doped 2D materials for photocatalysis: Current status and future perspectives. *Progress in Energy*, *5*, 012001.
Wang, R., Zhang, X., Zhao, L., Feng, J., Wei, T., Ren, Y., & Shen, Y. (2020). In-situ synthesis of Fe and O co-doped g-C3N4 to enhance peroxymonosulfate activation with favorable charge transfer for efficient contaminant decomposition. *Journal of the Taiwan Institute of Chemical Engineers*, *115*, 198–207.
Wen, F., Li, Y., Huang, X., Pang, L., Zhang, T., & Xu, Y. (2023). Utilizing three-dimensional ordered macroporous NiFe2O4 loaded with g-C3N4 as a heterogeneous photo-Fenton catalyst for tetracycline degradation. *Journal of Alloys and Compounds*, *958*, 170403.
Xue, X., Chen, X., & Zhang, Z. (2022). Enhancement of redox capacity derived from O-doping of g-C3N4/WO3 nanosheets for the photocatalytic degradation of tetracycline under different dissolved oxygen concentration. *Dalton Transactions*, *51*, 1086–1098.
Yang, X., Mao, L., Pi, Y., Wu, H., Ding, W., & Zhang, W. (2017). Effect of pH on the adsorption and photocatalytic degradation of sulfadimidine in Vis/g-C3N4 progress. *Environmental Science and Pollution Research*, *24*, 8658–8670.
Younis, S. A., Amdeha, E., & El-Salamony, R. A. (2021). Enhanced removal of p-nitrophenol by β-Ga2O3-TiO2 photocatalyst immobilized onto rice straw-based SiO2 via factorial optimization of the synergy between adsorption and photocatalysis. *Journal of Environmental Chemical Engineering*, *9*, 104619.
Yu, M. H., Feng, Y. Q., Pang, Y. H., Yang, C., & Shen, X. F. (2023). Electrochemical degradation and toxicity evaluation of Deoxynivalenol in wheat grains. *ACS Food Science & Technology*, *3*, 224–230.
Zhang, N., Wen, L., Yan, J., & Liu, Y. (2020). Dye-sensitized graphitic carbon nitride (g-C3N4) for photocatalysis: A brief review. *Chemical Papers*, *74*, 389–406.
Zhang, Y., Zheng, M., Feng, Y., Yu, Z., Wu, M., & Tang, L. (2023). Novel synthesis method of oxygen vacancy WO3 and its photocatalytic performance for degradation of rhodamine B. *Journal of Chemical Technology and Biotechnology*, *98*, 1542–1550.

Zhao, S., Yang, Y., Bi, F., Chen, Y., Wu, M., Zhang, X., & Wang, G. (2023). Oxygen vacancies in the catalyst: Efficient degradation of gaseous pollutants. *Chemical Engineering Journal*, *454*, 140376.

Zhou, W., Sun, F., Pan, K., Tian, G., Jiang, B., Ren, Z., Tian, C., & Fu, H. (2011). Well-ordered large-pore mesoporous anatase TiO2 with remarkably high thermal stability and improved crystallinity: Preparation, characterization, and photocatalytic performance. *Advanced Functional Materials*, *21*, 1922–1930.

Zhou, X., An, W., Xia, X., Long, Y., Liu, X., Xu, S., & Wang, Y. Z. (2022). Recovery and reutilization of epoxy thermoset via acidic ion exchange resin-induced controllable oxidative degradation and subsequent Microspheroidization. *ACS Sustainable Chemistry & Engineering*, *10*, 5582–5589.

Zhou, X., Shao, C., Li, X., Wang, X., Guo, X., & Liu, Y. (2018). Three dimensional hierarchical heterostructures of g-C3N4 nanosheets/TiO2 nanofibers: Controllable growth via gas-solid reaction and enhanced photocatalytic activity under visible light. *Journal of Hazardous Materials*, *344*, 113–122.

Zyoud, A. H., Zyoud, S. H., Nassar, H., Qamhieh, N., Hajamohideen, A. R., & Hilal, H. S. (2023). Photocatalytic degradation of aqueous methylene blue using Ca-alginate supported ZnO nanoparticles: Point of zero charge role in adsorption and photodegradation. *Environmental Science and Pollution Research*, *30*, 68435–68449.

Zyoud, A. H., Zyoud, S. H., Nassar, H., Qamhieh, N., Hajamohideen, A. R., & Hilal, H. S. (2023). Photocatalytic degradation of aqueous methylene blue using Ca-alginate supported ZnO nanoparticles: Point of zero charge role in adsorption and photodegradation. *Environmental Science and Pollution Research*, *30*, 68435–68449.

DİJİTAL ORGANİZASYONLARDA SİBER SALDIRILAR ve SİBER GÜVENLİK

CYBER ATTACKS AND CYBER SECURITY IN DIGITAL ORGANIZATIONS

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Özet
Bu çalışma ile dijital organizasyonların ortaya çıkışı ve dijital organizasyonlara karşı yapılan siber saldırılar ve bu saldırılara karşı önlem olarak siber güvenlik kavramları ele alınmaktadır. Teknolojik değişimlerle beraber organizasyonların yapısı etkilenerek dijitalleşmenin getirdiği süreçlerle şekillenmeye başlamıştır. Dijital organizasyonlar dijitalleşme süreçlerini işletme faaliyetlerine entegre eden organizasyonlardır. Bu organizasyonlar bulut bilgi işlem, mobil cihazlar, çok düzeyli müşteri etkileşimi, büyük veri analitiği, nesnelerin interneti, konum algılama teknolojileri, üç boyutlu yazdırma, akıllı sensörler ve arttırılmış gerçekliği kullanan işletmelerdir. Dijitalleşmenin ortaya çıkışı ile beraber işletmelerde siber saldırılar olmakta ve güvenlik açıkları meydana gelmektedir. Siber saldırılar organizasyonlar için çok büyük maliyetlere neden olmaktadır. Ayrıca iş yapma şekilleri etkilenmektedir. Siber saldırılar karşısında zaafiyete düşen işletmelere karşı güven kaybı olmaktadır. Güven kaybı maddi kayıplarla beraber işletme amaçlarını riske sokan bir sistematiğe dönüşmektedir. Siber saldırılara karşı önlem alma işletmeler için hayati bir durum olarak ortaya çıkmaktadır. Bunun için de siber güvenlik önlemleri alınmaktadır. Siber güvenlik bir bilgisayarı veya bilgisayar sistemini yetkisiz erişime veya saldırıya karşı korumak için alınan önlemler olarak ifade edilmektedir. Siber ortama karşı yapılan saldırıları önlemek ve tedbir almak için yapılan tüm faaliyetleri içermektedir. Dijitalleşme ile birlikte radikal bir değişime uğrayan organizasyonlarda güvenlik açığı bağlamında siber saldırılar ve siber güvenlik kavramları disiplinler arası çok önem arz eden kavramlar olarak ortaya çıkmaktadır.

Anahtar Kelimeler: Dijitalleşme, Dijital Organizasyon, Siber Saldırı, Siber Güvenlik

Abstract
This study examines the emergence of digital organizations, cyber-attacks against digital organizations, and cyber security concepts as a precaution against these attacks. With technological changes, the structure of organizations has been affected and has begun to take shape with the processes brought by digitalization. Digital organizations are the ones that integrate digitalization processes into business activities. These organizations are businesses that use cloud computing, mobile devices, multi-level customer interaction, big data analytics, the internet of things, location detection technologies, three-dimensional printing, smart sensors, and augmented

reality. With the emergence of digitalization, cyber-attacks occur in businesses and security gaps occur. Cyber-attacks cause huge costs for organizations. In addition, ways of doing business are affected. There is a loss of trust in businesses that are vulnerable to cyber-attacks. Loss of trust turns into a systematic that puts business objectives at risk along with financial losses. Taking precautions against cyber-attacks is a vital situation for businesses. For this reason, cyber security measures are taken. Cyber security is defined as the measures taken to protect a computer or computer system against unauthorized access or attack. It includes all activities carried out to prevent attacks against the cyber environment and to take precautions. In organizations that have undergone radical changes with digitalization, cyber-attacks and cyber security concepts emerge as interdisciplin
ary concepts of great importance in the context of security vulnerabilities.

Keywords: Digitalization, Digital Organization, Cyber Attack, Cyber Security

GAZZE'NİN TARİHİ VE KÜLTÜREL MİRASI ÖMER CAMİSİNİN İNANÇ TURİZMİ BAKIMINDAN DEĞERLENDİRİLMESİ

THE HISTORICAL AND CULTURAL HERITAGE OF GAZA AN EVALUATION OF THE ÖMER MOSQUE IN TERMS OF FAITH TOURISM

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Özet
Filistin'in kültürel ve dini mirasını temsil eden Büyük Ömer Camii, Gazze şehrinin en eski, en güzel ve en büyük camilerinden biridir. Filistin sınırları içinde ise Mescid-i Aksa ve Ahmed Paşa el-Cezzar camilerinden sonra üçüncü büyük camidir. Cami Bizans imparatorluğu, Emevî, Memlûk ve Osmanlı döneminin mimari özelliklerini ve estetik anlayışını yansıtmaktadır. 5300 metrekarelik bir alanı kapsayan yapı geniş bir avluya sahiptir. Tarihi bakımdan da önemli bir yeri olan cami adeta Gazze'nin tarihine de tanıklık etmektedir. Uzun bir hikayesi ve tarihi olan bu dini yapı zaman içerisinde çeşitli restorasyonlar geçirmiş ve böylece bugüne kadar tarihi değeri korunabilmiştir. Caminin tarihi değerinin önemli bir yönünü hem İslamiyet hem de Hıristiyanlık için taşıdığı değer oluşturmaktadır. Yine burası hem yerel halkın hem de turistlerin nazarında büyük bir kıymete sahiptir. Bu iki özelliği, yani hem farklı dinler hem de farklı insanlar için taşıdığı önem nedeniyle inanç turizmi açısından da dikkat çekici bir yapıdır. Bu dini yapı mimarisi, iç süslemeleri, çevresindeki tarihi alanlar, yerel pazarlar ve restoranlarıyla önemli bir turizm potansiyeline sahiptir; Gazze'nin göz ardı edilemeyecek inanç turizm destinasyonu olarak öne çıkmaktadır. Buna göre Caminin var olan ve geliştirilmeye açık olan inanç turizm potansiyeli, Gazze'nin ekonomisinin canlanması ve gelişmesine yapacağı katkılar bakımından bugün çok daha önemli bir anlam ifade etmektedir; bunun için de bilinmesi, tanıtılması gereken yerlerin başında gelmektedir. Nitekim Camiyi ziyaret eden turistler konaklama, yeme-içme, alışveriş gibi turizm hizmetlerinden faydalanırken yerel halkın ekonomik gelirine de katkı sağlayacaklardır. Turizm geliri, Gazze'deki işletmelerin ve hizmet sağlayıcıların büyümesine katkıda bulunarak Gazze'nin ayağa kalkmasında önemli ve zorunlu bir işleve sahiptir.

Anahtar Kelimeler: Gazze, İnanç Turizmi, Ömer Camii.

Abstract
The Great Omar Mosque, representing Palestine's cultural and religious heritage, is one of the oldest, most beautiful, and largest mosques in the city of Gaza. Inside the borders of Palestine, it is the third largest mosque coming after Al-Aqsa Mosque and Ahmed Pasha al-Jazzar Mosque. The mosque reflects the architectural features and artistic vision of the Byzantine Empire, Umayyad, Mamluk, and Ottoman periods; the structure, covering an area of 5300 square meters, has a large courtyard. From a historical aspect, the mosque also serves as a witness to Gaza's history. This place of worship, with its long history, has undergone various restorations over time, preserving its historical value until today. The mosque's historical value is rooted in its significance to both Islam and Christianity. This place holds great value for both the local people and tourists. Its importance for both different religions and different people makes it a notable site for faith-based tourism as well. This historic building has considerable tourism potential due to its architecture, interior

decorations, surrounding historical areas, local markets, and restaurants; it stands out as an undeniable faith tourism destination in Gaza. Accordingly, the existing and potential faith tourism potential of the mosque now holds much greater importance in terms of contributing to the rejuvenation and development of Gaza’s economy; for this reason, it comes on the head of the places that need to be known and promoted. Indeed, tourists visiting the mosque will benefit from tourism services such as accommodation, dining, and shopping, while also contributing to the economic income of the local people. Tourism revenue plays a crucial role in supporting the growth of businesses and service providers in Gaza, helping to revive the city's economy.

Keywords: Gaza, Faith tourism, Omar Mosque.

PELL DİZİLERİNİN YENİ BİR ÜYESİ: PSEUDO-PELL DİZİSİ

A NEW MEMBER OF THE PELL SEQUENCES: THE PESUDO-PELL SEQUENCE

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Özet

Bilgisayar bilimleri, fizik, finans, mimari, jeoistatistik, sanat, renkli görüntü işleme ve müzik gibi modern bilimin hemen her alanında kullanılan birçok tam sayı dizisi vardır. Fibonacci dizisi, matematikteki en ünlü ve merak edilen sayısal dizilerden biridir ve literatürde yaygın olarak incelenmiştir. Fibonacci dizisi, ilginç yönleriyle yüzyıllardır bilim severleri memnun etmiştir. Fibonacci dizisi aşağıdaki şekilde verilen bir formül tarafından üretilir:

$F_{n+2} = F_{n+1} + F_n$

$n \geq 0$, $F_0 = 0$ ve $F_1 = 1$[1, 2, 3, 4].

Pseudo-Fibonacci ve pseudo-Lucas dizileri, Fibonacci ve Lucas dizilerinin yeni genellemeleri olarak Ferns[5] tarafından aşağıdaki şekilde tanıtılmıştır:

$\Xi_{n+1} = \Xi_n + \Theta_n$

$\Theta_{n+1} = \Xi_{n+1} + \xi\Xi_n$

$\Xi_1 = 1$, $\Theta_1 = 1$ ve ξ bir pozitif tam sayıdır.

Pell dizisi, matematikteki en ünlü ve ilginç sayısal dizilerden biridir ve literatürde yaygın olarak çalışılmıştır. Pell dizisi aşağıdaki şekilde verilen bir formül tarafından üretilir:

$P_{n+2} = 2P_{n+1} + P_n$

$n \geq 0$, $P_0 = 0$ ve $P_1 = 1$[6, 7, 8]. Birçoğu ilginç biçimler ve bir dizi büyüleyici özellik sergileyen çok sayıda tam sayı dizisi vardır. Pell ve Pell-Lucas dizileri en popüler ve güzel sayı dizilerinden ikisidir. Güzellikleri ve her yerde bulunmaları matematik camiasını şaşırtmaya devam etmektedir. Pell ve Pell-Lucas sayıları ayrıca deney yapmak, bulmak ve tahmin etmek için sonsuz fırsatlar sağlar. Pell ve Pell-Lucas sayıları matematiksel dostlardır; bir dizi paralel özelliğe sahiptirler. Buradaki temel amacımız bu iki aile serisine alternatifler bulmaktır.

Bu çalışmada, Pell ve Pell-Lucas sayılarının yeni bir genellemesi tanıtılacaktır. Pseudo-Pell ve pseudo-Pell-Lucas sayılarının bazı özellikleri verilecektir.

Anahtar Kelimeler: Pell ve Pell-Lucas sayıları, pseudo-Pell ve pseudo-Pell-Lucas sayıları.

Abstract

There are many integer sequences that are used in almost every field of modern science, such as computer sciences, physics, finance, architecture, geostatistics, art, color image processing, and music. The Fibonacci sequence is one of the most famous and curious numerical sequences in mathematics and has been widely studied in the literature. The Fibonacci sequence has pleased science lovers alike for centuries with its interesting aspects. The Fibonacci sequence is generated by a recursive formula

$F_{n+2} = F_{n+1} + F_n$

for $n \geq 0$ with $F_0 = 0$ and $F_1 = 1$[1, 2, 3, 4].

The pseudo-Fibonacci and pseudo-Lucas sequences was introduced by Ferns[5] as novel generalizations of the Fibonacci and Lucas sequences as follows

$\Xi_{n+1} = \Xi_n + \Theta_n$

$\Theta_{n+1} = \Xi_{n+1} + \xi\Xi_n$

with initial conditions $\Xi_1 = 1$ and $\Theta_1 = 1$ in which ξ is a positive integer.

The Pell sequence is one of the most famous and interesting numerical sequences in mathematics and has been widely studied in the literature. The Pell sequence is generated by a recursive formula

$P_{n+2} = 2P_{n+1} + P_n$

for $n \geq 0$ with $P_0 = 0$ and $P_1 = 1$[6, 7, 8]. There are plenty of integer sequences, many of which exhibit quaint forms and a number of enchanting properties. The Pell and Pell-Lucas sequences, are two of the most popular and pretty number sequences. Their beauty and ubiquity continue to astonish the mathematical society. The Pell and Pell–Lucas numbers also ensure infinite opportunities to experiment, find, and estimate. The Pell and Pell–Lucas numbers are mathematical buddies; they have a number of parallel properties. Our main aim here is to find alternatives to these two series of families.

In this work, a new generalization of the Pell and Pell-Lucas numbers is introduced. We give some properties of the pseudo-Pell and pseudo-Pell-Lucas numbers.

Keywords: Pell and Pell-Lucas numbers, pseudo-Pell and pseudo-Pell-Lucas numbers.

REFERENCES

[1] S. Falcon, A. Plaza, The k-Fibonacci sequence and the Pascal 2-triangle, Chaos, Solitons & Fractals, **33(1)** (2007), 38-49. https://doi.org/10.1016/j.chaos.2006.10.022

[2] M. Edson, O. Yayenie, A new generalization of Fibonacci sequence and extended Binet's formula, Integers Electron. J. Comb. Number Theor., **9(6)** (2009), 639-654. https://doi.org/10.1515/INTEG.2009.051

[3] A. Stakhov, B. Rozin, Theory of Binet formulas for Fibonacci and Lucas p-numbers, Chaos, Solitons & Fractals, **27(5)** (2006), 1162-1177. https://doi.org/10.1016/j.chaos.2005.04.106

[4] J. Cigler, A new class of q-Fibonacci polynomials, The Electronic Journal of Combinatorics, **10(1)** (2003), 1-15.

[5] H. H. Ferns, pseudo-Fibonacci numbers, Fibonacci Quaterly, **6(6)** (1968), 305-317.

[6] P. Catarino, On some identities and generating functions for k-Pell numbers, Int. J. Math. Anal. **7(38)** (2013), 1877-1884.

[7] B. Kuloğlu, E. Özkan, A. G. Shannon, p-analogue of biperiodic Pell and Pell-Lucas polynomials, Notes on Number Theory and Discrete Mathematics, **29(2)** (2023), 336-347. https://doi.org/10.7546/nntdm.2023.29.2.336-347

[8] T. Koshy, Pell and Pell-Lucas numbers with applications, New York, Springer, 2014.

THE EFFECT OF FUEL LIBRARY ON THE EMISSION AND PERFORMANCE OF A GDI ENGINE: A NUMERICAL APPROACH

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Abstract

Dwindling fossil fuel resources, increasing population and energy demand have increased studies on more efficient operation of both spark ignition and compression ignition engines. GDI engines are one of the models developed to contribute to the more efficient operation of spark-ignition engines. Increasing costs, especially after the COVID-19 pandemic period, are among the parameters that limit experimental studies. At this stage, it has been observed that numerical package programs have recently been frequently used in the analysis of internal combustion engines. The numerical package programs offer the user the opportunity to work in a wide range of frameworks after the initial costs. Nowadays, numerical package programs are commonly used to analyze internal combustion engines. ANSYS Forte, a commonly used model, was employed in this investigation. One of the sub-models provided by this programs to the user is the usage of several fuel libraries. In this study, several fuel libraries were utilized in a GDI engine, and the effects on combustion, performance, and emissions were examined. In this study, Gasoline_1comp_59sp, Gasoline_PRF_178sp and Gasoline_3comp_241sp fuel libraries were preferred among the many fuel libraries offered to the user by the Forte software. According to the data, the highest IMEP value happened when the Gasoline_1comp_59sp fuel library was used, whereas the lowest value occurred when the Gasoline_3comp_241sp library was used. The highest NOx emission occurred when using library Gasoline_PRF_178sp, while the lowest NOx emission occurred when using library Gasoline_3comp_241sp. It was observed that the highest CO2 emission occurred in the use Gasoline_1comp_59sp, Gasoline_PRF_178sp and Gasoline_3comp_241sp libraries, respectively. These findings will help researchers better understand the effects of fuel libraries used in numerical models on engine performance and emissions. As a result, by creating accurate information that is close to experimental research, it will make it easier to study complicated and costly factors in experiments.

Keywords: GDI, numerical simulation, fuel library.

KOMBİNE KLOSTRİDİAL AŞI ÜRETİMİNDE KULLANILMAK ÜZERE *CLOSTRİDİUM PERFRİNGENS* BETA, EPSİLON VE *CLOSTRİDİUM NOVYİ* ALFA TOKSİNLERİNİ ÜRETEN REKOMBİNANT SUŞ GELİŞTİRİLMESİ

DEVELOPMENT OF RECOMBINANT STRAINS PRODUCING *CLOSTRIDIUM PERFRINGENS* BETA, EPSILON AND *CLOSTRIDIUM C. NOVYI* ALPHA TOXINS FOR USE IN COMBINED CLOSTRIDIAL VACCINE PRODUCTION

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Özet

Enterotoksemi ve enfeksiyöz nekrotik hepatitis, dünyada küçükbaş hayvan yetiştiriciliğinde, yüksek düzeyde ölüm oranlarından, tedavi ve kontrol maliyetlerinin pahalı olmasından dolayı büyük ekonomik kayıplara neden olan klostridial enfeksiyonlar arasındadır. Enterotoksemi, *C. perfringens* bakterisinin özellikle beta ve epsilon toksinleri tarafından oluşturulan toksemi ile karakterize bir hastalıktır. Enfeksiyöz nekrotik hepatitis ise, *C. novyi* tip B bakterisinin özellikle alfa toksini tarafından oluşturulan, akut, toksemik ve karaciğer nekrozları ile karakterize bir hastalıktır.

Aşılama ve beslenme yönetimi birçok ülkede klostridial hastalıkların kontrol stratejisinde kullanılan en değerli önlemlerdir. Koruyucu aşı, yeterli bağışıklık tepkisini uyarmak için yeterli immünojenik özelliklere sahip olmalı ve aşılanmış hayvanlarda iyi bir koruma düzeyi elde etmelidir. Son yıllarda bazı klostridial etkenlere karşı araştırma düzeyinde rekombinant aşılar geliştirildiği bildirilmiştir. Rekombinant aşıların toksik etkilerinin olmaması veya çok düşük olması, immunojenitelerinin iyi olması, patojen olmayan suşların kullanılması ve büyük çapta üretimlerinin kolay olması gibi bazı avantajlarının olduğu bildirilmektedir.

Sentetik biyoloji, temel ve translasyonel araştırma arasındaki boşluğu doldurmak için yeni bir platform sunar ve bulaşıcı ajanlarla mücadele için yenilikçi çözümler sağlama potansiyeline sahiptir. Sentetik biyoloji yaklaşımlarının ortaya çıkışı ve ters genetik sistemlerinin gelişimi, aşı üretimi için manipüle edilebilecek patojen genomlarının hızlı ve güvenilir tasarımına ve üretimine olanak sağlamıştır.
Bu çalışmada, *C. perfringes* tip D epsilon toksin geni (*CpDetx*), *C. perfringens* tip C beta toksin geni (*CpCcpb*) ve *C. novyi* tip B alfa toksin geni (*Btcn-alpha*) taşıyan farklı ekspresyon plazmidleri inşa edilmiş, uygun *Escherichia coli* konaklarına (NEB.10Beta, BL21 (DE3), C43 (DE3)) aktarılarak çeşitli optimizasyon denemeleri yapılmıştır. Kullanılan konaklar içerisinde en yüksek toksin miktarını belirlemek amacıyla üretilen protein miktarları SDS-PAGE yöntemi ile karşılaştırılmıştır. Yaptığımız çalışma sonucunda, pET ekspresyon plazmidi içerisinde bulunan toksin genler, *E. coli* C43 (DE3) konak suşuna yapılan transformasyon ile aşı üretiminde kullanılacak olan en yüksek proteini üreten suş olmuştur.

Anahtar Kelimeler: Sentetik biyoloji, klostridial hastalık, *C. perfringens*, *C. novyi*, aşı, suş.

Abstract
Enterotoxemia and infectious necrotic hepatitis are among the clostridial infections that cause great economic losses in small ruminant farming worldwide due to high mortality rates and expensive treatment and control costs. Enterotoxemia is a disease characterized by toxemia caused by the bacteria *C. perfringens*, especially beta and epsilon toxins. Infectious necrotic hepatitis is a disease caused by the alpha toxin of *C. novyi* type B bacteria, and is characterized by acute, toxemic liver necrosis.
Vaccination and nutritional management are the most valuable measures used in the clostridial disease control strategy in many countries. The preventive vaccine must have sufficient immunogenic properties to stimulate an adequate immune response and achieve a good level of protection in vaccinated animals. In recent years, it has been reported that recombinant vaccines have been developed at the research level against some clostridial agents. It is reported that recombinant vaccines have some advantages such as having no or very low toxic effects, having good immunogenicity, using non-pathogenic strains and being easy to produce on a large scale.
Synthetic biology offers a new platform to bridge the gap between basic and translational research and has the potential to provide innovative solutions to struggle infectious agents. The advent of synthetic biology approaches and the development of reverse genetics systems have enabled the rapid and reliable design and production of pathogen genomes that can be manipulated for vaccine production.
In this study, different expression plasmids carrying *C. perfringes* type D epsilon toxin gene (*CpDetx*), *C. perfringens* type C beta toxin gene (*CpCcpb*) and *C. novyi* type B alpha toxin gene (*Btcn-alpha*) were constructed and transferred into suitable *Escherichia coli* hosts (NEB.10Beta, BL21 (DE3), C43 (DE3)) and various optimization trials were performed. In order to determine the highest toxin amount among the hosts used, the amounts of protein produced were compared by SDS-PAGE method. As a result of our study, the toxin genes contained in the pET expression plasmid became the highest protein producing strain to be used in vaccine production by transformation into the *E. coli* C43 (DE3) host strain.

Keywords: Synthetic biology, clostridial disease, *C. perfringens*, *C. novyi,* vaccine, strain.

ZO/SnO_2/$FASnI_3$/CdTe/Ag PEROVSKİT GÜNEŞ HÜCRELERİ ÜZERİNDE SAYISALARAŞTIRMALAR

NUMERICAL INVESTIGATIONS ON IZO/SnO_2/$FASnI_3$/CdTe/Ag PEROVSKITE SOLAR CELLS

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ÖZET
Güç dönüşüm verimliliğinin (PCE) % 25'e ulaşmasıyla birlikte, metal halide perovskit tabanlı güneş hücreleri fotovoltaik performans alanında dönüştürücü bir güç olarak ortaya çıkmıştır. 2012 yılında katı hal perovskit güneş hücrelerinin geliştirilmesi, yapısal tasarım, malzeme kimyası, proses mühendisliği ve cihaz fiziği alanlarında kapsamlı araştırmalara yol açmış ve bu hücreleri yeni nesil güneş enerjisi toplayıcıları için güçlü adaylar olarak önemli ölçüde ilerletmiştir. Yüksek verimlilik ve düşük üretim maliyetlerinin birleşimi, perovskite güneş hücrelerini ticari silikon ve diğer organik veya inorganik güneş hücrelerine kıyasla avantajlı hale getirmektedir. Perovskit güneş hücrelerinin yapısal tasarımı üzerine yapılacak araştırmalar, PCE'de daha fazla iyileştirmeye olanak tanıyabilir ve bu hücrelerin ticarileştirilmesinin önünü açabilir. Bu bağlamda, mevcut çalışma, CdTe'nin bir HTL olarak ve sıcaklığın IZO/SnO_2/$FASnI_3$/CdTe/Ag üzerindeki etkilerini incelemek için SCAPS modelleme yaklaşımını kullanmıştır; burada CdTe, cihazda bir HTL olarak hizmet vermektedir. Cihazı optimize ettikten sonra, yaklaşık 1,3 eV'lik optimum bant aralığı değerlerinde yaklaşık %18,5'lik en büyük güç dönüşüm verimliliğine (PCE) ulaşabildik. Yaklaşık 300 K'lik düşük sıcaklığın ve 1,3 eV'lik orta bant aralığının cihazın gelişmiş güç dönüşümü için çok faydalı olduğu belirtilmiştir.

Anahtar Kelimeler: Perovskite Güneş Hücreleri, $FASnI_3$, SCAPS 1D

ABSTRACT
With the rapid advancement of power conversion efficiency (PCE) reaching 25%, metal halide perovskite-based solar cells have emerged as a transformative force in the photovoltaic performance landscape. The development of solid-state perovskite solar cells in 2012 sparked extensive research into structural design, materials chemistry, process engineering, and device physics, significantly advancing these cells as strong contenders for next-generation solar energy harvesters. The combination of high efficiency and low manufacturing costs makes perovskite solar cells advantageous over commercial silicon and other organic or inorganic solar cells. The research on the structural design of perovskite solar cells can enable further improvements in PCE and pave the way for their commercialization. In this regard, the current study used the SCAPS modeling approach to examine the effects of doping concentration and band gap tuning of CdTe as a HTL and temperature on IZO/SnO_2/$FASnI_3$/CdTe/Ag, in which CdTe serves as a HTL in device. After optimizing the device, we were able to attain the greatest power conversion efficiency (PCE) of approximately 18.5% at an optimal band-gap values of approximately 1.3 eV. It is noted that the

low temperature of about 300 K and the moderate band gap of 1.3 eV are very beneficial for the improved power conversion of the device.

Keywords: Perovskite Solar Cells, $FASnI_3$, SCAPS 1D

1.INTRODUCTION

As a light-harvesting material for solar applications, perovskite has grown in prominence. Long carrier diffusion lengths, high charge carrier mobilities, tunable band gaps, and a high absorption coefficient are just a few of the unique optoelectrical characteristics of perovskite [1]. Mass production of perovskite solar cells is challenging due to the current stability and toxicity issues of these solar cells, even with the rapid evolution of power conversion efficiency [2].

One of the biggest drawbacks of lead perovskite solar cells is their lead concentration. The European Union's Restriction of Hazardous Substances directive prohibits the use of lead in any electronics or electrical equipment due to its toxicity [3]. Thus, substitutes for lead as the metal cation in the perovskite photo-absorber have emerged as an important field of study. Lead may be easily replaced by moving up or down in group IV of the periodic table of elements such as Sn.

Nowadays, theoretical research is very common to comprehend gadget behavior prior to manufacture of solar cell devices [4]. In the current study, we have used SCAPS simulation to investigate the lead-free double perovskite materials, including $FASnI_3$ in a device architecture of IZO/SnO_2/$FASnI_3$/CdTe/Ag for the first time. To select a superior material, most of the work has gone into determining the proper band gap with temperature fluctuation in these lead-free double perovskite materials for solar applications.

2. MATERIALS AND METHODOLOGY

In this study, a theoretical model of a solar cell was created and the factors affecting the performance of the solar cell were investigated. The simulation tool SCAPS-1D, which is frequently used to examine the optimization processes of solar cells, was used in this study. The SCAPS-1D software was designed by Burgelman [5] and provides results based on the Shockley–Read–Hall recombination statistics, which consider the Poisson equation (Equation (1)), the continuity equation for holes (Equation (2)) and the continuity equation for electrons (Equation (3)).

$$\frac{d^2}{dx^2}\psi(x) = -\frac{q}{\varepsilon_0\varepsilon_r}\left(p(x) - n(x) + N_D - N_A + p_t(x) - n_t(x)\right) \quad (1)$$

$$\frac{dp}{dt} = -\frac{dJ_p}{dx} - R_p + G_p \quad (2)$$

$$\frac{dn}{dt} = -\frac{dJ_n}{dx} - R_n + G_n \quad (3)$$

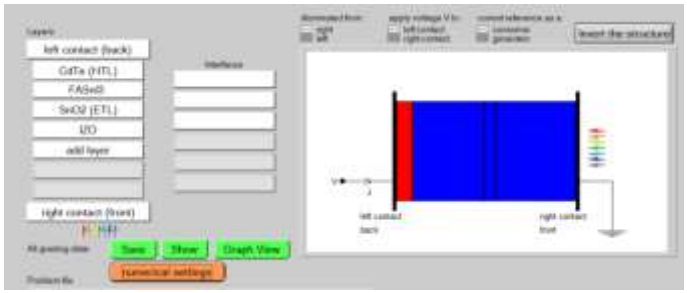
where $\psi(x)$, p, n, q, $\varepsilon_0, \varepsilon_r$, $N_D, N_A, p_t(x), n_t(x)$, J_p, J_n, $G_p(G_n)$, and $R_p(R_n)$ are the electrostatic potential, holes, and electron concertation, permittivity of free space, relative permittivity, donor and acceptor charge impurity, the trapped holes and electron densities, current hole densities, current electron densities, generation, and recombination rate of hole (electron), respectively. By defining these parameters, SCAPS-1D uses equations that consider the boundary conditions and calculates the performance parameters of solar devices (open circuit voltage (V_{oc}), current density (J_{sc}), fill factor (*FF*), power conversion efficiency (*PCE*), and quantum efficiency (*QE*)). The simulation parameters for IZO, SnO_2, $FASnI_3$, and CdTe are listed in Table 1. The function of the back electrode Au is defined as 5.1 eV [6].

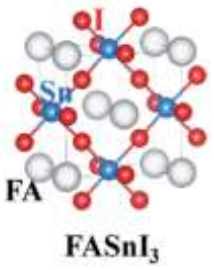
Table 1. The defined material parameters in the simulation program.

Parameters	IZO	SnO_2	$FASnI_3$	CdTe
Thickness [μm]	0.5	0.07	0.45	0.1
Band gap [eV]	3.5	3.5	1.41	1.5
Electron affinity [eV]	4.5	4	4	3.9
Dielectric permittivity	10	9	8.2	9.4
CB effective density of states [cm^{-3}]	$1x10^{19}$	$2.2x10^{17}$	$1x10^{18}$	$8x10^{17}$
VB effective density of states [cm^{-3}]	$1x10^{19}$	$2.2x10^{17}$	$1x10^{18}$	$1.8x10^{19}$
Electron thermal velocity [cm/s]	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$
Hole thermal velocity [cm/s]	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$
Electron mobility [cm^2 Vs^{-1}]	$1x10^{-2}$	100	22	320
Hole mobility [cm^2 Vs^{-1}]	$1x10^{-3}$	100	22	40
Donor density [cm^{-3}]	$1x10^{18}$	$1x10^{21}$	0	0
Acceptor density [cm^{-3}]	0	0	$7x10^{16}$	$2x10^{14}$
Bulk defect density [cm^{-3}]	$1x10^{14}$	$1x10^{15}$	$1x10^{13}$	$1x10^{15}$

3. RESULTS AND DISCUSSION

The design configuration of the $FASnI_3$-based perovskite solar cell and the crystal structure of cubic MASnI3 are also shown in Fig. 1.





(a) **(b)**

Figure 1. a) The design configuration of $FASnI_3$ based perovskite solar cell and **b)** the crystal structure of cubic $FASnI_3$ [7].

The acceptor doping density (N_A) of the CdTe as HTL has a significant impact on the performance of device. To analyze the device performance, we varied the N_A in the HTL for simulation, from 10^{12} to 10^{20} cm^{-3}. The impact of doping density on the J_{sc},V_{oc}, *FF* and *PCE* of the proposed device is shown in Fig. 2. The J_{sc} of the device increases up to $10^{18}cm^{-3}$ before beginning to degrade. The Fermi energy level of the holes approaches the VB when N_A rises, which results in an increase in V_{oc} or constancy until $10^{18}cm^{-3}$. Additionally, the increase in doping density increases built-in voltage, which leads to efficient separation of the generated charge carriers and an increase in V_{oc}. A similar trend is observed for *FF*, which increases slightly up to $10^{18}cm^{-3}$ and then rises sharply above the doping density of $10^{18}cm^{-3}$. Finally, *PCE* rises to after N_A =$10^{18}cm^{-3}$.

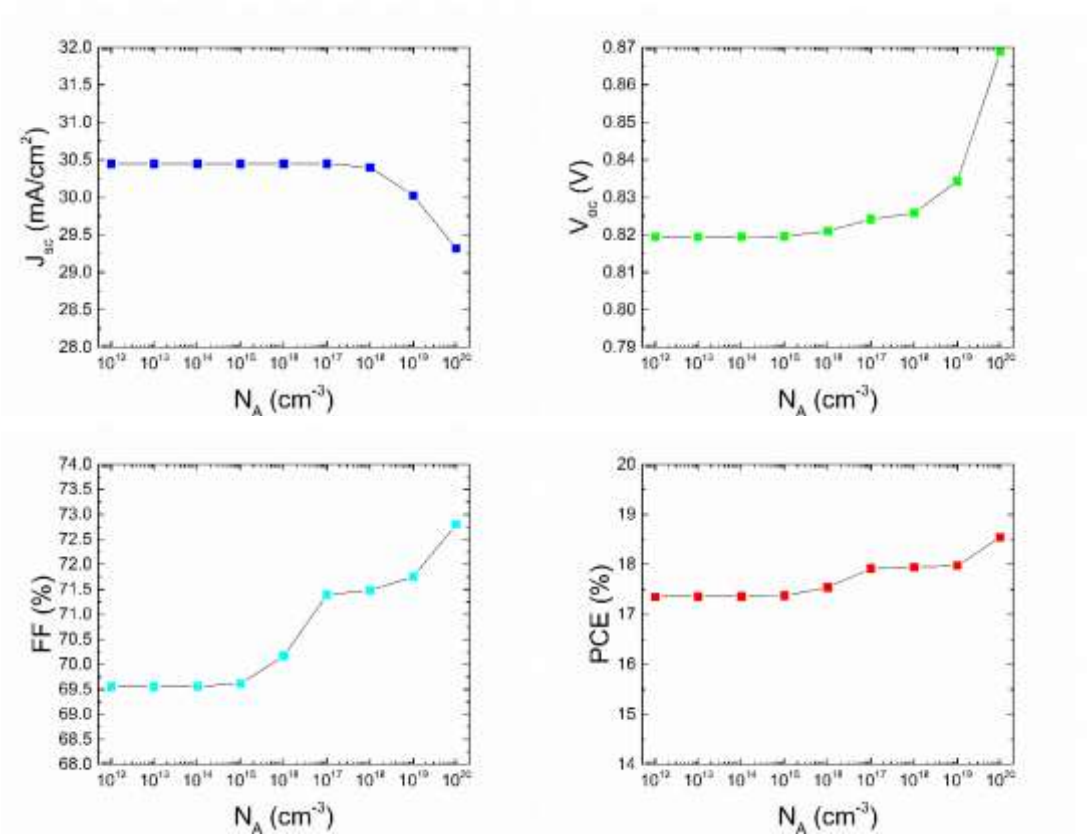
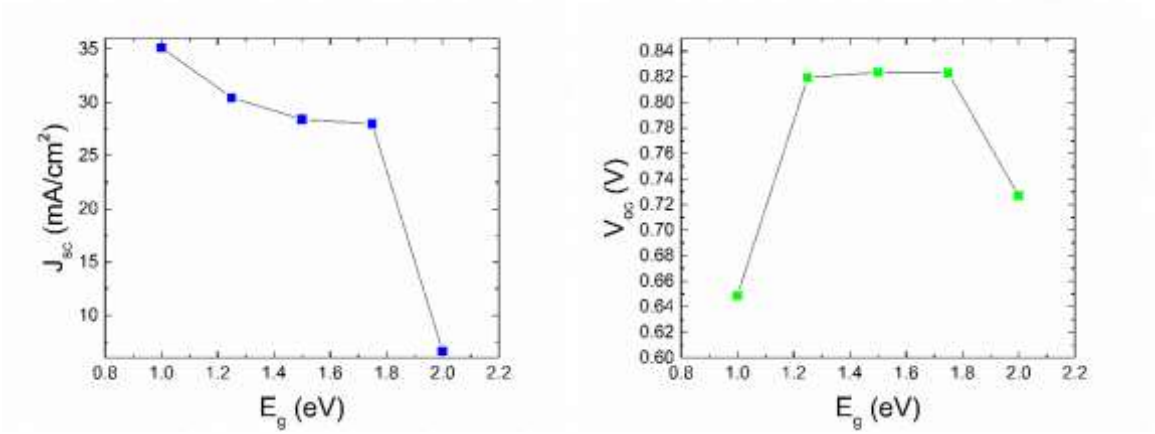


Figure 2. Effect of the acceptor concentration of CdTe as HTL on the performance parameters of the device.

One of the most important parameters for photovoltaic solar cell devices is the band gap. As seen in Fig. 3, we have adjusted the band gap of the CdTe as HTL of the device by SCAPS-1D simulation software to see how the band gap affects device performance. Regarding the optimization of performance parameters, specifically J_{sc},V_{oc}, *FF* and *PCE*, the band-gap range (0.9-2 eV) is essentially selected to be close to its optimal value. Although all parameters fluctuate with band gap, there is a maximum seen for the *PCE* value at 1.3 eV, which is the optimal value for the proposed device.



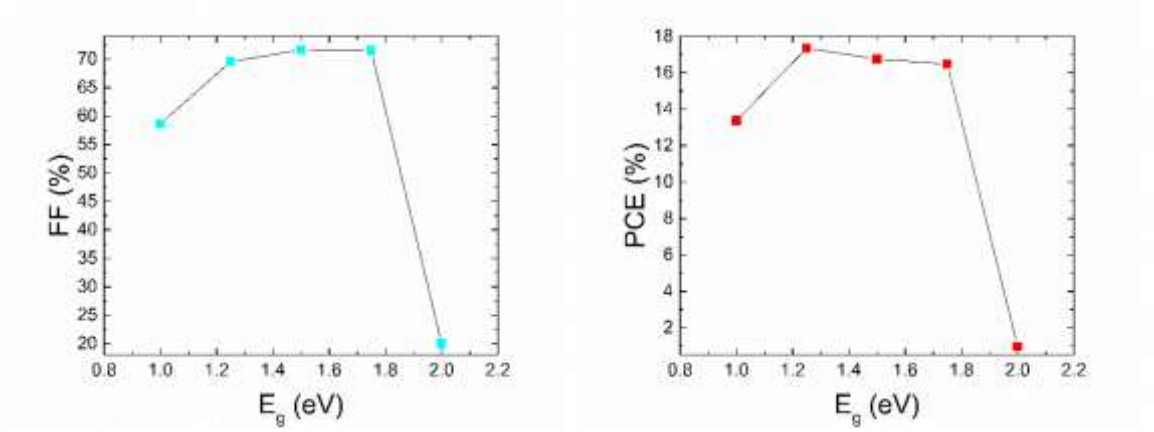


Figure 3. Effect of the bandgap of CdTe as HTL on the performance parameters of the device

The impact of temperature on the J_{sc},V_{oc}, *FF* and *PCE* of the proposed device is displayed in Fig. 4. The output voltage drops linearly while the output current climbs slightly when the temperature of the device rises. Thus, as the temperature rises, the device performance drops. In the absorbing materials of the current devices, the bandgap of the material reduces, and the energy of electrons increases as temperature rises. The recombination of electrons and holes is another effect of temperature rise. The device performance is adversely impacted by this carrier recombination process. At the investigated region of temperature (300-440 K), it is evident that the *PCE* reaches its maximum value (18.5%) at 300 K.

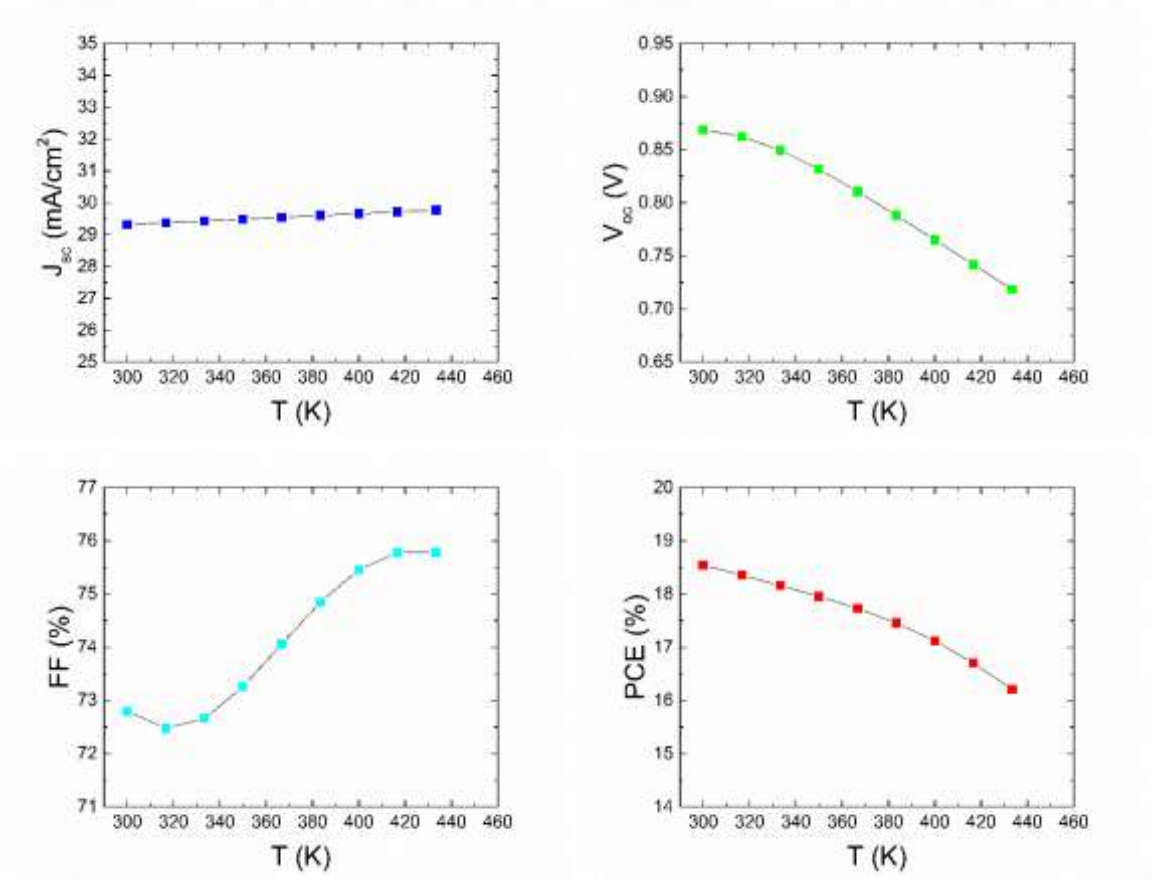


Figure 4. Effect of the temperature on the performance parameters of the device

4. CONCLUSION

This study used the SCAPS-1D simulation approach to examine the band gap tuning with temperature variation effect for lead-free double perovskites, namely $FASnI_3$ and compared the performance parameters. The modeling findings confirm that the moderate band-gap, approximately 1.3 eV, is very promising for raising the values of photovoltaic performance characteristics at low temperatures (about 300 K).

ACKNOWLEDGEMENTS

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5. REFERENCES

[1] Ju, D., Zheng, X., Yin, J., Qiu, Z., Turedi, B., Liu, X., ... & Tao, X. (2018). Tellurium-based double perovskites A2TeX6 with tunable band gap and long carrier diffusion length for optoelectronic applications. ACS Energy Letters, 4(1), 228-234.
[2] Rong, Y., Hu, Y., Mei, A., Tan, H., Saidaminov, M. I., Seok, S. I., ... & Han, H. (2018). Challenges for commercializing perovskite solar cells. Science, 361(6408), eaat8235.
[3] Moody, N., Sesena, S., deQuilettes, D. W., Dou, B. D., Swartwout, R., Buchman, J. T., ... & Bawendi, M. G. (2020). Assessing the regulatory requirements of lead-based perovskite photovoltaics. Joule, 4(5), 970-974.
[4] Mishra, K., Chauhan, R. K., Mishra, R., & Srivastava, V. (2024). Performance optimization of lead-free inorganic perovskite solar cell using SCAPS-1D. Journal of Optics, 53(3), 2668-2678.
[5] Verschraegen, J., & Burgelman, M. (2007). Numerical modeling of intra-band tunneling for heterojunction solar cells in SCAPS. Thin Solid Films, 515(15), 6276-6279.
[6] Sayah, G. T. (2023). A comprehensive simulation study of methylammonium-free perovskite solar cells. Results in Optics, 11, 100390.
[7] Shi, T., Zhang, H. S., Meng, W., Teng, Q., Liu, M., Yang, X., ... & Zhao, Y. J. (2017). Effects of organic cations on the defect physics of tin halide perovskites. Journal of Materials Chemistry A, 5(29), 15124-15129.

SON DERECE KARARLI $MASnBr_3$ TABANLI PEROVSKİT GÜNEŞ HÜCRELERİ
HIGHLY STABLE $MASnBr_3$ BASED PEROVSKITE SOLAR CELLS

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ÖZET
Perovskit güneş hücrelerinin performansı hızla iyileşmiş olup, artık %20'nin üzerinde verimlilik elde edilmektedir. Bu teknoloji, düşük malzeme ve işleme maliyeti nedeniyle önemli ilerlemeler kaydetmiştir. Ancak, perovskit güneş hücrelerinin sınırlı kararlılığı ticarileştirme için bir zorluk olmaya devam etmektedir. Bu soruna katkıda bulunan cihaz içindeki katmanlar ve arayüzlerle ilgili kararlılık sorunlarını incelemek çok önemlidir. Bu araştırmada, ZnO elektron taşıma katmanı olarak seçilirken, CuSbS2 delik taşıma katmanı olarak seçilmiştir. Perovskit güneş hücrelerinin çıkış parametreleri sıcaklık, perovskitin bant aralığı ve radyasyon yoğunluğu açısından analiz edilmiştir. Burada, olağanüstü uzun vadeli kararlılık ve verimlilik üretebilen kararlı ve kurşunsuz MASnBr3 perovskit ışık toplayıcıları sunuyoruz. Çalışmada SCAPS-1D, sırasıyla ZnO ve CuSbS2 elektron ve delik taşıma katmanlarını kritik bir şekilde değerlendirmek için kullanıldı. FTO/ZnO/MASnBr3/CuSbS2/Au'dan oluşan cihaz yaklaşık %22'lik bir güç dönüşüm verimliliğine (PCE) ulaştı. Verimliliği 275 K'den 360 K'ye kadar sabit kaldı ve ardından 420 K'de %19,5'e düştü, bu da önerilen cihaz için termal kararlılığın ne kadar iyi olduğunu doğruladı. Sonuç olarak, bu çalışma perovskit güneş hücrelerinin kararlılığını ve verimliliğini iyileştirmeye yönelik çalışmalara rehberlik edecektir.

Anahtar Kelimeler: Perovskite Güneş Hücreleri, $MASnI_3$, SCAPS 1D

ABSTRACT
The performance of perovskite solar cells has rapidly improved, now achieving efficiencies over 20%. This technology has made significant progress due to its low material and processing cost. However, the limited stability of perovskite solar cells remains a challenge for commercialization. It’s crucial to examine the stability issues related to the layers and interfaces within the device that contribute to this problem. In this research, ZnO is chosen as the electron transport layer, while CuSbS2 is selected as the hole transport layer. The output parameters of perovskite solar cells are analyzed concerning temperature, band gap of perovskite, and radiation intensity. Herein, we provide stable and lead-free $MASnBr_3$ perovskite light harvesters, which can produce outstanding long-term stability and efficiency. In this work, the SCAPS-1D is used to critically assess the ZnO and $CuSbS_2$ electron and hole transport layers, respectively. The device consisting of FTO/ ZnO/ $MASnBr_3$/ $CuSbS_2$ /Au attains a power conversion efficiency (PCE) of about ~22%. Its efficiency remains stable until 360 K from 275 K and then reduces to 19.5% at 420 K, which verifies how good thermal stability is for the proposed device. Ultimately, this work will guide studies to improve the stability and efficiency of perovskite solar cells.

Keywords: Perovskite Solar Cells, $MASnI_3$, SCAPS 1D

1.INTRODUCTION

Fossil fuels have been rapidly depleted due to the fast development of society for several decades, which has had a significant negative influence on the environment [1]. There are great hopes for solar energy as a clean and renewable energy source. Organic-inorganic halide perovskite solar cells (PSCs) have drawn a lot of attention in photovoltaic applications due to their straightforward design, inexpensive preparation, adjustable band gap, and improved power conversion efficiency [2].

The commercial practicality of organic-inorganic hybrid PSCs is hindered by the intrinsic volatility and thermal instability of the organic material, even with the notable advancements in power conversion efficiency [3]. Using an ETL to extract the photoelectrons produced by the absorber material and an HTL to enhance hole extraction will maximize the efficiency of the perovskite layer. The stability and functionality of the device are greatly impacted by the type and character of these layers. In the present study, we found that $MASnBr_3$ based perovskite solar cells can be very stable when the ZnO and $CuSbS_2$ electron and hole transport layers are employed in the device design, respectively.

2. MATERIALS AND METHODOLOGY

In this research, a theoretical model of a solar cell is designed. The factors that may affect the performance of the designed solar cell are investigated. Solar cell performance analyses are performed using the numerical simulation tool SCAPS-1D. SCAPS-1D was developed by Burgelman [4] and provides simulation results with Shockley-Read-Hall recombination statistics using the Poisson equation (Equation (1)), the continuity equation for holes (Equation (2)) and the continuity equation for electrons (Equation (3)).

$$\frac{d^2}{dx^2}\psi(x) = -\frac{q}{\varepsilon_0\varepsilon_r}(p(x) - n(x) + N_D - N_A + p_t(x) - n_t(x)) \quad (1)$$

$$\frac{dp}{dt} = -\frac{dJ_p}{dx} - R_p + G_p \quad (2)$$

$$\frac{dn}{dt} = -\frac{dJ_n}{dx} - R_n + G_n \quad (3)$$

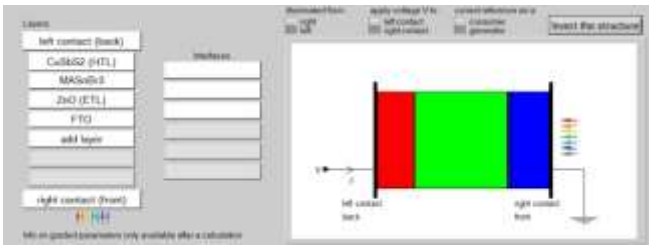
where $\psi(x)$, p, n, q, $\varepsilon_0, \varepsilon_r$, $N_D, N_A, p_t(x), n_t(x)$, J_p, J_n, $G_p(G_n)$, and $R_p(R_n)$ are the electrostatic potential, holes, and electron concertation, permittivity of free space, relative permittivity, donor and acceptor charge impurity, the trapped holes and electron densities, current hole densities, current electron densities, generation, and recombination rate of hole (electron), respectively. In this study, the open circuit voltage (V_{oc}), current density (J_{sc}), filling factor (FF), power conversion efficiency (PCE) and quantum efficiency (QE) parameters were calculated using SCAPS-1D. The function value of the back electrode Au was taken as 5.1 eV from the literature.

Table 1. The utilized material parameters utilized in SCAPS-1D.

Parameters	FTO	ZnO	$MASnBr_3$	$CuSbS_2$
Thickness [μm]	0.4	0.05	1	0.4
Band gap [eV]	3.2	3.3	1.3	1.58
Electron affinity [eV]	4.4	4	4.17	4.2
Dielectric permittivity	9	9	10	8.2
CB effective density of states [cm^{-3}]	$2.2x10^{18}$	$3.7x10^{18}$	$2.2x10^{18}$	$2x10^{18}$
VB effective density of states [cm^{-3}]	$1.8x10^{19}$	$1.8x10^{19}$	$1.8x10^{18}$	$1x10^{19}$
Electron thermal velocity [cm/s]	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$
Hole thermal velocity [cm/s]	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$	$1x10^{7}$
Electron mobility [cm^2 Vs^{-1}]	20	100	1.6	49
Hole mobility [cm^2 Vs^{-1}]	10	25	1.6	49
Donor density [cm^{-3}]	$1x10^{19}$	$1x10^{18}$	$1x10^{13}$	0
Acceptor density [cm^{-3}]	0	0	$1x10^{13}$	$1.38x10^{18}$
Bulk defect density [cm^{-3}]	$1x10^{14}$	$1x10^{14}$	$1x10^{14}$	$1x10^{14}$

3. RESULTS AND DISCUSSION

The design configuration of the $MASnBr_3$ based perovskite solar cell and the crystal structure of cubic MASnBr3 are illustrated in Fig. 1.

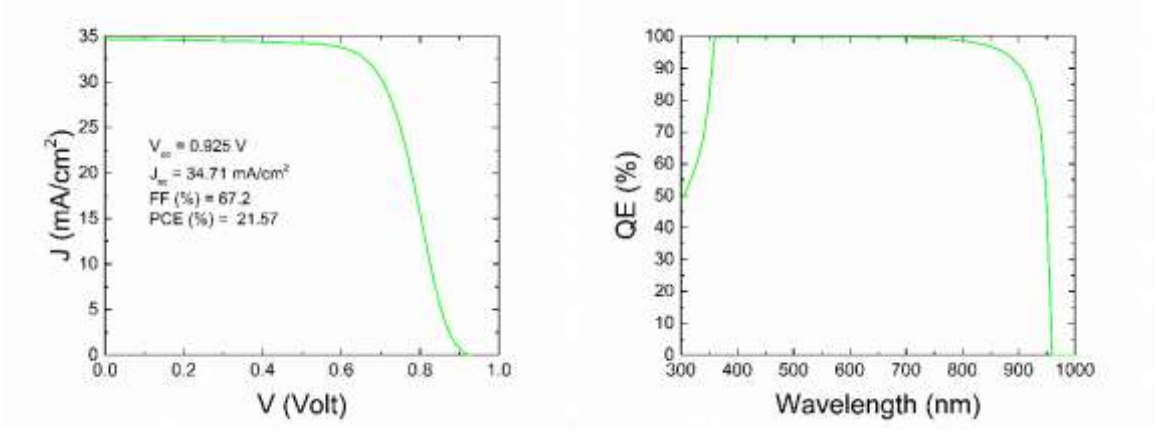


(a) **(b)**

Figure 1. a) The design configuration of $MASnBr_3$ based perovskite solar cell and **b)** the crystal structure of cubic CH_3NH_3(MA) $SnBr_3$ [5].

Fig. 2a shows the current density vs. voltage plots for the proposed device designed using ZnO, $MASnBr_3$, $CuSbS_2$ and Au as ETL, absorber layer, HTL and metal contact, respectively. ZnO as ETL extracts the electron from the perovskite materials and then moves it to the FTO in the PSC device configuration. Additionally, ETL hinders electrons from back recombining with the holes in the absorber layer. $CuSbS_2$ as a HTL gathers holes from the perovskite ($MASnBr_3$) in the PSCs device configuration and transmits them to the back metal contact (Au). Over 21% *PCE* value is achieved for the device under 1 Sun.

Fig 2b displays EQE vs. wavelength plots for the device. The ratio of the number of charge carriers generated by solar cells to the number of photons striking those cells is known as the external quantum efficiency, or EQE. The EQE curve remains unchanged at the wavelength range of 350-750 nm. The EQE curves then show a drop in wavelength when the wavelength increases from 750 nm to 1000 nm. This difference results from increased absorbance at shorter wavelengths, while the drop is caused by the absence of light absorption when incident photons have energy below the band gap.



(a) **(b)**

Figure 2. a) The J-V curve and **b)** the QE curve obtained by simulation for the device

Solar cells are made to function in a variety of temperature environments when used in real time. Because of the greater temperature-induced thermal stresses in the absorber layer, an increase in operating temperature may result in subpar device performance. As such, it is equally critical to analyze the device performance at various operating temperatures. Fig. 3 illustrates how temperature changes affect the device performance parameters. The J_{sc} remains unchanged with temperature. The V_{oc} and FF of the device show a linear decline at only higher temperatures, which only lowers the device performance at higher temperatures. The increase in reverse saturation current with a rise in operating temperature is responsible for the decrease in V_{oc}. The PCE is mainly maintained in the investigated temperature region, confirming that the device is highly stable.

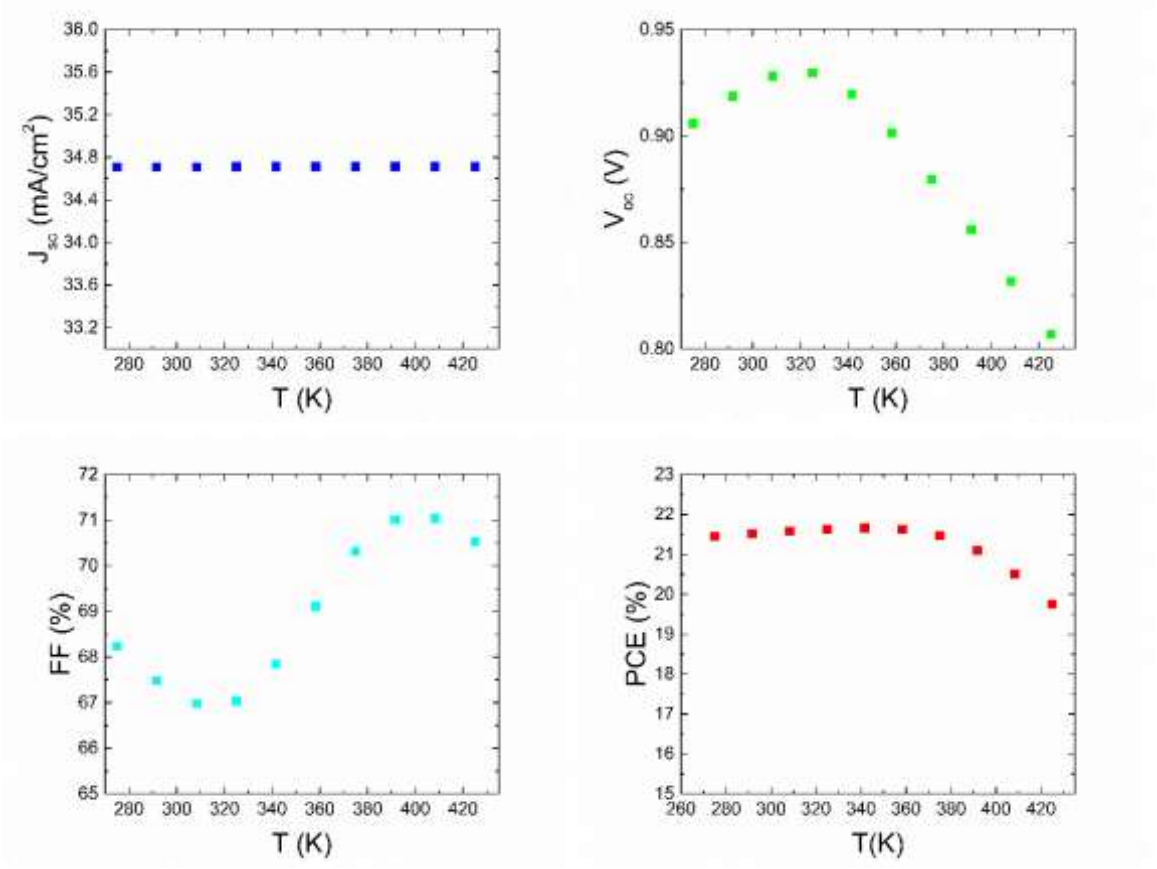


Figure 3. Effect of the temperature on the performance parameters of the device

Fig. 4 illustrates how the bandgap of absorber layer changes affect the device performance parameters. This finding implies that raising the bandgap efficiency of the device is necessary to outperform a its counterparts. To accomplish the best performance, an optimal bandgap value is found to be 1.3 eV for the proposed device.

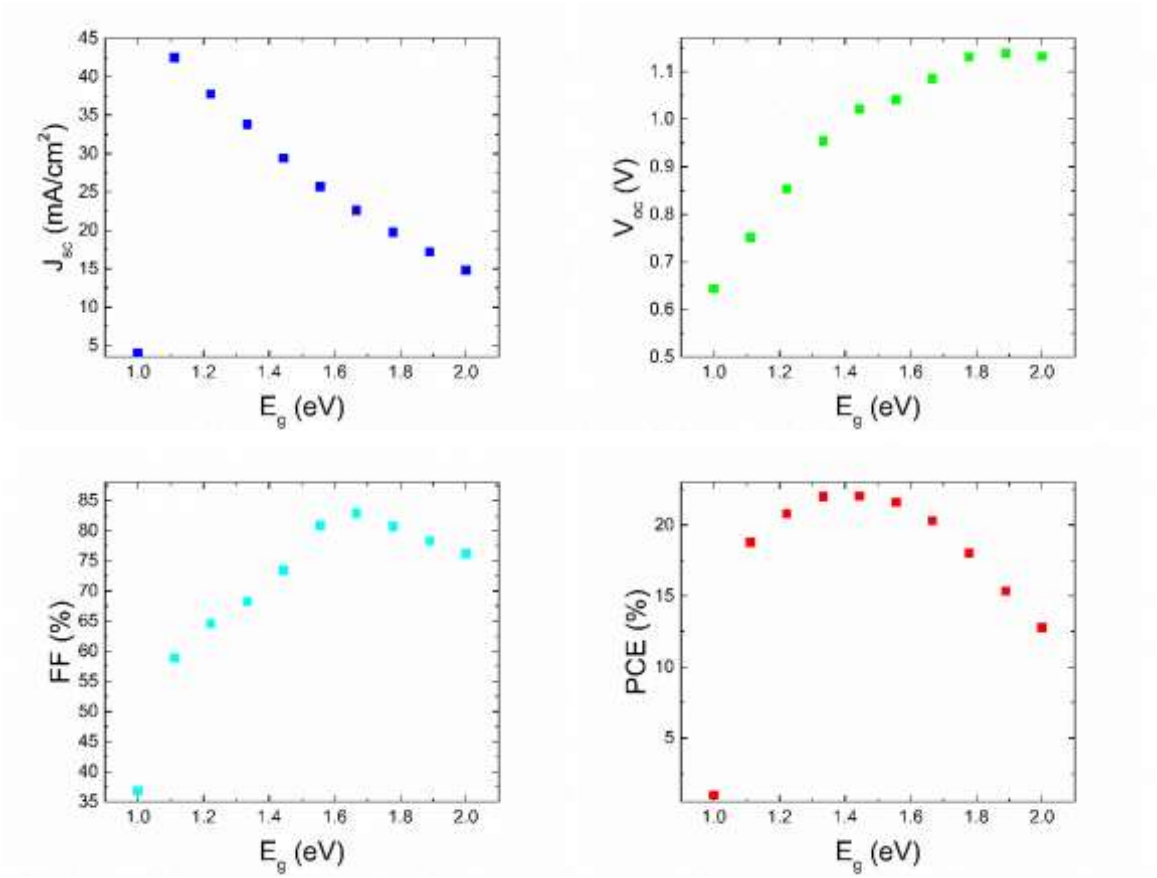
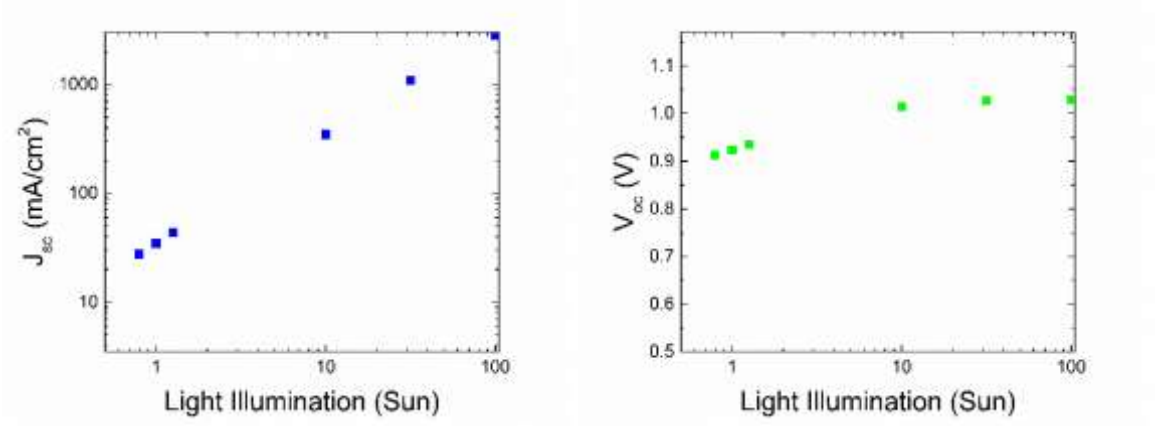


Figure 4. Effect of the bandgap of perovskite layer on the performance parameters of the device

The characteristic parameters of the simulated device under different Suns illumination are displayed in Fig. 5. It is observed that as the intensity of illumination increases, the photocurrent increases monotonically. The increasing quantity of photogenerated carriers as light intensity rises may be the cause of this phenomena. Conversely, there is a decrease in *FF*. The parasitic resistances fluctuate a higher intensity of illumination, leading to alter *FF*. Finally, PCE dramatically drops after 10 Suns.



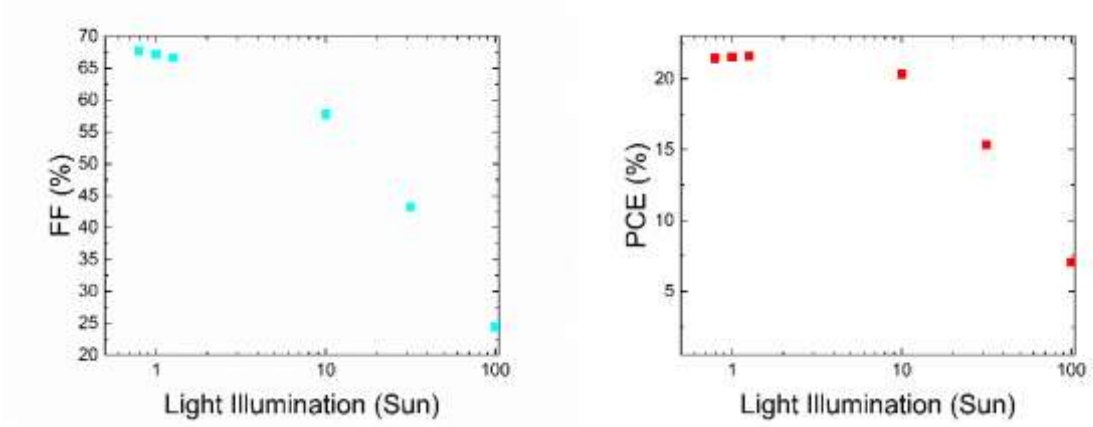


Figure 5. Effect of the light illumination on the performance parameters of the device

4. CONCLUSION

We offer $MASnBr_3$ perovskite light harvesters that are lead-free and stable, capable of achieving exceptional long-term steady and efficient results. ZnO and $CuSbS_2$ as electron and hole transport layers, respectively, are critically determined with the SCAPS-1D. FTO/ ZnO/ $MASnBr_3$/ $CuSbS_2$/Au device achieves a power conversion efficiency (PCE) of approximately ~22%. The suggested device's excellent thermal stability is demonstrated by its efficiency, which stays constant until 360 K from 275 K and then drops to 19.5% at 420 K.

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5. REFERENCES

[1] Dissanayake, P. D., Yeom, K. M., Sarkar, B., Alessi, D. S., Hou, D., Rinklebe, J., ... & Ok, Y. S. (2023). Environmental impact of metal halide perovskite solar cells and potential mitigation strategies: A critical review. Environmental Research, 219, 115066.

[2] Karna, L. R., Upadhyay, R., & Ghosh, A. (2023). All-inorganic perovskite photovoltaics for power conversion efficiency of 31%. Scientific Reports, 13(1), 15212.

[3] Kumawat, K. L., Nanda, K. K., & Rajamalli, P. (2023). Intrinsic stability of perovskite materials and their operational stability in light-emitting diodes. Journal of Materials Chemistry C, 11(22), 7159-7182.

[4] Verschraegen, J., & Burgelman, M. (2007). Numerical modeling of intra-band tunneling for heterojunction solar cells in SCAPS. Thin Solid Films, 515(15), 6276-6279.

[5] Qian, W. H., Cheng, X. F., Zhou, J., He, J. H., Li, H., Xu, Q. F., ... & Lu, J. M. (2020). Lead-free perovskite MASnBr3-based memristor for quaternary information storage. InfoMat, 2(4), 743-751.

PATHOPHYSIOLOGY OF THE MONKEYPOX VIRUS

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ABSTRACT
The monkeypox virus (Monkeypox virus - MPXV) is a DNA virus belonging to the Orthopoxvirus genus of the Poxviridae family. First discovered in laboratory monkeys in 1958, this virus exhibits symptoms similar to those of smallpox. The monkeypox virus was first identified in humans in 1970 in the Desmocratic Republic of Congo. Although it shares genetic similarities with the smallpox virus, the monkeypox virus is less contagious and generally causes a milder course of disease. Endemic in certain regions of Africa, this virus has occasionally spread to other parts of the world, leading to outbreaks. A notable outbreak occurred in the United States in 2003, spread by animals imported from Africa, and global outbreaks in 2022 have highlighted the increasing threat potential of the virus. This study aims to examine the pathophysiology, clinical manifestations, and immune system impacts of the monkeypox virus in detail.

Keywords: Monkeypox virus (MPXV), Pathophysiology, Zoonotic infection, Viral replication, Global outbreak

INTRODUCTION
The Monkeypox virus (MPXV) is a zoonotic DNA virus and a member of the Poxviridae family. First discovered in laboratory monkeys in 1958, this virus has caused endemic disease, particularly in certain regions of Africa. MPXV, which exhibits clinical symptoms similar to smallpox, was first identified in humans in 1970 in the Democratic Republic of the Congo. The virus is genetically closely related to the smallpox virus (Variola); however, MPXV causes a milder disease course and is less contagious.

The virus is typically transmitted from infected animals to humans through direct contact. The outbreak that occurred in the United States in 2003, spread through animals imported from Africa, highlighted the potential global threat of the virus. The global outbreaks experienced in 2022 further underscored the increasing potential for the virus to spread.

The primary aim of this research is to examine the pathophysiology and clinical findings of the Monkeypox virus in detail. The study focuses on understanding the physiological processes such as how the virus enters the human body, its intracellular replication process, and its effects on the immune system, as well as the clinical manifestations of the disease. The significance of this research lies in its potential to contribute to the development of public health policies in light of current outbreaks and to provide information that may help in taking more effective measures against future possible outbreaks.

MONKEYPOX VIRUS

The Monkeypox virus (MPXV) is a DNA virus belonging to the Poxviridae family and the genus Orthopoxvirus. First discovered in laboratory monkeys in 1958, this virus attracted attention due to its clinical symptoms resembling those of smallpox (Likos et al., 2005). It was first identified in humans in 1970 in the Democratic Republic of the Congo. The Monkeypox virus is closely related to the smallpox virus, and these two viruses are genetically similar. However, the Monkeypox virus is less contagious than the smallpox virus, and the disease it causes generally has a milder course (Likos et al., 2005).



Figure 1: (https://hospitalnews.com/monkeypox-virus-five-things-to-know/)

Monkeypox disease is endemic in certain regions of Africa and is usually transmitted to humans from wild animals. Since the first human case was identified in the Congo in 1970, the disease has occasionally led to outbreaks outside the African continent (Centers for Disease Control and Prevention, 2003). In 2003, an outbreak occurred in the United States, spread through animals imported from Africa, and this incident revealed the potential global threat of the disease (Centers for Disease Control and Prevention, 2003). In 2022, outbreaks occurred in many countries globally, highlighting the virus's increasing potential for spread (World Health Organization, 2022).

STRUCTURE AND GENETIC CHARACTERISTICS OF THE MONKEYPOX VIRUS

The Monkeypox virus (MPXV) is a large and complex DNA virus. This virus, which belongs to the Poxviridae family, contains a double-stranded DNA genome approximately 197 kilobases (kb) in length. The genome is filled with genes coding for about 190 open reading frames (ORFs), which are responsible for essential functions such as viral replication, immune evasion, and virulence (McCollum & Damon, 2014). The virus's structure is notable for its centrally located nucleoid and the surrounding double lipid-layered envelope. This structure enhances the virus's resistance to environmental factors and its ability to infect different host cell types (Meyer et al., 2002).

On the virus's outer surface, specific proteins facilitate its attachment to host cells. These proteins enable the virus to penetrate the cell membrane and enter the cell. Additionally, the virus's genome includes genes that encode the enzymes required during the replication process. With these features, MPXV can successfully replicate within the host cell and cause disease (Esposito & Fenner, 2001). Although the virus is structurally similar to the smallpox virus (Variola virus), it has a different disease course and transmissibility profile due to certain differences.

The Monkeypox virus is divided into two main genetic clades that are endemic to Western and Central Africa: the West African clade and the Congo Basin clade. The Congo Basin clade is more virulent and has higher mortality rates than the West African clade (Likos et al., 2005). The genetic variations between these two clades indicate the virus's adaptation process to different

geographical regions. These variations are closely related to the evolutionary changes the virus has undergone and contribute to its ability to infect different host species (Rimoin et al., 2010).

Throughout its evolutionary process, the Monkeypox virus has gained diversity through mutations and recombinations in its genome. These changes have enhanced the virus's mechanisms for immune evasion and its ability to cause disease in different species (Elde et al., 2012). The evolution of the virus has also increased the risk of transmission to humans and has occasionally led to outbreaks. Genetic analyses suggest that MPXV may become more contagious over time and pose a threat for future outbreaks.

PATHOPHYSIOLOGY: THE EFFECTS OF MONKEYPOX VIRUS ON THE BODY

Transmission Routes and Cellular Entry Mechanisms: The Monkeypox virus (MPXV) is typically transmitted to humans through direct contact with the blood, body fluids, or skin lesions of infected animals. Additionally, transmission can occur through contact with contaminated objects (fomites) and respiratory droplet infection (Hutin et al., 2001). Although human-to-human transmission is less common, it is possible through close contact and respiratory droplets. The entry of MPXV into host cells begins with the interaction of specific glycoproteins on the virus's outer envelope with receptors on the surface of host cells. This interaction allows the virus to fuse with the cell membrane and enter the cell (McCollum & Damon, 2014).

Once inside the cell, the virus is transported to intracellular compartments where it uncoats using the host cell's enzymes. This process releases the virus's genetic material. The mechanisms used to cross the cell membrane and enter the cell enhance the virus's infectivity and facilitate its evasion of the immune system (Moss, 2013). Epidermal cells and mucosal surfaces are among the target cells of MPXV, leading to the formation and spread of lesions on the skin.

Intracellular Replication Process of the Virus: Unlike other DNA viruses, the Monkeypox virus replicates in the cytoplasm rather than the nucleus of the cell. This process begins after the virus enters the cell, using the host cell's ribosomes to replicate its DNA. The virus replicates its genetic material through transcription and translation, forming new viral particles (Moss, 2013). During this process, the genes encoding the virus's own DNA polymerase enzymes ensure the virus's replication and enable the formation of new viral particles within the host cell.

The newly formed viral particles assemble in the cytoplasm and are released from the cell using the host cell membrane. This process weakens the cell and can eventually lead to cell death. The intracellular replication process facilitates the rapid spread of the virus and allows it to infect new cells from the infected ones (Esposito & Fenner, 2001). These unique mechanisms of the replication process contribute to the destructive effects of MPXV on host cells.

Immune System Response and Immunopathology: When a Monkeypox virus infection is recognized by the body's immune system, both cellular and humoral immune responses are activated. Cellular immunity aims to kill infected cells and prevent the spread of the virus. Cytotoxic T cells and natural killer cells recognize and eliminate virus-infected cells. Humoral immunity neutralizes viral particles through antibody production and prevents the virus from spreading (Di Giulio & Eckburg, 2004). However, MPXV has certain mechanisms that can weaken these immune responses. For example, viral proteins can suppress the interferon response, helping the virus evade the immune system (Johnston et al., 2012).

Excessive cytokine release and inflammation during the immune response can cause damage to infected tissues, a process known as immunopathology. The Monkeypox virus can cause severe inflammation, especially in the skin and mucosal surfaces, leading to clinical symptoms such as lesions, blisters, and secondary infections (Rimoin et al., 2010). Immunopathological processes influence the clinical course of the disease and can contribute to the development of complications.

EFFECTS ON TARGET ORGANS AND SYSTEMS

Effects on the Skin and Mucosal Surfaces: The most prominent effects of the Monkeypox virus are observed on the skin and mucosal surfaces. The initial symptoms of infection typically include fever, headache, and lymphadenopathy (swelling of the lymph nodes), followed by the development of papules and pustules on the skin within a few days (Ježek et al., 1987). These lesions spread to different parts of the body and can be seen all over the infected person. Skin lesions are usually characterized by central umbilicated vesicles that eventually crust over and heal (Reynolds et al., 2012). On mucosal surfaces, lesions may appear, particularly in the mouth, eyes, and genital area, potentially leading to complications such as secondary infections and scarring.

These effects on the skin and mucosal surfaces are due to viral replication in the targeted epidermal cells. The virus replicates within epidermal cells, leading to necrosis of the cells, which in turn triggers an inflammatory response (McCollum & Damon, 2014). This process also contributes to the virus's evasion of the immune system, as viral particles within the skin lesions are released when infected cells die, spreading to surrounding cells.

Effects on the Respiratory System: The Monkeypox virus can be transmitted via the respiratory system and cause significant effects on this system. Infected individuals may experience symptoms such as inflammation in the upper respiratory tract, cough, sore throat, and shortness of breath (Fine et al., 1988). The virus initiates infection by attaching to epithelial cells in the respiratory tract, where it can rapidly replicate. Respiratory infections can also lead to serious complications such as pneumonia, which can be particularly dangerous in individuals with weakened immune systems.

The effects of the virus on the respiratory system increase its potential for transmission through droplet infection. This is particularly important in enclosed spaces and for those in close contact with infected individuals. The virus transmitted via the respiratory tract can descend to the lower respiratory tract, causing more severe diseases (Jezek et al., 1986). When the virus reaches bronchial and alveolar cells, viral replication occurs, leading to severe lung infections.

Effects on the Nervous System: Although rare, the effects of the Monkeypox virus on the nervous system can be serious. Neurological complications include encephalitis (inflammation of the brain), meningitis (inflammation of the meninges), and other central nervous system disorders (Sejvar et al., 2004). Encephalitis occurs when the virus reaches brain tissue and causes inflammation, potentially leading to loss of consciousness, seizures, and even permanent neurological damage. These effects on the nervous system are linked to the virus's ability to cross the blood-brain barrier.

Nervous system effects usually occur in the later stages of the disease and can be fatal. It is also known that the virus can cause symptoms such as neuropathy by inducing inflammation in peripheral nerves (Jezek et al., 1986). These effects increase the severity of the disease and place a significant burden on healthcare systems in regions where the infection is widespread.

Effects on Other Organs and Systems: The Monkeypox virus can also affect other organs and systems in the body. In particular, gastrointestinal symptoms such as nausea, vomiting, abdominal pain, and diarrhea may occur. These symptoms are associated with the virus causing infection in the gastrointestinal mucosa (McCollum & Damon, 2014). Additionally, symptoms affecting liver function, such as hepatosplenomegaly (enlargement of the liver and spleen), may be observed. This condition is related to the virus replicating in liver cells and triggering an inflammatory response in the organ.

Moreover, it is known that the virus affects the lymphatic system, leading to widespread lymphadenopathy (swelling of the lymph nodes) (Ježek et al., 1987). This is a sign of the body's immune response to the infection and typically occurs in the early stages of the disease. There may also be indirect effects of the infection on other organs such as the heart and kidneys; in severe cases, increased stress on these organs can lead to systemic complications.

CLINICAL FINDINGS AND COURSE OF THE DISEASE

Symptoms of Infection and Clinical Progression: The symptoms of Monkeypox virus (MPXV) infection usually begin with prodromal symptoms that appear 5 to 21 days after infection. These symptoms include high fever, headache, muscle aches, back pain, severe fatigue, and lymphadenopathy (swelling of the lymph nodes) (Reynolds et al., 2012). Lymphadenopathy is a distinguishing feature of Monkeypox infection, setting it apart from other poxvirus infections like smallpox. One to three days after the onset of fever, skin rashes appear. These rashes begin as macules (flat lesions) and progress sequentially through papules (raised lesions), vesicles (fluid-filled blisters), pustules (pus-filled blisters), and scabbing stages (McCollum & Damon, 2014).

The rashes usually start on the face, hands, and feet, and then spread to other parts of the body. The lesions can be painful and eventually crust over and heal. The extent and number of rashes can vary depending on the severity of the infection. In mild cases, the lesions may remain localized, while in more severe cases, they can spread throughout the body. The duration of the disease typically ranges from 2 to 4 weeks, and most cases resolve spontaneously (Parker & Buller, 2013). However, complications can develop in some cases, making the course of the disease more complex.

Clinical Differences in Different Patient Groups: The clinical course of Monkeypox infection can vary depending on factors such as age, gender, immune status, and geographic origin. For example, children generally exhibit more severe symptoms than adults. This is due to children's less developed immune systems, making them more vulnerable to the disease (Jezek et al., 1988). Individuals with weakened immune systems also experience more severe infections. In people with weakened immune systems due to HIV infection or other immunosuppressive conditions, Monkeypox infection may be more severe and prolonged, with a higher risk of complications (Di Giulio & Eckburg, 2004).

Clinical differences have also been observed based on geographic region. There are significant differences between the West African clade and the Congo Basin clade. The Congo Basin clade is generally more virulent, leading to higher mortality rates (Likos et al., 2005). These differences can also affect the epidemiological characteristics of the disease and its potential for spread. Additionally, individuals who have been vaccinated against smallpox in the past may have some immunity against Monkeypox infection, leading to a milder course of the disease.

Complications and Fatal Course: Monkeypox virus infection can lead to serious complications in some cases. The most common complications include bacterial superinfection, sepsis, bronchopneumonia, gastroenteritis, and encephalitis (Ježek et al., 1987). Bacterial superinfection is common due to the secondary infection risk of skin lesions, which can lead to septicemia. Respiratory infections and bronchopneumonia can occur due to the spread of the virus in the respiratory tract and can be fatal. Complications in the gastrointestinal system can also develop, leading to dehydration and electrolyte imbalances (Reynolds et al., 2012).

A fatal course is more common in individuals exposed to the Congo Basin clade and those with weakened immune systems. Infections caused by this clade can have a mortality rate of up to 10% (Likos et al., 2005). Encephalitis and other central nervous system complications increase the risk of neurological damage and death. Additionally, pregnant women and newborns are also at high risk for serious complications and a fatal course (McCollum & Damon, 2014). Therefore, early diagnosis and appropriate treatment interventions are critical in reducing mortality rates.

CONCLUSION

The Monkeypox virus (MPXV), as a zoonotic pathogen, poses a significant public health threat capable of causing severe clinical symptoms and outbreaks in humans. The endemic nature of the disease, particularly in certain regions of Africa, and its occasional spread beyond international borders, underscore the potential global threat posed by the virus (McCollum & Damon, 2014). The symptomatology of the virus, characterized by fever, lymphadenopathy, and distinctive skin rashes, plays a crucial role in the recognition of the disease. However, infections caused by

different clades of the virus, particularly the Congo Basin clade, are associated with higher mortality rates and serious complications (Likos et al., 2005).

For effective control of Monkeypox, early diagnosis and rapid intervention are paramount. In this context, increasing clinical awareness, particularly in endemic regions and at-risk populations, is critical to preventing the spread of infection. Additionally, understanding the transmission routes of the virus and interrupting these pathways are key strategies for controlling outbreaks (Reynolds et al., 2012). It is known that the smallpox vaccine provided partial protection against MPXV in the past; therefore, the reintroduction of the vaccine or the development of new vaccines may be considered to prevent future outbreaks (Di Giulio & Eckburg, 2004).

As a recommendation, further research on the epidemiology and pathogenesis of MPXV is necessary. Specifically, a detailed examination of the virus's molecular structure could enable the development of new treatment strategies and vaccines. Moreover, global health systems, especially in low-income countries, should be better prepared to respond to such zoonotic diseases. In this regard, strengthening international collaborations, increasing information sharing, and developing effective intervention strategies will create a more robust global defense against threats like MPXV (McCollum & Damon, 2014; Di Giulio & Eckburg, 2004).

REFERENCES

Di Giulio, D. B., & Eckburg, P. B. (2004). Human monkeypox: an emerging zoonosis. *The Lancet Infectious Diseases*, 4(1), 15-25.

Elde, N. C., Child, S. J., Geballe, A. P., & Malik, H. S. (2012). Protein kinase R reveals an evolutionary model for defeating viral mimicry. *Nature*, 457(7228), 485-489.

Esposito, J. J., & Fenner, F. (2001). Poxviruses. *Fields Virology*, 2, 2885-2921.

Fine, P. E. M., Ježek, Z., Grab, B., & Dixon, H. (1988). The transmission potential of monkeypox virus in human populations. *International Journal of Epidemiology*, 17(3), 643-650.

Hutin, Y. J., Williams, R. J., Malfait, P., Pebody, R., Loparev, V. N., Ropp, S. L., ... & Regnery, R. L. (2001). Outbreak of human monkeypox, Democratic Republic of Congo, 1996 to 1997. *Emerging Infectious Diseases*, 7(3), 434-438.

Ježek, Z., Marennikova, S. S., Mutumbo, M., Nakano, J. H., & Paluku, K. M. (1988). Human monkeypox: a study of 2,510 contacts of 214 patients. *Journal of Infectious Diseases*, 158(4), 528-534.

Ježek, Z., Szczeniowski, M., Paluku, K. M., & Mutombo, M. (1987). Human monkeypox: clinical features of 282 patients. *Journal of Infectious Diseases*, 156(2), 293-298.

Johnston, S. C., Johnson, J. C., Stonier, S. W., Lin, K. L., Mohamed, M. R., van Buuren, N., ... & Hensley, L. E. (2012). Cytokine modulation correlates with severity of monkeypox disease in humans. *Journal of Clinical Virology*, 54(2), 142-148.

Likos, A. M., Sammons, S. A., Olson, V. A., Frace, A. M., Li, Y., Sammons-Jackson, W. G., ... & Damon, I. K. (2005). A tale of two clades: monkeypox viruses. *Journal of General Virology*, 86(10), 2661-2672.

McCollum, A. M., & Damon, I. K. (2014). Human monkeypox. *Clinical Infectious Diseases*, 58(2), 260-267.

Meyer, H., Perrichot, M., Stemmler, M., Emmerich, P., Schmitz, H., Varaine, F., ... & Formenty, P. (2002). Outbreaks of disease suspected of being due to human monkeypox virus infection in the Democratic Republic of Congo in 2001. *Journal of Clinical Microbiology*, 40(8), 2919-2921.

Moss, B. (2013). Poxvirus DNA replication. *Cold Spring Harbor Perspectives in Biology*, 5(9), a010199.

Parker, S., & Buller, R. M. L. (2013). A review of experimental and natural infections of animals with monkeypox virus between 1958 and 2012. *Future Virology*, 8(2), 129-157.

Reynolds, M. G., Yorita, K. L., Kuehnert, M. J., Davidson, W. B., Huhn, G. D., Holman, R. C., & Damon, I. K. (2006). Clinical manifestations of human monkeypox influenced by route of infection. *Journal of Infectious Diseases*, 194(6), 773-780.

Rimoin, A. W., Mulembakani, P. M., Johnston, S. C., Lloyd Smith, J. O., Kisalu, N. K., Kinkela, T. L., ... & Meyer, H. (2010). Major increase in human monkeypox incidence 30 years after smallpox vaccination campaigns cease in the Democratic Republic of Congo. *Proceedings of the National Academy of Sciences*, 107(37), 16262-16267.

Sejvar, J. J., Chowdary, Y., Schomogyi, M., Stevens, J., McKnight, B., Patel, J., ... & Hughes, C. M. (2004). Human monkeypox infection: a family cluster in the midwestern United States. *Journal of Infectious Diseases*, 190(10), 1833-1840.

World Health Organization (WHO). (2022). Monkeypox outbreaks in non-endemic countries.

PHYSIOLOGICAL PROCESSES OCCURRING BENEATH THE SKIN: BLOOD CIRCULATION, NERVOUS SYSTEM, AND IMMUNE FUNCTIONS

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ABSTRACT
This paper details the physiological functions of the skin and their importance to overall body health. As the largest organ of the body, the skin performs various critical roles, including physical and chemical protection, sensory perception, immune response, and temperature regulation. The layers of the skin, particularly the epidermis, dermis, and hypodermis, play an active role in maintaining body homeostasis by exhibiting different structures and functions. Blood circulation and the lymphatic system are vital in maintaining skin health and facilitating the healing processes. Similarly, the interaction between the nervous system and the skin enables sensory responses to environmental stimuli. Additionally, the skin, as part of the immune system, acts as the first line of defense against pathogens and plays a role in the pathogenesis of various skin diseases. The paper emphasizes the critical importance of understanding the physiological functions of the skin for overall body health, focusing on current research and future treatment strategies.

Keywords: Skin Physiology, Immune System, Sensory Receptors, Blood Circulation, Skin Health

INTRODUCTION
The skin, in addition to being the largest organ of the human body, serves numerous vital functions. The primary function of the skin is to protect the body from external factors, forming a barrier against physical, chemical, and biological hazards. However, the functions of the skin are not limited to being a protective barrier. The skin also plays important roles in
critical physiological processes such as temperature regulation, vitamin D synthesis, sensory perceptions, and immune response. These multifunctional roles of the skin are essential for maintaining the body's homeostasis and providing protection against pathogens. This paper will explore the anatomical structure of the skin, blood circulation, the lymphatic system, interaction with the nervous system, and the effects on the immune system, thereby highlighting the critical role of the skin in body physiology. The aim of the paper is to contribute to the development of more effective approaches in maintaining skin health and treating various skin diseases through an understanding of the skin's complex functions.

PHYSIOLOGICAL IMPORTANCE OF THE SKIN

Skin and Its General Functions

The skin, as the largest organ of the human body, serves numerous vital functions. Its primary function is to protect the body from external factors, acting as a barrier against physical, chemical, and biological damages (Wysocki, 1999). The skin consists of three main layers: the epidermis, dermis, and hypodermis. Each layer has distinct structures and functions. The epidermis, being the outermost layer, provides protection against microorganisms and water loss. The dermis, which contains nerve endings and blood vessels, is responsible for sensory perception and temperature regulation (Walters & Roberts, 2002).

The skin also plays a critical role in regulating homeostatic processes. Body temperature regulation is achieved through sweating and the dilation or constriction of blood vessels (Greaves, 1976). Additionally, the skin supports body health by being involved in vitamin D synthesis and serving as the first line of defense in immune response. Sensory perceptions and psychological effects are also experienced through the skin, indicating that the skin plays a social and emotional role beyond its biological functions (Oláh et al., 2012).

The skin plays a central role in the body's immune system. Langerhans cells, located in the epidermis, recognize antigens and mediate immune responses, protecting the body against pathogens (Monteiro-Riviere, 2020). These cells respond quickly in the event of any injury or infection in the skin and activate other components of the immune system. This protective role of the skin is crucial in preventing pathogens from entering the body.

Moreover, the skin is directly connected to the nervous system and enables the body's sensory experiences. Various receptors in the skin transmit sensory information such as pressure, temperature, and pain to the central nervous system, allowing individuals to interact with their environment (Roosterman et al., 2006). These features demonstrate that the skin is not only a protective covering but also plays an active role in regulating body functions. The multifaceted functions of the skin further emphasize its importance as an integral part of body physiology.

BLOOD CIRCULATION AND LYMPHATIC SYSTEM UNDER THE SKIN

Blood Vessels in the Skin and Regulation of Circulation

The blood circulation within the skin is critical for maintaining the healthy functioning of the skin. As the skin is the organ closest to the body surface and constantly interacts with the external environment, blood circulation is essential for basic physiological functions such as heat regulation, nutrient delivery, and waste removal. Blood vessels in the skin are located in the epidermis and dermis layers, and they play a significant role in temperature regulation (Huggenberger & Detmar, 2011). The increase or decrease in blood flow allows the skin to cool down or warm up, helping to maintain the body's temperature homeostasis.

The regulation of blood circulation also plays a crucial role in the skin's healing process. In the event of injuries or infections, blood vessels dilate to increase blood flow, speeding up the delivery of necessary cells and substances to the wound area. Furthermore, the control of blood circulation in the skin is regulated by hormonal and neural mechanisms, enabling the skin to adapt to external environments (Jurisic & Detmar, 2009).

The Impact of Microcirculation on Skin Health

Microcirculation plays a vital role in skin health as it involves the circulation of blood within the smallest vessels in the skin. Microcirculation ensures the delivery of oxygen and nutrients to skin cells while also helping to remove metabolic waste (Mortimer & Rockson, 2014). The healthy and vibrant appearance of the skin is directly related to the efficient functioning of these small vessels.

Disruption of microcirculation can lead to numerous skin problems. For instance, inadequate microcirculation slows down cell regeneration processes, leading to skin aging and reduced healing capacity. Moreover, insufficient microcirculation in the skin increases the risk of frostbite in cold weather (Kesler et al., 2013). Therefore, maintaining and supporting microcirculation is essential for sustaining skin health.

Function of the Lymphatic System and Waste Removal

The lymphatic system plays a key role in removing excess fluid and waste products from the body. Lymphatic vessels in the skin collect fluid that accumulates in the intercellular spaces and filter this fluid, removing pathogens as it returns to the bloodstream. The lymphatic system also aids in regulating immune responses; harmful microorganisms and foreign substances are captured in lymph nodes and destroyed by immune cells (Rovenská & Rovensky, 2011).

Inefficient functioning of the lymphatic system can lead to problems such as edema. Edema results in fluid accumulation in tissues, causing swelling and discomfort in the skin. Disruption of lymphatic circulation, in particular, can increase the risk of skin infections and chronic skin diseases. Therefore, the lymphatic system is critical not only for maintaining skin health but also for overall fluid balance in the body (Sneddon & Elwell, 2020).

The Relationship Between Skin Diseases and Circulatory Disorders

Skin diseases are often directly related to blood circulation and the lymphatic system. For example, some chronic skin conditions like rosacea develop due to the abnormal dilation and inflammation of blood vessels in the skin (Alitalo, 2011). This condition can lead to persistent redness and swelling of the skin. Similarly, disruption of lymphatic circulation can result in serious conditions such as lymphedema. Lymphedema, particularly after surgical interventions or radiation therapy, causes severe swelling and hardening of the skin.

The impact of circulatory disorders on skin health is not limited to physical discomfort; these conditions can also weaken the skin's immune response and increase the risk of infections. Therefore, ensuring the proper functioning of circulatory systems is essential for maintaining skin health and the success of dermatological treatments (Brakenhielm & Alitalo, 2019).

NERVOUS SYSTEM AND SKIN INTERACTION: SENSORY RECEPTORS

Different Types of Sensory Receptors in the Skin

The skin is an organ that contains different types of sensory receptors, which enable the body to interact with its environment. These receptors include mechanoreceptors, thermoreceptors, nociceptors, and proprioceptors. Mechanoreceptors detect mechanical stimuli such as touch, pressure, and vibration, and are located in different layers of the skin. Meissner's corpuscles and Pacinian corpuscles, in particular, play a critical role in detecting light touch and vibration (Lumpkin & Caterina, 2007). Thermoreceptors allow the skin to detect temperature changes. Cold and heat receptors are sensitive to different temperature ranges and contribute to the regulation of body temperature by relaying this information to the central nervous system.

Nociceptors are specialized receptors that detect pain and are crucial for identifying potential damage to the skin. Nociceptors can be activated by chemical, thermal, or mechanical stimuli, resulting in the sensation of pain. Proprioceptors, although primarily found in muscles, tendons, and joints, detect information related to body position and movement; they also contribute to body awareness in conjunction with mechanoreceptors in the skin (Zimmerman et al., 2014).

Perception of Sensations Such as Pain, Temperature, and Touch

The sensory receptors in the skin detect environmental stimuli and transmit this information to the central nervous system. Sensations such as pain, temperature, and touch are perceived by different types of receptors, and these signals are processed by the spinal cord and brain. The perception of pain begins with the activation of nociceptors in the skin. These receptors respond to potentially harmful stimuli and transmit pain signals to the brain, allowing for a rapid reflex response (Prescott & Ratté, 2017). For example, during a burn on the skin, thermal nociceptors are activated, triggering a quick withdrawal reflex.

Temperature perception occurs through thermoreceptors. Cold and heat receptors are sensitive to different temperature ranges and respond instantly to temperature changes. These receptors help maintain body temperature balance and enable appropriate responses in extremely hot or cold environments. Touch sensation is usually perceived by mechanoreceptors, which respond to a wide range of stimuli from light touch to deep pressure on the skin (McGlone & Reilly, 2010).

Interaction Between the Nervous System and Skin: Reflexes and Reactions

The interaction between the sensory receptors in the skin and the central nervous system enables reflex responses and conscious sensory experiences. Reflexes are rapid and involuntary reactions that typically aim to protect the body from potential dangers. For example, when you touch a hot surface, thermal receptors are quickly activated, triggering a motor response through the spinal cord reflex arc, causing you to withdraw your hand (Zotterman, 1939). These reflexes occur even before the perception of pain and instantly protect the body.

Additionally, when sensory information reaches the brain, more complex reactions and conscious sensory experiences emerge. Sensations of touch, pain, and temperature are processed in the brain's somatosensory cortex, determining how an individual will respond to environmental stimuli. These processes allow the body to adapt to internal and external stimuli, forming the basis of survival mechanisms (Mountcastle, 2005).

Sensory Disorders and Neural Anomalies in the Skin

Sensory disorders arise when the sensory receptors in the skin or their pathways to the central nervous system are disrupted. These disorders include hyperesthesia (increased sensitivity), hypoesthesia (reduced sensitivity), paresthesia (abnormal sensory perceptions), and anesthesia (loss of sensation). For instance, in conditions such as diabetic neuropathy, nerve damage can cause disruptions in the perception of temperature, touch, or pain in the skin. This can lead to vulnerability to injuries, as the individual may not perceive damage to the skin in a timely manner (Arendt-Nielsen & Yarnitsky, 2009).

Furthermore, disruptions in the interaction between the nervous system and the skin can affect reflex responses. For example, in conditions such as reflex sympathetic dystrophy (RSD), the disordered interaction between the nervous system and the skin can result in painful and prolonged inflammatory processes. These conditions often lead to complex and chronic clinical situations requiring specialized treatment (Drummond, 2010).

The Immunological Structure of The Skin: Langerhans Cells and Other Immune Cells

The skin functions not only as a barrier but also as a complex immunological structure. Among the most critical cells in this structure are Langerhans cells. Langerhans cells are located in the upper layers of the epidermis and act as antigen-presenting cells that recognize pathogens and initiate immune responses. After capturing and processing antigens, these cells migrate to regional lymph nodes, where they activate T cells and trigger the body's immune response (Nestle et al., 2009).

In addition, the dermal layer contains other immune cells such as mast cells, macrophages, dendritic cells, and T cells. These cells play crucial roles in regulating inflammatory processes in the skin and responding to pathogens. Mast cells, in particular, are important for rapidly initiating allergic reactions and inflammatory responses (Harvima & Nilsson, 2011). The coordinated work of these cells is necessary for maintaining the immunological functions of the skin.

Interaction Between The Skin and Systemic Immunity

The immune cells present in the skin function as part of not only local but also systemic immune responses. The contribution of the skin to the immune system is primarily mediated by Langerhans cells and dendritic cells. These cells capture and process antigens, then transport them to lymph nodes where they activate T cells. After activation, these T cells are transported through the circulatory system to other parts of the body, initiating a systemic immune response (Zhu et al., 2024).

This process is particularly important in chronic inflammatory skin diseases such as allergic contact dermatitis and psoriasis. In these diseases, beyond local inflammation, a systemic immune response may be triggered. For example, in psoriasis, responses mediated by Th1 and Th17 cells can lead to inflammatory processes not only in the skin but also in other parts of the body (Dainichi et al., 2018). Therefore, the skin is considered a critical organ in maintaining the effectiveness of the immune system both locally and systemically.

The Role of the Skin as the First Line of Defense Against Pathogens

The skin serves as the body's first line of defense against pathogens. The keratinized cells on the skin's surface provide a physical barrier, while Langerhans cells and other immune cells play a central role in detecting pathogens and initiating the immune response. Langerhans cells recognize the antigens of pathogens such as bacteria, viruses, and fungi, activating the immune system. These cells are particularly important in conditions such as allergic contact dermatitis, where Langerhans cells process antigens, present them to the immune system, and trigger an inflammatory response (Callard & Harper, 2007).

However, disruption of the skin barrier can weaken the skin's ability to defend against pathogens. For example, in skin diseases like atopic dermatitis, the weakening of the skin barrier allows pathogens to enter more easily, increasing the risk of infection. This can result in an overactive immune response, leading to chronic inflammation and abnormal activity in other parts of the immune system (Guttman-Yassky & Krueger, 2018).

Skin Diseases and the Immune System: Conditions like Psoriasis and Eczema

Skin diseases are often associated with abnormal functioning of the immune system. Psoriasis is one such condition, typically characterized by the overactivity of Th1 and Th17 cells. These cells lead to the secretion of inflammatory cytokines, resulting in the formation of thick, scaly plaques on the skin. Langerhans cells play a significant role in the pathogenesis of psoriasis, as they are central in antigen presentation and the activation of T cells (Kim et al., 2016).

Eczema (atopic dermatitis), on the other hand, is generally associated with the overactivity of Th2 cells, leading to chronic inflammation and barrier dysfunction in the skin. In atopic dermatitis, Langerhans cells and mast cells play critical roles in regulating inflammatory responses in the skin (Bos et al., 1992). These diseases arise as a result of the complex interaction between the skin and the immune system and are often linked to systemic immune disorders.

CONCLUSİON

The complex physiological functions of the skin have a profound impact on overall body health. The skin not only acts as a physical barrier but also plays critical roles in immunity, sensory perception, temperature regulation, and metabolic processes. The blood circulation and lymphatic system in the skin help maintain body homeostasis, while its interaction with the nervous system enables sensory responses to the external environment. Moreover, the skin serves as the first line of defense against pathogens, playing a central role in maintaining overall body health. The proper functioning of all these roles underscores the importance of skin health for general body health (Nestle et al., 2009).

Recent research has made significant progress in understanding the complex interactions between the skin and the immune system. Studies on specific immune cells, such as Langerhans cells, and their role in the pathogenesis of skin diseases have paved the way for the development of new treatment strategies (Zhu et al., 2024). From a future perspective, the development of personalized treatment methods for skin health is of great importance. In this context, advances in genetics and molecular biology could lead to more targeted and effective approaches in treating skin diseases (Guttman-Yassky & Krueger, 2018).

In conclusion, understanding the physiological functions of the skin is critical not only for treating dermatological problems but also for preserving and improving overall body health. Participants in this seminar are expected to understand the importance of maintaining skin health and the early diagnosis and treatment of skin diseases. Future research and clinical practices will provide new opportunities for a better understanding and preservation of skin health. In this context, individuals are advised to make lifestyle choices that support skin health and seek dermatological support when necessary (Callard & Harper, 2007).

REFERENCES

Alitalo, K. (2011). The lymphatic vasculature in disease. *Nature Medicine*.
Arendt-Nielsen, L., & Yarnitsky, D. (2009). Experimental and clinical applications of quantitative sensory testing applied to skin, muscles and viscera. *The Journal of Pain*.
Bos, J. D., Wierenga, E. A., Smitt, J. H. S. (1992). Immune dysregulation in atopic eczema. *Archives of Dermatology*.
Brakenhielm, E., & Alitalo, K. (2019). Cardiac lymphatics in health and disease. *Nature Reviews Cardiology*.
Callard, R. E., & Harper, J. I. (2007). The skin barrier, atopic dermatitis and allergy: A role for Langerhans cells?. *Trends in Immunology*.
Dainichi, T., Kitoh, A., Otsuka, A., & Nakajima, S. (2018). The epithelial immune microenvironment (EIME) in atopic dermatitis and psoriasis. *Nature Immunology*.
Drummond, P. D. (2010). Sensory disturbances in complex regional pain syndrome: clinical observations, autonomic interactions, and possible mechanisms. *Pain Medicine*.
Greaves, M. W. (1976). Physiology of skin. *Journal of Investigative Dermatology*.
Guttman-Yassky, E., & Krueger, J. G. (2018). Systemic immune mechanisms in atopic dermatitis and psoriasis with implications for treatment. *Experimental Dermatology*.
Harvima, I. T., & Nilsson, G. (2011). Mast cells as regulators of skin inflammation and immunity. *Acta Dermato-Venereologica*.
Huggenberger, R., & Detmar, M. (2011). The cutaneous vascular system in chronic skin inflammation. *Journal of Investigative Dermatology*.
Jurisic, G., & Detmar, M. (2009). Lymphatic endothelium in health and disease. *Cell and Tissue Research*.
Kesler, C. T., Liao, S., & Munn, L. L. (2013). Lymphatic vessels in health and disease. *Wiley Interdisciplinary Reviews: Systems Biology and Medicine*.
Kim, J. H., Hu, Y., Yongqing, T., et al. (2016). CD1a on Langerhans cells controls inflammatory skin disease. *Nature Immunology*.
Lumpkin, E. A., & Caterina, M. J. (2007). Mechanisms of sensory transduction in the skin. *Nature*.
McGlone, F., & Reilly, D. (2010). The cutaneous sensory system. *Neuroscience & Biobehavioral Reviews*.
Monteiro-Riviere, N. A. (2020). Comparative anatomy, physiology, and biochemistry of mammalian skin. *Taylor & Francis*.
Mortimer, P. S., & Rockson, S. G. (2014). New developments in clinical aspects of lymphatic disease. *The Journal of Clinical Investigation*.
Mountcastle, V. B. (2005). *The sensory hand: neural mechanisms of somatic sensation*. Harvard University Press.
Nestle, F. O., Di Meglio, P., Qin, J. Z., & Nickoloff, B. J. (2009). Skin immune sentinels in health and disease. *Nature Reviews Immunology*.
Oláh, A., Szöllősi, A. G., & Bíró, T. (2012). The channel physiology of the skin. *Springer*.
Prescott, S. A., & Ratté, S. (2017). Somatosensation and pain. In *Conn's Translational Neuroscience*. Elsevier.
Roosterman, D., Goerge, T., & Schneider, S. W. (2006). Neuronal control of skin function: the skin as a neuroimmunoendocrine organ. *Physiological Reviews*.
Rovenská, E., & Rovensky, J. (2011). Lymphatic vessels: structure and function. *Israeli Medical Association Journal*.
Sneddon, M., & Elwell, R. (2020). Essential to health yet overlooked: the vital role of the lymphatic system. *British Journal of Nursing*.
Walters, K. A., & Roberts, M. S. (2002). The structure and function of skin. *Taylor & Francis*.

Wysocki, A. B. (1999). Skin anatomy, physiology, and pathophysiology. *Nursing Clinics of North America*.
Zimmerman, A., Bai, L., & Ginty, D. D. (2014). The gentle touch receptors of mammalian skin. *Science*.
Zotterman, Y. (1939). Touch, pain and tickling: an electro-physiological investigation on cutaneous sensory nerves. *The Journal of Physiology*.
Zhu, R., Yao, X., & Li, W. (2024). Langerhans cells and skin immune diseases. *European Journal of Immunology*.

PERCEPTION AND PUBLIC HEALTH IMPACT OF LANDSCAPING OF THE CENTER FOR WETLAND, UNIVERSITY OF UYO, UYO, NIGERIA

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ABSTRACT

Background of the Study:
Environmental pollution creates conducive environment for breeding of parasites and causes serious problem to human health. A study on the perceptions and health implications of landscape architecture in Uyo was investigated. The study assessed and improved on the Centre for Wetland landscape in the University of Uyo, investigated the prevalence of intestinal parasites before and after landscaping, and participants preferences and perception of landscaping and its health implications.

Methodology:
Hundred 100 participants who were staff and students of University of Uyo were selected by stratified random sampling and were served with structured questionnaires. Soil samples were analysed for soil parasite using Baermann method, formal-ether sedimentation and zinc-sulphate floatation methods before and six months after landscaping.

Results:
The results revealed that landscaping reduces the prevalence of soil borne parasite in the Center for Wetland soil from 61.7% before landscaping to 16.7% after landscaping. It improve the sanitation, drainage and hygiene of the Centre and create a conducive environment for learning. The prevalence and mean intensity of parasite species isolated from Wetland soil before landscaping were *Ascaris lumbricoides* with a prevalence of 6.7% and mean intensity of 4.0, *Ancyclostoma duodenale* with a prevalence of 25% and mean intensity of 2.93, *Strongyloides stercoralis* with prevalence of 13.3% and mean intensity of 3.63 and *Trichomonas hominis* 6.7% and 2.5. The environmental and public health characteristics of the Centre before landscaping shows a high level of pollution, offensive odour, flooding, poor sanitation and unconducive environment for learning. After landscaping there was tremendous improvement in the environmental and public health characteristics which creates a good psychological impact, conducive environment for learning and reduces stress, tension and fatigue.

Conclusion:
The study demonstrated the importance of landscaping of the environment, its benefits and health implications. Sustainable landscape planning should promote the training of environmental management and landscaping at higher institutions of learning.

Keyword: Landscaping, Perception, Public health, Impact, Centre for wetland.

COMPARATIVE ANALYSIS OF PROGRESSIVE COLLAPSE RESISTANCE IN LOW AND MID-RISE RC SOLID SLAB BUILDINGS DESIGNED ACCORDING TO TBEC-2018

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ABSTRACT
This study evaluates the progressive collapse resistance of two reinforced concrete (RC) buildings, one with 3 stories and the other with 9 stories, both designed according to the Turkish Building Earthquake Code (TBEC-2018). The assessment focuses on the building's structural performance under extreme loading conditions, particularly in the context of potential progressive collapse. Nonlinear dynamic analyses were conducted using Extreme Loading for Structures (ELS) software, which employs the Applied Element Method (AEM) for detailed simulations of structural behavior. The study explores critical scenarios involving the removal of ground-floor columns at six different locations within the building plans. These scenarios were selected as they represent high-risk conditions for initiating progressive collapse. The results of the analyses were then compared with the criteria outlined in the Unified Facilities Criteria (UFC) guidelines, a widely recognized standard for assessing progressive collapse potential.
The findings reveal that both the 3-story and 9-story buildings exhibit sufficient resistance to progressive collapse, regardless of height differences. The structural response in all scenarios showed minimal plastic deformations and no significant damage, indicating a high level of robustness in the designs. These results suggest that the provisions of TBEC-2018 are effective in reducing the risk of progressive collapse in RC structures, particularly in seismic regions. The study contributes to a better understanding of how current design codes influence building resilience and offers insights for future design and evaluation practices aimed at enhancing the safety of RC structures in earthquake-prone areas.

Keywords: Progressive collapse, Applied Element Method, Extreme Loading for Structures (ELS), Reinforced Concrete, Turkish Building Earthquake Code, Unified Facilities Criteria (UFC)

1. INTRODUCTION
UFC defined progressive collapse as "a chain reaction of failure of building members to an extent disproportionate to the original localized damage. Such damage may result in upper floors of a building collapsing onto lower floors.". a lot of reasons for lost columns which are vehicle accidents, earthquakes, and blasts. Progressive collapse accidents occurred in many regions, such as (the Ronan Point Apartment in England in 1968, the Alfred P. Murrah Building in Oklahoma City in 1993, and the World Trade Center in New York, USA, in 2001). These accidents encourage engineers to find design methods that prevent or decrease the effect of progressive collapse. Many codes were developed to study the mechanism of progressive collapses, like UFC 2009 [1] and

GSA 2013 [2]. In this paper, the UFC 2009 code will be used to study the effect of removing more than one column at the same time in the corner and inside columns. Models developed using the applied element program (ELS) [3]. The structure models were designed using the Turkish Building Earthquake Code (TBEC-2018) [4].

Many studies were developed to specify the mechanism of progressive collapse. These studies were divided into experimental tests study and modelling studies after verification of the program of modelling were used. However, more than one column removal due to war, severe seismic, and terrorist attacks are more expected to happen. Failure of more than one column leads to massive failure of a large part of a building or a whole building failure. So, in this paper, the R.C. bracing technique will used to study how much the bracing element will enhance in preventing progressive collapse. Two approaches used indirect and direct design methods. The Alternative Path Method, one of the direct design methods, is the most commonly used.

Pachenari A. et al. [5]. modelled a multistory of a concrete building using nonlinear static and nonlinear dynamic analysis to evaluate progressive collapse. They found that nonlinear static analysis gives values larger than nonlinear dynamic analysis for parameters of shear force in beams.

Kim J., and Kim T. [6]. Investigate the progressive collapse of 2D steel moment frames using linear statics and nonlinear dynamics analysis. They noted that with the increased number of stories, the progressive collapse potential of the frames reduces.

Gamaniouk T. [7]. 2D steel frame structures were modelled for different numbers of stories (10, 20, 30, 40). were analysed in case of removing one column. Results show that the higher number of stories performs less number of plastic hinges, and the use of a bracing system wasn't affected in preventing progressive collapse because there was no continuity in the structure model.

Kim J. et al. [8] 2D structural models are analysed for steel frames using the FEM program. Eight different bracing types were considered, and their performances were compared. It was found that the brace with an inverted-V shape was the most significant ductile behavior during progressive collapse.

Nassir M. et al. [9] Compare progressive collapse resistance of a multi-story building on the 8th floor under both single and multi-column removal scenarios using linear static analysis FEM. It is noted that the removal of two columns scenario is more critical, as well as the removal of two external columns (corner and external column) scenario.

Bhatta, 2023 [10] Study the effect of infill walls on resisting progressive collapse. The study was performed experimentally to verify the numerical results. Results show that infill walls increase the resistance to progressive collapse.

Yi W. et al. [11] tested a one-third scale RC frame under quasi-static loading to study progressive collapse. Results show that the failure occurred at a displacement of 43.6 cm and rotation of 10.3°. Results show the effect of CTA where the capacity of the structure was 1.4 times the capacity calculated from the plastic limit state.

Sasani M. et al. [12] studied the effect of a reinforcement beam connected to removed columns on progressive collapse after removing the internal columns of a concrete building. It found that the reinforcement ratio of the beam is very effective in preventing progressive collapse.

Su Y. [13] tested 12 samples of reinforced concrete beam-column using quasi-static under loss of column. It was studied using different span-to-depth ratios of beam and beam sections. The results show that the CAA to load resistance of beams was increased by the span-depth ratio of beams or the longitudinal reinforcement ratio.

Farhang Vesali N. et al. [14] Determined the effect of longitudinal reinforcing ratio and stirrup of reinforcement beams to resist progressive collapse. It found that stirrups had a minor effect on CAA.

Yu J. and Tan K. H. [15] Investigate the effects of seismic detailing and the span-to-depth ratio of a concrete beam in case of interior column loss. It was founded on reaching CTA faster with larger

span-depth ratios. The author suggests that when deflection at the middle point of the beam reaches 10% of the total span length, the beam will reach CTA capacity
Alogla K. et al. [16] Determine the effect of providing additional longitudinal reinforcing bars in the mid-layer of beams in improving the ductility of concrete beams.
Dmitriev A. N. and Lalin V. V [17] study different analysis methods, linear static and non-linear dynamic, and compare the results from analysis with experimental results and found that non-linear dynamic analysis is more accurate than linear static and dynamic where AEM depends on non-linear dynamic analysis was used.
As shown in the literature review, most researchers study the progressive collapse in two-method experimental studies or model methods using FEM programs after verification of the FEM program with experimental results. A lot of studies have been performed to study the effect of the removal of more than one column, but no solution has been found to prevent progressive collapse. On the other hand, a lot of studies discuss the effect of using steel bracing in preventing progressive collapse (ASCE/SEI 41-06, 2006) [18] (ELS, 2014) for steel structures, but RC brace was not discussed. In this paper, study the effect of an RC brace with a different shape to prevent progressive collapse in case of losses of three columns at the same time as the external columns. In this study, a 3D model of 3 and 9 stories was developed using the AEM program "Extreme Loading for Structures" software (ELS) [3], which uses nonlinear analysis to study the effect of different shapes of RC bracing in preventing progressive collapse according to UFC limits.

2. MODEL ANALYSIS

In this paper, UFC guidelines [1] will be considered. UFC guidelines two design methods, which are direct design method and indirect design method. The alternative path method (APM) is one of the direct design methods, and it's the most used method by researchers to study progressive collapse. APM can bridge loads of failed columns to the near columns by beams. According to UFC guidelines, the applied load depends on the analysis type, which can be static or dynamic. For this paper, the dynamic analysis will be used, so the combination load equation will be (1.2DL+0.5LL) (UFC2009) [1], where DL is the dead load, and LL is the live load. UFC assumes that the losses of the primary element, that is, columns, will occur suddenly. According to UFC guidelines, loss columns have different locations in the plan, as shown in Fig.4. The beam plastic rotation is checked using (Table 4.1) in the UFC guidelines for dynamic nonlinear analysis. The paper will use AEM to study the behavior of structure against progressive collapse. The use of AEM in previous studies was few, where most of the studies FEM considered. AEM can study the building behavior from initial loading to the end of failure, which means this method combines both the Finite Element Method (FEM) and the Discrete Element Method (DEM). Where FEM considers the behavior of the building until element separation, and DEM can be used after element separation. AEM considers the element of structure as a collective of small elements that are connected together by springs, as shown in Fig.1. These elements connect their surface with springs that represent stress and strain between elements. Every two elements can be separated due to an extreme loading case, which means AEM considers the separation of small elements. Each element has six degrees of freedom for translation and rotation, as shown in Fig. 2.

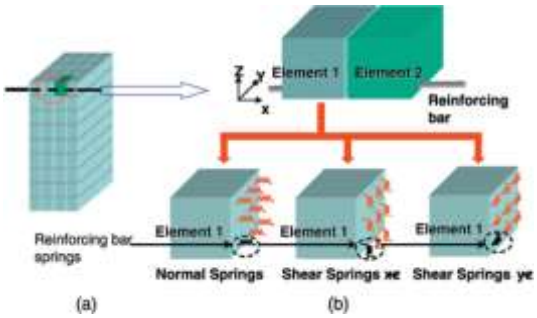


Fig.1 Element of structure modeled by AEM [3]

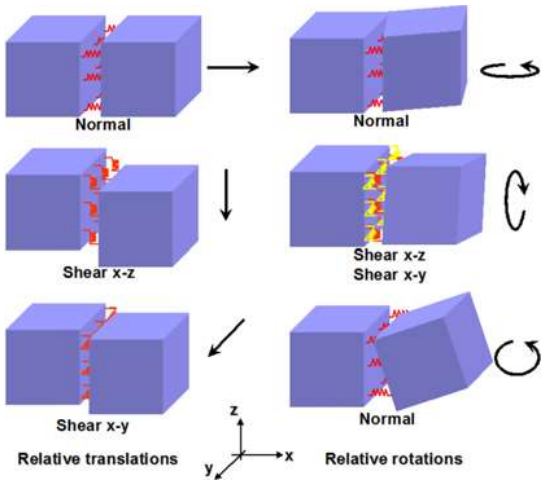


Fig. 2 Element degrees of freedom [3]

METHODOLOGY OF WORK

The main purpose of this paper is to study the buildings designed according to TBEC-2018 in resistance of progressive collapse in the case of removing six scenarios of bearing elements without removing the connection between the beam and columns to save the transition of load to the other existing element. For this purpose, a 3 and 9-story 3D-dimensional RC structure is considered. The structure model was designed according to the new Turkish code 2018 (TBEC-2018) [4]. Various scenarios of removing columns will be studied in this paper using the extreme loading element program (ELS).

2.1. MODEL DESCRIPTION

A 3 and 9-stories RC 3D structure, as shown in Fig. 3, is analyzed considering various scenarios of removing columns using ELS software. Table 3.1 shows the general properties of the RC structure elements; Table 3.2 shows the designed dimensions of the RC structure. Fig.4 shows the plan where six scenarios of removing columns were selected, as well as the 3D model.

Table 3.1: General properties and dimensions of RC structure

No.	Description	Value
1.	Concrete Grade	C30
2.	Steel Grade	F420
3.	Story height	3.2m
4.	Span distance between columns – Center to Center –	6.0m
5.	Live load	0.20 ton/m^2
6.	Dead Load (covering material + equivalent partition load)	0.362 ton/m^2
7.	Analysis type	Nonlinear Dynamics Analysis

Table 3.2: Design of RC structure

Story No.		Column		Shear Wall	Beam mm	Slab Thickness cm
		External Column Dimension(mm)	Internal Column Dimension(mm)			
3-Story	1st.—3th.	300x300	300x300	2000x300	230x300	13
9-Story	1st.—3th.	600x600	630x630	3000x330 2300x330	230x300	
	6th.—9th.	300x300	330x330			

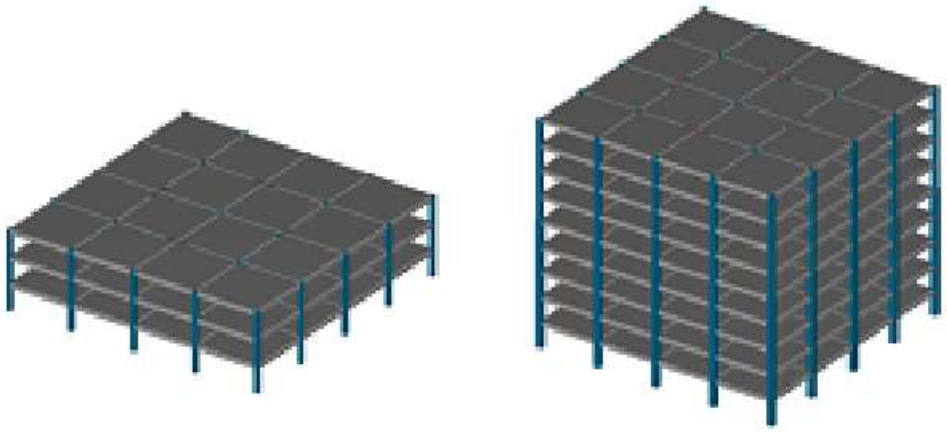


Fig.3. 3D RC structure for 3 and 9-stories

As per the UFC recommendations, six different locations in the plan were considered for element removal: external corner (EC), external penultimate (EP), and external middle (EM), as well as internal corner (IC), internal side (IS), and internal middle (IM) load-bearing element as shown in Fig. 4. Although not specifically intended, one can realize that these 6 locations cover all possible distinctive column/shear wall locations on the plan which is due to the plan layout selected. The internal side (IS) removal element was a shear wall, while the others were columns.

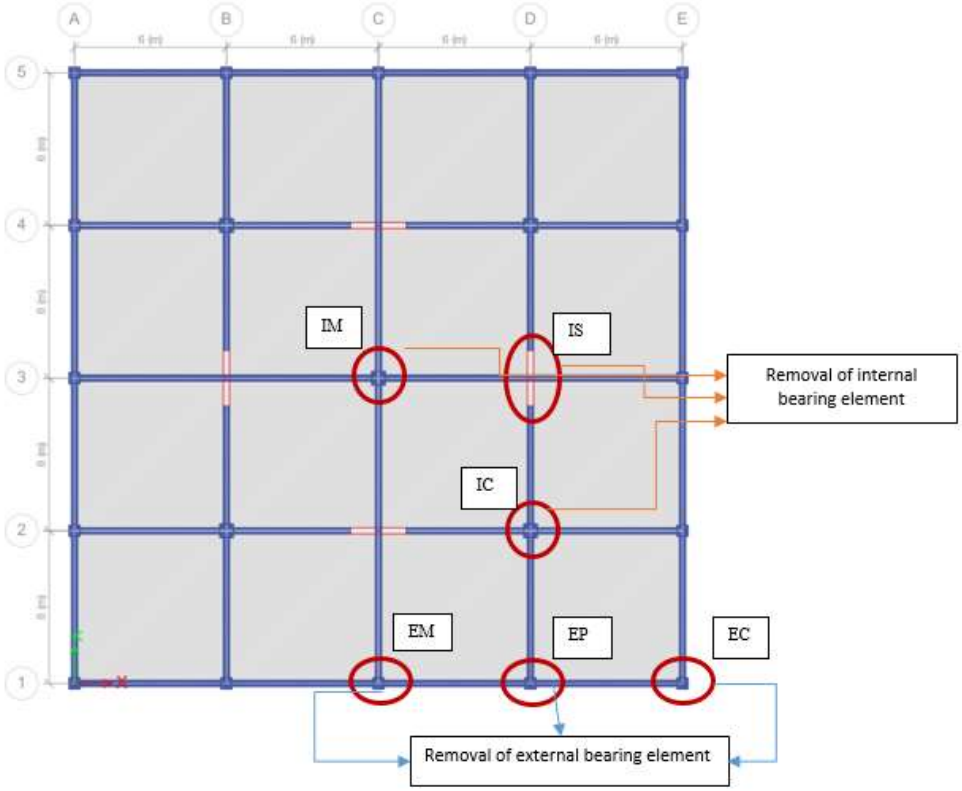


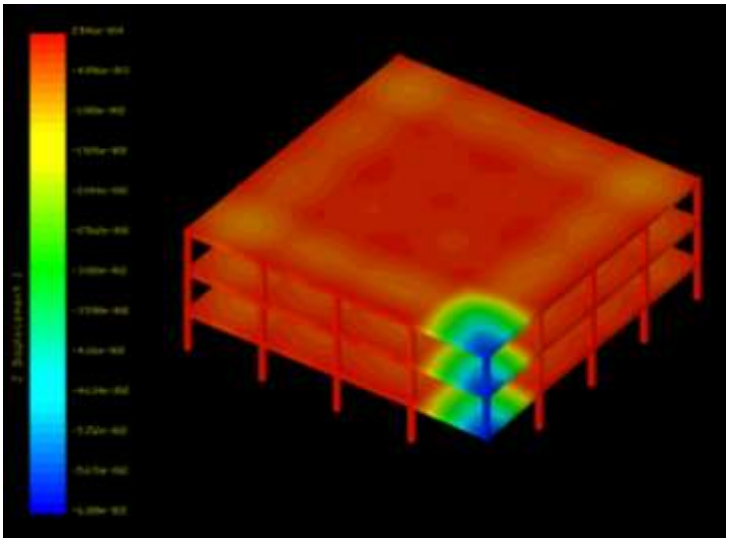
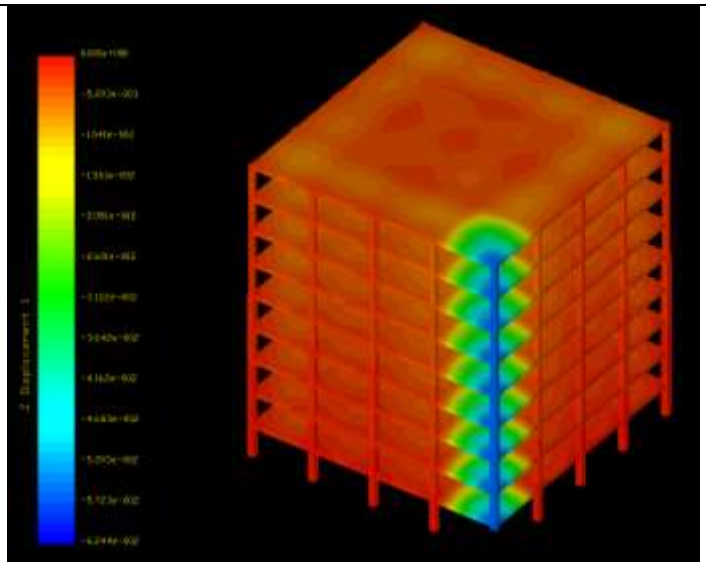
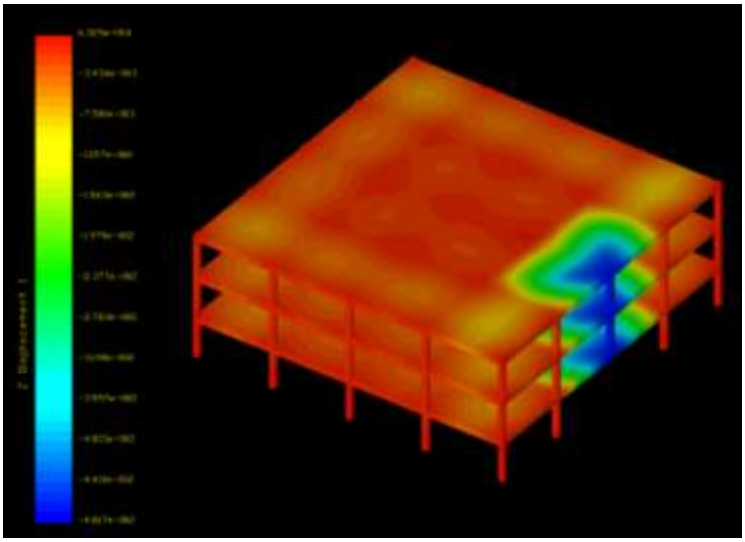
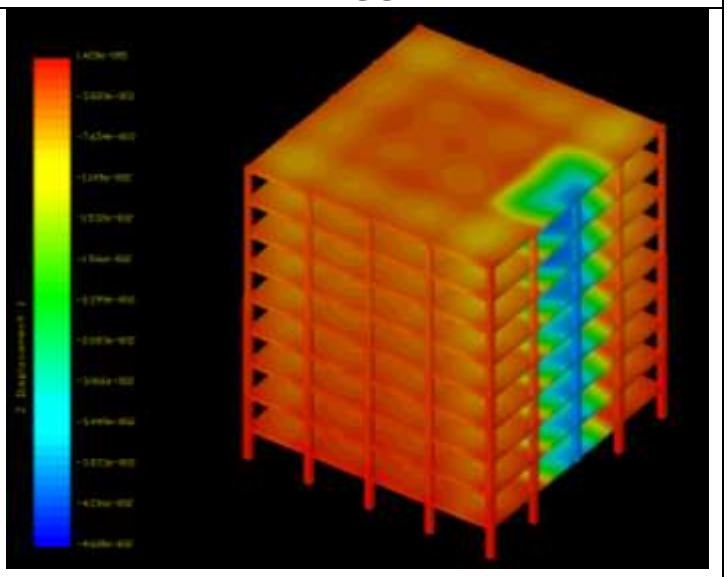
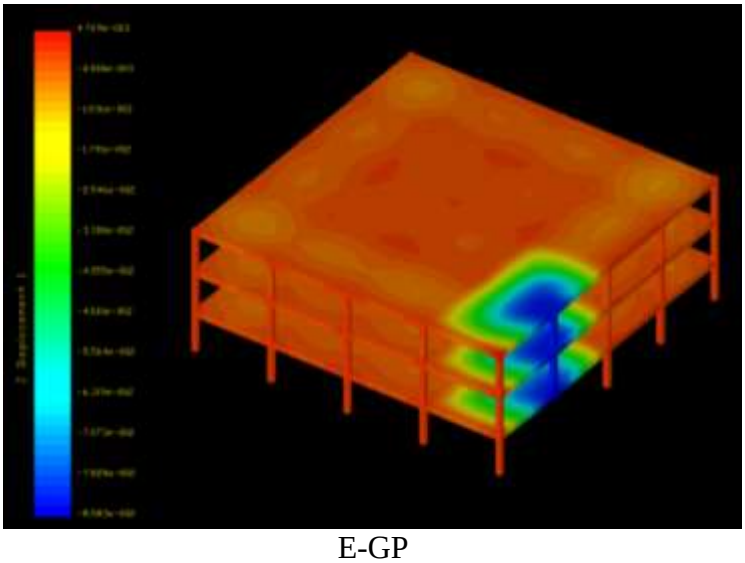
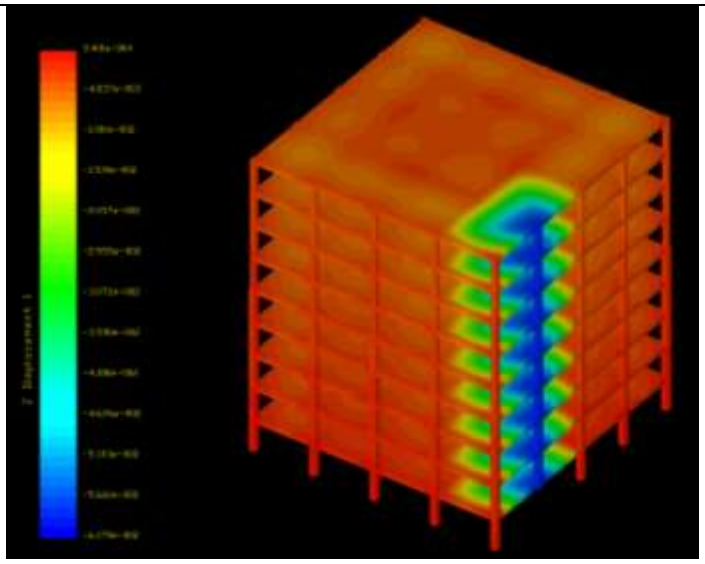
Fig. 4 Scenarios of removing vertical load-bearing elements in the plan

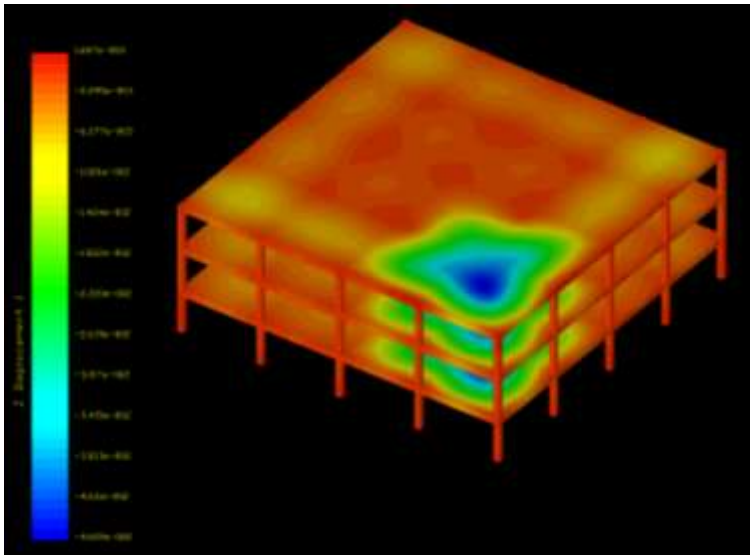
3. RESULTS AND DISCUSSION

The progressive collapse analysis of RC frame shear-wall structures was performed using the Extreme Loading for Structures (ELS) software. The analysis duration for most column removal scenarios was set to 1 second, which was sufficient to capture either the maximum vertical displacement or the completion of one full cycle of vertical motion at the top of the removed load-bearing element. Out of the six different column removal scenarios, this timeframe was effective in allowing the structure to exhibit its critical response under progressive collapse conditions.

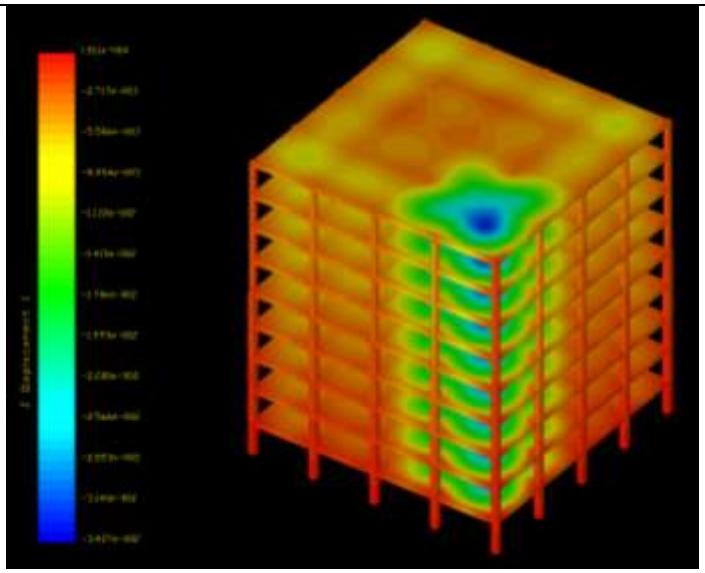
Fig. 5, 6 and 7 illustrate the vertical displacements observed for both external and internal column removal scenarios on the ground floor. The results highlight the varying degrees of structural deformation depending on the location of the removed column. Table 4 provides a detailed comparison of key parameters, including the vertical displacement (in mm) at the top of the removed element (Dis.), the maximum total rotation (TR) in radians, and the maximum plastic rotation (PR) in radians. These metrics offer a comprehensive understanding of the structural behavior under each column removal scenario.

The findings from this analysis highlight the resilience of RC frame shear-wall structures under progressive collapse scenarios, particularly when designed in accordance with modern seismic codes. This emphasizes the importance of understanding the specific failure mechanisms associated with different column removal scenarios for more effective collapse mitigation strategies.

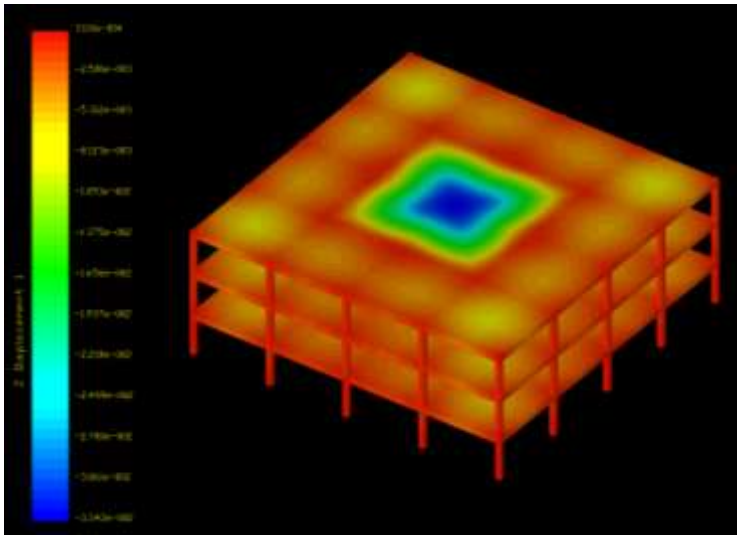
3 Floor	9 Floor
 **E-GC**	 **E-GC**
 **E-GM**	 **E-GM**
 E-GP	 E-GP



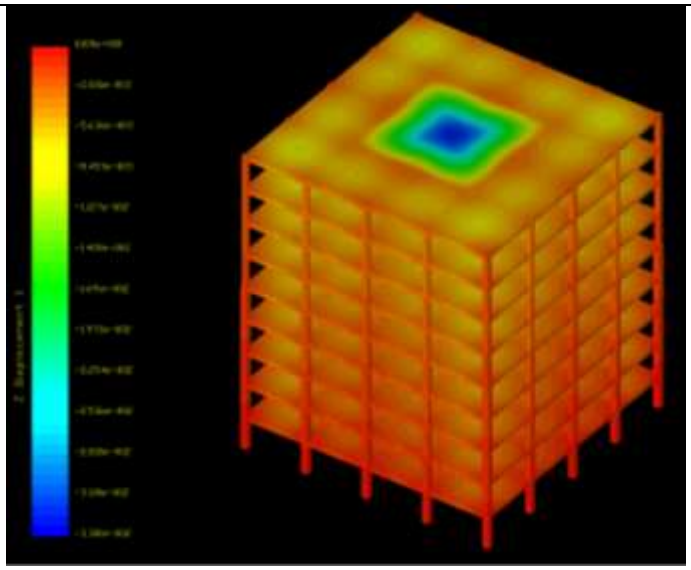
I-GC



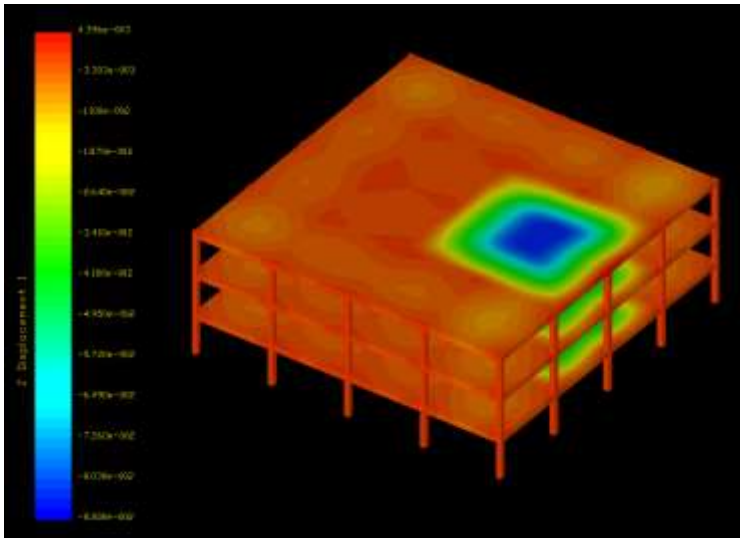
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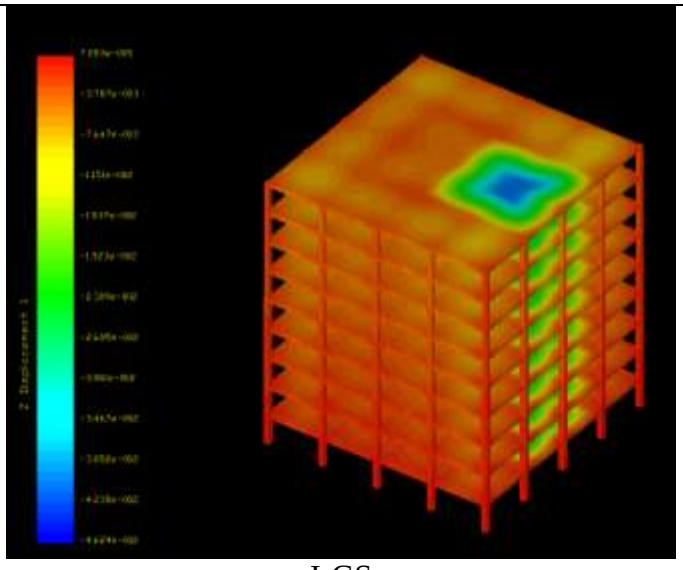
I-GM



I-GM



I-GS



I-GS

Fig. 5 ***Vertical displacements for both external and internal column removal scenarios on the ground floor.***

***Table 4**. The maximum vertical displacement (Dis.), total rotation (TR), and plastic rotation (PR) of models*

Removal scenario	3-story				9-story			
	Level	Dis.	T.R(x10-3)	P.R.	Level	Dis.	T.R(x10-3)	P.R.
External corner	ground	6.19	17.09	3.0	ground	6.24	47.44	2.0
External middle	ground	4.82	12.67	0.0	ground	4.60	31.32	0.0
External penultimate	ground	8.38	30.63	3.0	ground	6.18	47.79	6.0
Internal corner	ground	4.61	14.71	3.0	ground	3.43	48.93	0.0
Internal middle	ground	3.34	8.02	0.0	ground	3.38	62.13	0.0
Internal Side	ground	8.80	33.94	8.0	ground	4.62	48.30	3.0



Fig. 6 ***Vertical displacements for both external and internal column removal scenarios on the ground floor of three stories.***

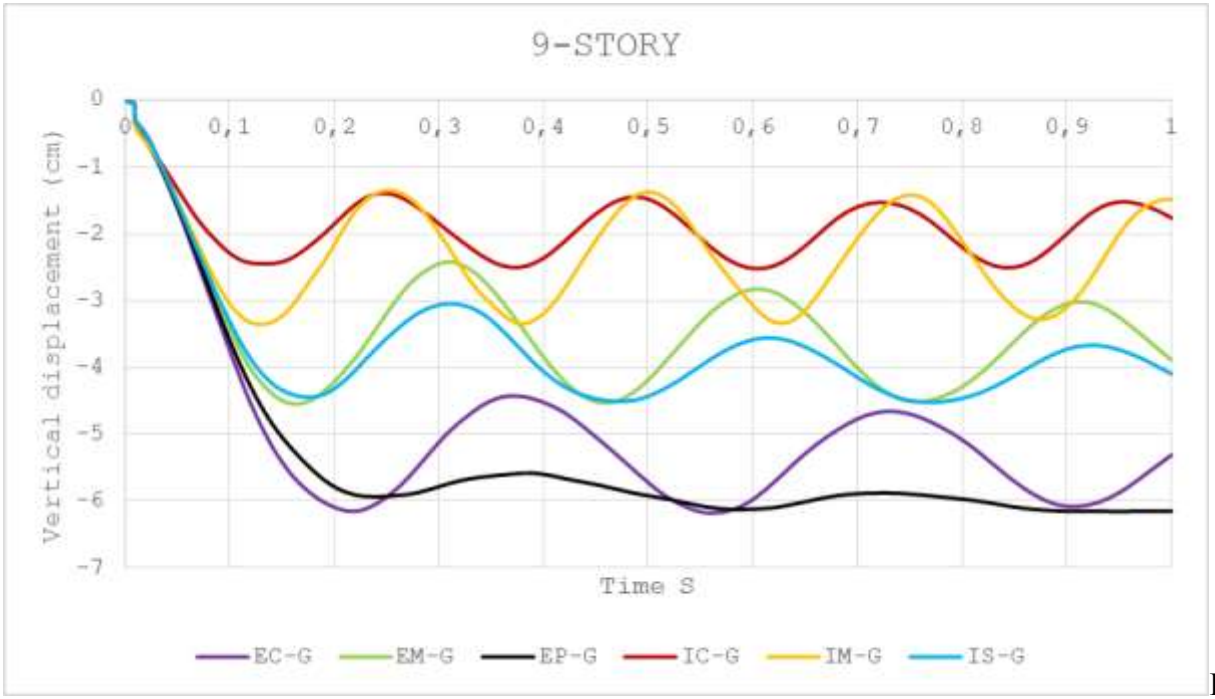


Fig. 7 Vertical displacements for both external and internal column removal scenarios on the ground floor of three stories.

The results of the vertical displacement analysis for the six different column removal scenarios in both the 3-story and 9-story RC buildings reveal critical insights into the structural behavior under progressive collapse conditions. When the external corner column was removed, both buildings exhibited similar vertical displacements, with values of 61.9 mm for the 3-story building and 62.4 mm for the 9-story building. This indicates that both structures have comparable vulnerabilities when this particular element is removed, irrespective of height.

In the external, middle column removal scenario, the displacements were slightly lower for the 9-story building at 46.0 mm, compared to 48.2 mm in the 3-story building. This suggests a marginally better performance in the taller building, likely due to the distribution of forces across a greater number of floors. However, a more pronounced difference emerged in the external penultimate column removal scenario, where the 3-story building experienced a significantly higher displacement of 83.8 mm compared to 61.8 mm in the 9-story building. This indicates that the shorter building is more vulnerable to collapse in this scenario, possibly due to its less of its element numbers.

For the internal corner column removal, both buildings exhibited reduced displacements, but the 9-story building showed superior performance with a lower displacement of 34.3 mm compared to 46.1 mm in the 3-story building. The internal middle column removal scenario displayed near-identical results, with displacements of 33.4 mm for the 3-story building and 33.8 mm for the 9-story building, suggesting similar structural responses to this type of failure mechanism.

The most significant difference in performance was observed in the internal side column removal scenario. The 3-story building experienced a much higher displacement of 88.0 mm, compared to just 46.2 mm in the 9-story building. This highlights the greater vulnerability of the shorter building in this scenario, suggesting that its structural system is less equipped to redistribute loads effectively when an internal side column is removed.

Overall, the results demonstrate that while both buildings exhibit resilience to column removal in most scenarios, the 3-story building is generally more susceptible to higher displacements, particularly in cases involving the external penultimate and internal side columns. This underscores the importance of considering both building height and column location when assessing progressive collapse resistance in RC structures.

4. CONCLUSIONS

The findings of this study indicate that the 3-story building tends to experience higher vertical displacements compared to the 9-story building across most of the analysed column removal scenarios. This difference is especially pronounced when external penultimate or internal side columns are removed, suggesting that low-rise buildings may be more vulnerable to progressive collapse under these conditions. On the other hand, the 9-story building demonstrates stronger resistance to progressive collapse, exhibiting lower or comparable vertical displacements across various scenarios. This indicates that mid-rise buildings, such as the 9-story structure examined here, may have inherent advantages in resisting progressive collapse, particularly due to their ability to redistribute loads more effectively.

The internal side and external penultimate column removal scenarios highlight the structural benefits of increased building height. The superior performance of the taller building in these cases underscores the significance of structural configuration and height when evaluating collapse resistance. These findings suggest that taller buildings may have an edge in maintaining stability during column removal events, making them potentially more resilient under progressive collapse scenarios.

This study emphasizes the need to account for building height and structural layout when assessing the collapse resistance of reinforced concrete buildings, especially in line with the design principles set forth by TBEC-2018. The results reinforce the importance of designing for collapse resistance, particularly in low-rise structures that may be more susceptible to failure in critical column removal scenarios. Future designs should carefully consider these factors to improve overall structural resilience in seismic and collapse-prone regions.

5. REFERENCES

[1] UFC 4-023-03, “Unified Facilities Criteria, Department of Defense,” Design of buildings to resist progressive collapse, USA, 2009.

[2] U.S. General Services Administration (GSA), “Progressive collapse analysis and design guidelines for new federal office buildings and major modernization projects,” Washington DC, 2003.

[3] Applied Science International, LLC, Applied Science International, ASI, 2004. [Online]. Available: https://www.appliedscienceint.com/. [Accessed 2024].

[4] TBEC-2018. Turkish Building Earthquake Code. Ankara, Turkey, 2018.

[5] Pachenari, A., Keramati, A., & Pachenari, Z. (2013). Investigation of progressive collapse in intermediate RC frame structures. *The structural design of tall and special buildings*, 22(2), 116-123.

[6] Kim, J., & Kim, T. (2009). Assessment of progressive collapse-resisting capacity of steel moment frames. *Journal of Constructional Steel Research*, 63(1), 169-179.

[7] Gamaniouk, T. (2014). Parametric analysis of progressive collapse in high-rise buildings. *(Doctoral dissertation, Massachusetts Institute of Technology)*.

[8] Kim J., Lee Y., & Choi H. (2011). Progressive collapse resisting capacity of braced frames. *The structural design of tall and special buildings*, 20(2), 237-270.

[9] Nassir, M., Yang, J., Nyunn, S., Azim, I., & Wang, F. L. (2019). Progressive Collapse Analysis of multi-story building under the scenario of multi-column removal. *In E3S Web of Conferences. EDP Sciences*, (Vol. 136, p. 04030).

[10] Bhatta, S. Y. (2023). Numerical Modelling of Structural Behavior of RC Frames With and Without Infill Walls Subjected to Progressive Collapse. *Journal of Civil Engineering and Construction*, 12(3), 111-123.

[11] Yi, W. J., He, Q. F., Xiao, Y., & Kunnath, S. K. (2008). Experimental study on progressive collapse-resistant behavior of reinforced concrete frame structures. *ACI Structural Journal*, 103(4), 433.
[12] Sasani, M. &. (2008). Progressive collapse analysis of an RC structure. *The Structural Design of Tall and Special Buildings*, 17(4), 737-771.
[13] Su Y. T. (2009). Progressive collapse resistance of axially-restrained frame beams. *ACI Structural Journal*, 106(3).
[14] FarhangVesali, N. V. (2013). Development of arching action in longitudinally-restrained reinforced concrete beams. *Construction and Building Materials*, 47, 7-19.
[15] Yu J., & Tan K. H. (2013). Structural behavior of RC beam-column subassemblages under a middle column removal scenario. *Journal of Structural Engineering*, *139*(2), 233-250.
[16] Alogla, K., Weekes, L., & Augusthus-Nelson, L. (2016). A new mitigation scheme to resist progressive collapse of RC structures. *Construction and Building Materials*, *125*, 533-545.
[17] Dmitriev, A. N., & Lalin, V. V. (2021). Comparison of different procedures for progressive collapse analysis of RC flat slab structures under corner column loss scenario. *Buildings*, *11*(9), 405.
[18] ASCE/SEI 7/ Minimum Design Loads for Buildings and Other Structures. American Society of Civil Engineers, 2021.
[19] Dmitriev, A. N., & Lalin, V. V. (2021). Comparison of different procedures for progressive collapse analysis of RC flat slab structures under corner column loss scenario. *Buildings*, *11*(9), 405.

INNOVATIVE PROFESSIONAL ACTIVITY IN STARTING A TEACHING CAREER INDEPENDENTLY

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Abstract
The article deals with professional development, innovative activity, its definitions, the role of innovative activity in pedagogical education, the principles of preparing future students for innovative activity. Innovative changes in the educational process, the introduction of any innovations into the system are also studied in detail through the direct renewal and transformation of the teacher's work. Innovation is a continuous process of innovation that is shaped and refined over time. Innovative activity is aimed at solving a number of problems that arise as a result of the incompatibility of traditional norms with new social requirements or the contradiction of the emerging norm of practice with the emerging norm. Innovations make a worthy contribution to the development of education through the continuous introduction of innovations into pedagogical activity, have a positive impact on pedagogical activity. Innovative teaching is the creativity and novelty of the teacher that changes the style and method of teaching. Across the world, educational institutions are introducing new ideas, methods, and innovations based on technology to improve student learning. Innovative teaching is essential to the present and future of education to help students reach their full potential. Higher education should address the long-term intellectual needs of the student, such as whether the provision of new material by teachers has helped the student acquire new concepts or opened new channels of intellectual stimulation or enhanced the student's ability to think critically and creatively. Innovative education is necessary for all teachers to meet the educational needs of a new generation. However, innovative teaching skills of teachers are the main factor affecting the effectiveness of innovative education.

Key words: Innovation, pedagogical technology, flexibility, creative level, heuristic level.

Introduction. It is established that future teachers are required to acquire the necessary professional skills to begin their independent teaching careers. After that, any innovative changes in the educational process, as well as the introduction of new elements into the system, are implemented directly by renewing and modifying the teacher's activities. Innovative activity is a continuous process based on new developments, which forms and evolves over a long period.
In the Uzbekistan National Encyclopedia, innovation (from the English innovation — introduced novelty, invention) is defined as innovations in fields such as technology and the organization of work, based on the replacement of generations of technology and advancements in science, technology, and advanced practices, along with their application in various sectors and areas of activity.
Innovative activity arises from the conflict between traditional norms that do not meet new social demands or the contradictions of a newly established practical norm. Innovations constantly bring novelties into pedagogical activities and contribute to the development of education, positively impacting pedagogical practice.

V.S. Lazarev emphasizes that, since innovative activity is a specific type of activity, it is necessary to understand its unique motives, goals, tasks, and other aspects.
According to A.F. Ismailov, innovative activity is a driving, progressive force that propels the pedagogical community forward. Innovative activity is aimed at solving complex problems that arise from the mismatch between traditional norms and new social demands or the clash between newly applied norms and existing ones.
The key point for us is that we need to develop a model for the professional formation of a teacher engaged in innovative activities, which should be one of the organizational mechanisms for repeating the process of activity effectiveness.
One of the scholars who studied the successful implementation of innovative activity by teachers, S. Sulaymanova, emphasized: "The essence of the process of professional development of a teacher lies in solving individual educational shortcomings that arise during the teacher's professional growth. This process includes enriching the teacher's knowledge and skills, preparing and implementing individual educational programs, and forming the necessary professional qualifications for successfully carrying out innovative activities."
According to S. G. Grigoryeva, innovative activity refers to a targeted pedagogical activity that is based on reflecting on one’s practical teaching experience through comparison, study, modification, and development of the educational process to achieve better results, gain new knowledge, and distinguish oneself in terms of quality.
In the process of innovative activity, the teacher directs and creates conditions for the student's acquisition of knowledge and personal development, based on their potential. In such an educational process, the student becomes the central figure. Properly integrating pedagogical technologies into the learning process leads to students taking on the role of the main organizer or advisor, which requires greater independence, creativity, and willpower from them.
H.B. Orinboyev, B.H. Jalilov, and M.A. Ortiqov argue that "the use of any pedagogical technology in the learning process depends on individual characteristics, specifically on who is teaching the student and who the student is. Training conducted based on pedagogical technology satisfies young people’s desire to express their opinions on significant achievements and challenges in life, giving them the opportunity to think and substantiate their points of view."
M.A. Kuprina emphasized that the formation of innovative activity can be assessed at one of four levels:
Adaptability is characterized by the teacher's unstable attitude toward innovation. New developments are only assimilated under social pressure.
Reproductive refers to a stable attitude toward pedagogical innovations, marked by copying pre-prepared methodological developments with minor changes. The teacher recognizes the need for self-improvement.
Heuristic level is characterized by high goals, stability, and knowledge of methods to implement innovations. The teacher is always open to new things, constantly seeking and implementing new pedagogical solutions.
Creative level demonstrates the high effectiveness of innovative activity, heightened sensitivity to problems, and creative activity. The teacher purposefully seeks out new information, creates original programs, and shares their pedagogical experience. In the activities of such teachers, intuition, creative imagination, and improvisation play a significant role.
According to I.V. Safronov, innovative activity consists of carrying out a series of events that are combined into a logical chain. Each link in this chain and every stage of this activity follows its own logic of development, with its own laws and content. According to M.A. Kuprina, the demand for innovation in a teacher's activity is dominated by the willingness to take risks and search for better methods of working. Innovative changes in the educational process, and the introduction of any novelty into the system, are directly implemented through the renewal and modification of the teacher’s activities. Innovative activity is a continuous process of working

based on new developments, which forms and improves over time. Innovative activity aims to positively solve a series of problems arising from the mismatch between new social demands and traditional norms, or from the clash between newly emerging norms and established practices. Innovations consistently introduce new developments into pedagogical activities, contributing to the development of education and positively influencing pedagogical practice.

The high level of formation of students' knowledge, skills, and competencies in educational institutions depends on the teacher’s innovative activity and the enrichment of conflicting phenomena and perspectives. Considering the balance between creativity and professionalism is crucial for reflecting the structure of innovative activity.

According to R.B. Yarmatov, “teachers’ innovative activity involves searching for, studying, and utilizing new developments while implementing innovative approaches and technologies in the educational process. This is done by integrating pedagogical, psychological, and socio-economic innovations to enhance the effectiveness of educational processes.” The introduction of innovations in the learning process and the incorporation of any novelty into the system are studied in detail through the renewal and modification of the teacher's work.

Innovative activity is a continuous process of working based on innovations, developing and improving over time. It aims to positively address a series of issues arising from the mismatch between traditional norms and new social demands or conflicts between emerging norms and established practices. By continually introducing innovations, innovative activity contributes significantly to the development of education and positively impacts pedagogical practice.

Innovative teaching involves the teacher’s creativity and novelty in modifying teaching methods. Around the world, educational institutions introduce new ideas, methods, and technology-based innovations to improve student learning. Innovative teaching is essential for helping students realize their full potential, both now and in the future. Higher education should meet the long-term intellectual needs of students. For instance, does the way new material is presented by teachers help students grasp new concepts, or does it open new channels of intellectual stimulation, enhancing students' critical and creative thinking skills? Meeting the educational needs of the new generation requires innovative teaching from all educators. However, the skill of teachers in innovative teaching is a key factor affecting the effectiveness of innovative education. Some studies suggest that many teachers lack the qualifications for innovative teaching!

The diagnostics of innovative activity are carried out in three stages:

Before implementing the innovation (this includes a statement of issues related to professional preparation, mainly analytical in nature);

During the implementation of innovative activity (this has a constructive and transformative character, involving operational review, restructuring the teacher's activities, and aligning them with the educational experiment program);

the innovation into the educational process (the goals and outcomes of the previously implemented innovation are compared).

Innovative activity is the result of a person’s actions toward making innovative changes, such as creating new methods and technologies, and applying novel approaches to personal and social fields. It also involves freely and creatively engaging in one's professional field.

The information on innovative activity and its components provides a solid didactic and preparatory foundation for developing optimal options for the educational process and preparing future teachers. Therefore, future teachers must be consistently trained for innovative activity, which will create opportunities for them to become intellectually mature, innovative, and highly skilled professionals.

In this regard, the process of preparing teachers for innovative activity can be integrated as a strategy based on the following principles:

Focusing on creative activity and recognizing the unique characteristics of each teacher, ensuring varied and individualized approaches;

Applying a creative approach to teacher preparation;
Strengthening pedagogical education with relevant cycles of subjects that ensure teachers' awareness of innovations;
Ensuring the openness, adaptability, and dynamism of the content, forms, and methods of teacher professional development;
Democratizing pedagogical education, fostering the creative activity and initiatives of all participants in the pedagogical process.

Conclusion. In conclusion, when implementing innovative activities for future teachers, analyzing the resources available in the institution is critical, especially the human resources and the professionalism of highly qualified teachers who ensure high educational outcomes. The readiness of the teaching staff to embrace new ideas plays a significant role.

References

1. O‘zbekiston Milliy Ensiklopediyasi. “Toshkent” davlat ilmiy nashriyoti.199-b
2. Urinboyev H. B., Djalilov B. Kh., Ortiqov M. A. The importance of modern innovative teaching methods in the higher education system of Uzbekistan / Journal of Critical Reviews Vol 7, Issue 7, 2020. -1066 p.
3. Lazarev V.S., Innovatsionnaya deyatelnost uchitelya// Eksperiment i innovatsii v shkole. 2008/2. -S.5.
4. Ismailov A.F. Akademik litseylarda tarix fanini o‘qitishning innovatsion texnologiyalarini takomillashtirish . Ped. fan. b.fal. dok (PhD) ilmiy darajasini olish uchun yozilgan diss. Toshkent, 2018. -58 b.
5. Suleimanova S. Innovative Activity of the Teacher: In the Course of his Professional Formation. Procedia - Social and Behavioral Sciences 81 (2013). -P. 395 – 399.
6. Grigoreva S. G. Innovatsionnaya deyatelnost uchitelya kak pedagogicheskoe yavlenie // Vestnik ChGPU im. I. Ya. Yakovleva. 2011. № 3 (71). Ch. 1. -S.53.
7. Urinboyev H. B., Djalilov B. Kh., Ortiqov M. A. The importance of modern innovative teaching methods in the higher education system of Uzbekistan / Journal of Critical Reviews Vol 7, Issue 7, 2020. -1065 p.
8. Kuprina M.A. «Innovatsionnaya deyatelnost sovremennogo pedagoga dopolnitelnogo obrazovaniya» (metodicheskiy sbornik) . -Tambov.:, 2018. -S.26.
9. Safronov I.V. Ponyatiya «Innovatsiya» i «Innovatsionnaya deyatelnost»: Suщnost i soderjanie / Voprosы sovremennoy nauki i praktiki, Universitet im. V.I. Vernadskogo. №4(14). 2008. Tom 1. -221 s.
10. Kuprina M.A. «Innovatsionnaya deyatelnost sovremennogo pedagoga dopolnitelnogo obrazovaniya» (metodicheskiy sbornik) . -Tambov.:, 2018. -S.11.
11. Musurmonov R., Musurmonova M. Ta’limda innovatsion faoliyat - davr talabi/ Science and education» scientific journal. December 2020 / volume 1 special issue 4. -225 r.
12. Kuprina M.A. «Innovatsionnaya deyatelnost sovremennogo pedagoga dopolnitelnogo obrazovaniya» (metodicheskiy sbornik) . -Tambov.:, 2018. -S.7.
13. Yarmatov R.B. Bo‘lajak tarix o’qituvchilarining kasbiy metodik tayyorgarligini takomillashtirish: Avtoref. ped. fan. dok. - Toshkent, 2020. - 70 b

LINGALA LANGUAGE INTERFERENCE IN ENGLISH LEARNING AT JUNIOR SECONDARY SCHOOL IN NORTHERN BRAZZAVILLE

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Abstract

Lingala is the local language shared by the population in northern Brazzaville in the Republic of Congo. At school, learners also use it to communicate between peers. Besides, English is one of the subjects included in the secondary school curriculum. However, we notice that learners from secondary school have difficulties to pronounce some English words appropriately. Willing to find out the factors which prevent learners from a comprehensible words pronunciation, we carried out a survey among seventy (70) learners in two junior secondary schools of Brazzaville: Revolution, a public school and Joseph perfection, a private one. To get genuine information, we used analytical method, the data collection instruments were oral and written tests. The findings of our investigation reveal that these mistakes result from Lingala language interference in Learners' learning. Therefore, we suggested remedial activities that can help learners improve their pronunciation and grammar skills.

Keywords: English learning, interference, junior secondary school, learners, lingala language.

STATIC PERFORMANCE PREDICTION IN THE RIVETED AND HYBRID DOUBLE SHEAR LAP JOINTS

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Abstract
By the present paper, a numerical model was proposed to estimate the comportment of hybrid (riveted and bonded) double lap joints. In order to enhance the performances of our double lap joints in particular the equivalent rigidity and the ultimate resistance, initially, a static study was made. From the contour plots of normal, shear and equivalent stresses, a sensitivity study was carried out on the effects of thickness of the substrates, rivet diameter and the overlap length. After that, a comparison between riveted and hybrid joints in term of the distribution of the normal and shear stress was evaluated for two connections configurations.

Keywords: Numerical model; Hybrid joint; Shear stresses; Strength.

GENOTOXICITY CAUSED BY LEAD IN VIGNA MUNGO VAR. HD-94

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ABSTRACT
A common environmental contaminant in most developed nations is lead (Pb). Its genotoxic effects on living things are a huge global issue. In this study, we looked at the genotoxic effects of lead exposure on Vigna mungo var. HD-94 seeds. For six hours, seeds of V. mungo were exposed to varying amounts of lead (25, 50, 75, 100, and 125 ppm). When compared to the control group, seeds exposed to lead showed a significant drop in mitotic index ($p < 0.05$), which declined as Pb concentration and treatment duration increased. Furthermore, these seeds' mitotic stage showed a noticeably greater percentage ($p < 0.001$) of chromosomal aberrations. In conclusion, the heavy metal Pb can hinder mitosis and result in significant cytogenetic abnormalities in seedlings, which can lower the possibility for germination.

Keywords: Vigna mungo, Lead, Chromosomal aberrations, Mitotic index, Seed germination, Radicle length.

HOW INFRASTRUCTURE SATISFACTION AND SAFETY PERCEPTIONS AFFECT UNIVERSITY STUDENTS' TRANSPORTATION DECISIONS?

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ABSTRACT
This study examines the relationship between transportation behaviors, satisfaction with infrastructure, and perceptions of environmental safety among university students residing in dormitories. The primary goal is to investigate how the perceived quality of infrastructure and surroundings—such as discomfort caused by stray animals, environmental safety, street lighting adequacy, availability of sidewalks, and the quality of public transportation—affects students' daily decisions to walk, use public transportation, or choose other modes including micromobility, private and shared transport. A survey was conducted during the 2022-2023 academic year among university students residing in dormitories in Kütahya, Türkiye, using a 5-point Likert scale to measure satisfaction levels, perceptions, and students' preferred transportation modes for educational trips.
Cluster analysis was employed to categorize students based on their survey responses. The findings indicate that satisfaction with infrastructure led to an aproximate 7% shift in mode choice from public transportation to walking. Dissatisfaction with infrastructure, particularly concerning pedestrian safety and lighting, was found to limit students' mobility and reduce their willingness to walk. These results highlight the substantial impact of physical and social conditions on students' transportation decisions, with safety and accessibility emerging as key drivers of active transportation behaviors. The study emphasizes the need for sustainable, student-centered transportation policies to foster more active and safer transportation options for students.

Keywords: University Students, Active Transportation, Cluster Analysis, Sustainable Transportation Policies

INTRODUCTION
Transportation plays a crucial role in people's daily lives, shaping how individuals plan routine commutes such as home-to-work, home-to-school, and other daily trips. These commuting habits, when prevalent within certain population groups, can have a profound impact on the overall structure of urban transportation systems. The transportation mode choices of university students, in particular, represent a critical area of study as they affect not only the students' quality of life but also broader aspects of urban planning and sustainability. During their education-related trips, students frequently travel between their residences and campuses, relying on various transportation options including public transit, walking, micromobility vehicles (e.g., bicycles, scooters), private cars, and shared transport modes (Assi vd., 2020).

Several factors influence these choices, such as infrastructure quality (Guzman vd., 2020), environmental safety (Zannat vd., 2020), the availability and quality of the sidewalks (Orellana vd., 2020) and street lightning conditions (Berežnỳ & Konečnỳ, 2017). Concerns regarding safety are particularly significant, shaping transportation preferences in complex ways (Meena, 2024; Oestreich vd., 2021). Safety perceptions are influenced by various factors, including urban environments, gender, and socioeconomic factors (Oestreich vd., 2021). Notably, women's safety concerns, such as infrastructure quality, safe boarding/alighting, and access to real-time transportation information, are critical in shaping their mode choices (Meena, 2024).

The quality of public transportation services, including the ease of use, cleanliness, and safety of bus stops, has also been identified as a key factor in determining students' satisfaction and transportation mode choices (Ruiz-Padillo & de Oña, 2024; Shaaban & Kim, 2016).

This study aims to explore the relationship between university students' transportation behaviors and their satisfaction with infrastructure, public transportation, and environmental safety. It focuses on identifying the key factors influencing students' transportation mode decisions, with particular attention to issues such as safety, stray animals, street lighting, sidewalks, and public transportation quality. For this purpose, survey data conducted among dormitory-residing university students were analyzed using cluster analysis. The study aims to contribute to the development of student-centered, sustainable transportation policies.

STUDY AREA AND METHODOLOGY

This study utilized survey data from university students residing in dormitories in Kütahya, Turkey, during the 2022-2023 academic year. The aim was to measure students' satisfaction with infrastructure, perceptions of environmental safety, and their preferred modes of transportation for educational trips. The survey employed a 5-point Likert scale to assess how students' perceptions of infrastructure—such as discomfort caused by stray animals, environmental safety, adequacy of street lighting, availability of sidewalks, and the quality of public transportation—affect their daily transportation decisions. These decisions include walking, using public transportation, or opting for other modes such as micromobility, private, or shared transportation.

The collected data were analyzed using K-means clustering (Kassambara, 2017; Maechler vd., 2023) a method that groups individuals into clusters based on similar responses. The clustering was performed by applying the Euclidean distance formula, which calculates the distance between data points to form cohesive clusters (Suwanda vd., 2020). The Euclidean distance is computed as follows:

$$d = \sqrt{\sum_{i=1}^{n}(x_i - \mathrm{y})^2} \qquad (1)$$

where;

d is Euclidean distance,

n is the number of observations for the related variable,

x_i represents the value of the related variable, and

y is the cluster centroid

To ensure the quality of the clustering solution, the distribution of clusters was validated using the Silhouette method (Saputra vd., 2020; Shutaywi & Kachouie, 2021; Yuan & Yang, 2019) which evaluates how well each data point fits within its cluster compared to others. Additionally, a bivariate cluster plot (Kaufman & Rousseeuw, 2009; Pison vd., 1999; Struyf vd., 1997) was generated to visually represent the formed clusters and to better understand their separation and cohesion.

RESULTS

The survey responses were grouped into two distinct clusters: one representing students with high satisfaction levels (satisfied) and the other representing those with low satisfaction levels (dissatisfied). Using the Silhouette method for cluster analysis, the optimal number of clusters was

determined to be two (Figure 1.a). These groups were classified as "satisfied" and "dissatisfied." The bivariate cluster plot (Figure 1.b), generated using multidimensional scaling, illustrates the clustering results, with each point representing an observation. Ellipses are used to visualize the spread and density of the clusters.

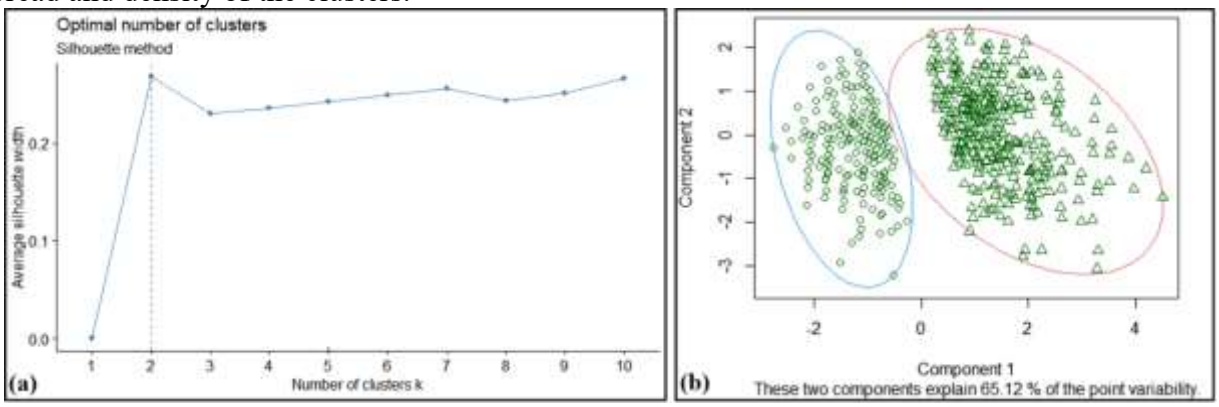


Figure 1: Cluster Validation Plots; a) Silhouette Method, b) Bivariate Cluster Plot

Figure 2 compares the satisfaction levels of two groups—dissatisfied and satisfied—across various transportation-related factors, with each bar representing the average response on a 5-point Likert scale. The most pronounced differences between the two groups are related to safety (in terms of stray animals and the perceived safety along the travel route) and pedestrian infrastructure (sidewalks and lighting). Interestingly, satisfaction with public transport shows the smallest difference between the two groups. Notably, even among the "satisfied" group, satisfaction levels for public transport remain below the midpoint of the Likert scale (2.5). This suggests that although students may not be fully satisfied with the public transport system, they likely continue to use it out of necessity due to a lack of alternatives. This observation highlights a critical insight: if a viable alternative to public transport were introduced, it could prompt a shift in mode choice without necessarily improving the quality of the existing public transport system. Such a potential shift should be a key consideration for decision-makers aiming to improve overall student satisfaction with transportation options.

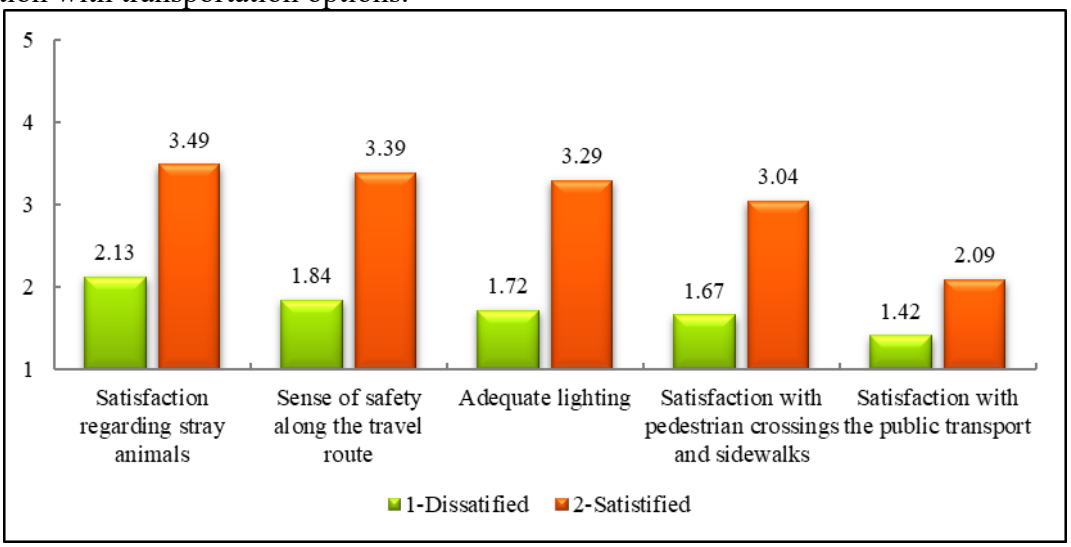


Figure 2: Average Responses of Clusters

When examining the transportation preferences of the satisfied group, walking increased by 6.7%, while the use of public transportation decreased by 7.4%. No significant changes were observed in other transport modes, likely due to limited data for those modes. However, with data from different regions, alternative trends may emerge, potentially showing shifts in other transport options as well (Figure 3).

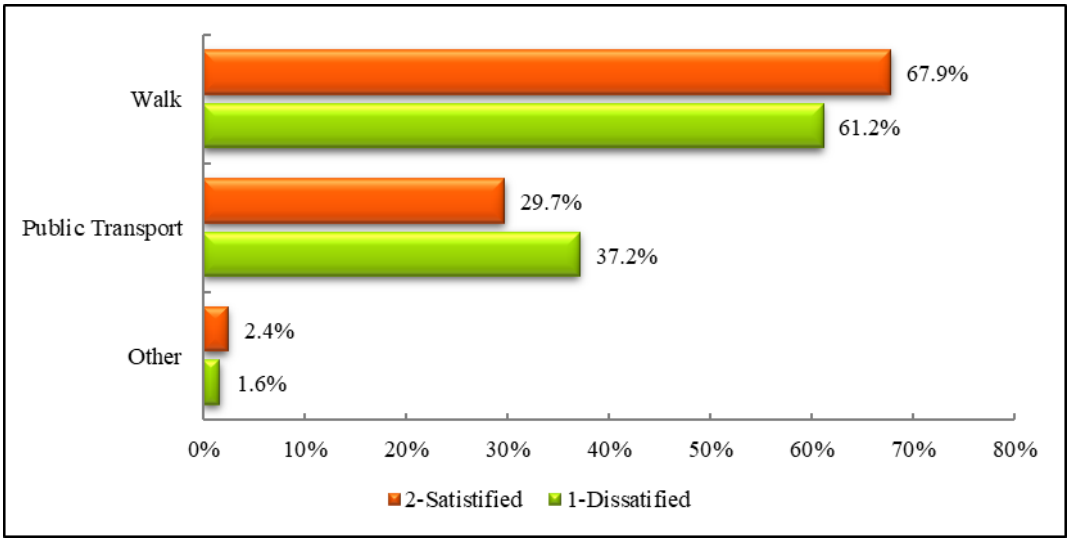


Figure 3: Mode Share Distribution by Satisfaction Level

The findings reveal that satisfaction with transportation infrastructure plays a significant role in influencing mode choice, particularly in promoting a shift from public transportation to walking. Students with negative perceptions of infrastructure, particularly regarding pedestrian safety and inadequate lighting, were found to be less inclined to walk and experienced reduced mobility. These physical and safety concerns thus act as key barriers to active transportation modes.

DISCUSSION AND CONCLUSION

This study underscores the significant influence that transportation infrastructure and environmental conditions have on university students' transportation decisions. In particular, perceptions of safety emerged as a critical factor driving students' adoption of active transportation modes, such as walking. The absence of key safety features—such as pedestrian-friendly infrastructure, adequate lighting, and general accessibility—deters students from walking and leads them to choose less active forms of transportation.

The findings reveal that improving the existing infrastructure and environmental conditions could encourage students to make safer, more active transportation choices. Safety and accessibility are foundational elements that shape transportation preferences and behaviors, particularly for active modes such as walking. This insight highlights the need for more sustainable, student-centered transportation policies that promote healthier transportation habits. Enhancing pedestrian safety, improving lighting, and making walkable areas more accessible can significantly boost students' preference for walking over other modes.

From a policy perspective, the results suggest that interventions designed to improve infrastructure safety and accessibility—particularly around university campuses—would not only promote more active transportation behaviors but also lead to a shift away from reliance on less sustainable modes of transport. This shift would benefit both the students and the broader urban ecosystem, fostering a culture of sustainability and active mobility.

To broaden the understanding of transportation mode choices, particularly among underrepresented modes (e.g., micromobility, shared transport), future research should explore similar studies across different regions. Regional disparities in infrastructure, safety perceptions, and socio-economic factors can significantly shape transportation behavior, leading to a more generalized understanding of the influencing factors. Furthermore, employing advanced statistical and mathematical models—such as machine learning algorithms, or logit models—would provide a more nuanced analysis of student transportation preferences, capturing the complexity and diversity of decision-making processes. Incorporating both individual-level data (e.g., socio-

demographic attributes) and regional data (e.g., infrastructure quality, accessibility) would complement the current focus on satisfaction and safety perceptions, providing a more comprehensive dataset for analysis. Additionally, longitudinal studies could track changes in student transportation behaviors over time, allowing researchers to observe how improvements in infrastructure and safety measures impact transportation decisions in the long term. By addressing these considerations, future research could offer valuable insights for developing more effective transportation policies that encourage active and safe transportation behaviors among university students.

REFERENCES

Assi, K., Gazder, U., Al-Sghan, I., Reza, I., & Almubarak, A. (2020). A nested ensemble approach with ANNs to investigate the effect of socioeconomic attributes on active commuting of university students. *International Journal of Environmental Research and Public Health*, *17*(10), 3549.

Berežnỳ, R., & Konečnỳ, V. (2017). The impact of the quality of transport services on passenger demand in the suburban bus transport. *Procedia engineering*, *192*, 40-45.

Guzman, L. A., Arellana, J., & Alvarez, V. (2020). Confronting congestion in urban areas: Developing Sustainable Mobility Plans for public and private organizations in Bogotá. *Transportation Research Part A: Policy and Practice*, *134*, 321-335.

Kassambara, A. (2017). *Practical guide to cluster analysis in R: Unsupervised machine learning* (C. 1). Sthda.

Kaufman, L., & Rousseeuw, P. J. (2009). *Finding groups in data: An introduction to cluster analysis*. John Wiley & Sons.

Maechler, M., Rousseeuw, P., Struyf, A., Hubert, M., & Hornik, K. (2023). *cluster: Cluster Analysis Basics and Extensions*. https://CRAN.R-project.org/package=cluster

Meena, S. (2024). Women's safety in Public Transportation: A case study of Jaipur city, India. *India (June 21, 2024)*.

Oestreich, L., Torres, T. B., & Ruiz-Padillo, A. (2021). Fuzzy analysis of students' perception of traffic safety in school environments: The case of a small Brazilian city. *International journal of injury control and safety promotion*, *28*(2), 255-265.

Orellana, D., Bustos, M. E., Marín-Palacios, M., Cabrera-Jara, N., & Hermida, M. A. (2020). Walk'n'roll: Mapping street-level accessibility for different mobility conditions in Cuenca, Ecuador. *Journal of Transport & Health*, *16*, 100821.

Pison, G., Struyf, A., & Rousseeuw, P. J. (1999). Displaying a clustering with CLUSPLOT. *Computational statistics & data analysis*, *30*(4), 381-392.

Ruiz-Padillo, A., & de Oña, J. (2024). Analysis of the relationships among infrastructure, operation, safety, and environment aspects that influence public transport users: Case study of university small and medium sized cities in Brazil. *Transportation Research Part A: Policy and Practice*, *185*, 104115.

Saputra, D. M., Saputra, D., & Oswari, L. D. (2020). Effect of distance metrics in determining k-value in k-means clustering using elbow and silhouette method. *Sriwijaya international conference on information technology and its applications (SICONIAN 2019)*, 341-346.

Shaaban, K., & Kim, I. (2016). The influence of bus service satisfaction on university students' mode choice. *Journal of Advanced Transportation*, *50*(6), 935-948.

Shutaywi, M., & Kachouie, N. N. (2021). Silhouette analysis for performance evaluation in machine learning with applications to clustering. *Entropy*, *23*(6), 759.

Struyf, A., Hubert, M., & Rousseeuw, P. J. (1997). Integrating robust clustering techniques in S-PLUS. *Computational Statistics & Data Analysis*, *26*(1), 17-37.

Suwanda, R., Syahputra, Z., & Zamzami, E. M. (2020). Analysis of euclidean distance and manhattan distance in the K-means algorithm for variations number of centroid K. *Journal of Physics: Conference Series*, *1566*(1), 012058.

Yuan, C., & Yang, H. (2019). Research on K-value selection method of K-means clustering algorithm. *J*, *2*(2), 226-235.
Zannat, K. E., Adnan, M. S. G., & Dewan, A. (2020). A GIS-based approach to evaluating environmental influences on active and public transport accessibility of university students. *Journal of Urban Management*, *9*(3), 331-346.

STRUCTRAL AND OPTICAL TUNING OF Fe-DOPED ZnO NANOPARTICLES SYNTHESIZED VIA CO-PRECIPITATION METHOD

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ABSTRACT

Fe-doped ZnO nanoparticles with varying concentrations of iron (0.00, 0.02, 0.05, and 0.10) were synthesized using the chemical co-precipitation method. This method provides a simple and efficient way to incorporate dopants into ZnO's crystal structure, enhancing its properties for various applications. The impact of iron doping on the structural, morphological, and optical characteristics of ZnO nanoparticles was systematically investigated through X-ray diffraction (XRD), scanning electron microscopy (SEM), and UV-Visible spectroscopy.

XRD analysis confirmed that both the pure and Fe-doped ZnO nanoparticles maintained a single-phase wurtzite crystal structure, indicating that iron was successfully incorporated into the ZnO lattice without the formation of secondary phases. The crystallite size was found to decrease with increasing Fe content, which can be attributed to the substitution of Zn^{2+} ions by smaller Fe^{3+} ions, leading to lattice distortion and hindering grain growth.

SEM imaging provided insights into the surface morphology of the nanoparticles, revealing that the nanoparticles tended to form aggregates, with individual particles exhibiting a range of sizes. These aggregates were likely the result of the coalescence of smaller nanoparticles, and the size distribution appeared to vary depending on the level of Fe doping.

UV-Visible spectroscopy demonstrated a notable effect of iron doping on the optical properties of ZnO. As the concentration of Fe increased, a reduction in the energy band gap was observed. This band gap narrowing is likely due to the introduction of Fe-related states within the band structure, which modifies the electronic transitions. The reduction in the band gap with increasing Fe concentration suggests potential applications of Fe-doped ZnO nanoparticles in photocatalysis and optoelectronic devices.

Keywords: Fe-doped ZnO nanoparticles, Co-precipitation method, structural, microstructural, optical properties.

6 ŞUBAT DEPREMLERİNİ YAŞAMIŞ BİREYLERİN TRAVMA DÜZEYİ, VAROLUŞSAL KAYGI VE MEKÂNA BAĞLANMA İLE İLİŞKİSİNİN İNCELENMESİ

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ÖZET
Bu araştırmada, 6 Şubat 2023 tarihinde meydana gelmiş depremleri doğrudan yaşamış bireylerin, deprem sonrası travma düzeyi, varoluşsal kaygı ve mekana bağlanma ile ilişkisinin incelenmesi amaçlanmıştır. Çalışmanın yürütülme hedefiyle paralel olarak, betimsel ve ilişkisel araştırma yöntemi kullanılmıştır. Araştırmanın hedef grubunu, 6 Şubat depremlerini, afet bölgesi ilan edilen 11 ilde yaşamış, yetişkin bireyler oluşturmuştur. 456 katılımcıya google forms üzerinden online olarak ulaşılmıştır. Araştırma verileri anket formu şeklinde elde edilmiştir. Anket içeriği 4 ayrı formdan oluşmaktadır. Sosyo-demografik Bilgi Formu, Deprem Sonrası Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekana Bağlanma Ölçeği kullanılan ölçeklerdir. Katılımcıların travma düzeyi belirleme ölçeğine ait duyuşsal alt boyut puanları ile mekâna bağlanma ölçeğine ait daire, mahalle, ilçe ve şehir alt boyut puanları arasında pozitif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu saptanmıştır. Katılımcıların duyuşsal puanları arttıkça, mekâna bağlanma ölçeğine ait daire, mahalle, ilçe ve şehir alt boyut puanları da istatistiksel olarak anlamlı düzeyde artmaktadır. Araştırmaya katılanların varoluşsal kaygı ölçeği genel puanları ve ölçeğe ait anlamsızlık kaygısı alt ölçek puanları ile mekâna bağlanma ölçeğine ait daire, bina, mahalle, ilçe ve şehir alt boyut puanları arasında negatif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu tespit edilmiştir. Katılımcıların anlamsızlık kaygısı puanları ile varoluşsal kaygı ölçeği genel puanları arttıkça, mekâna bağlanma ölçeğine ait daire, bina, mahalle, ilçe ve şehir alt boyut puanları istatistiksel olarak anlamlı düzeyde azalmaktadır. Araştırmanın tüm bulgularından elde edilen sonuç neticesinde, çeşitli önerilerde bulunulmuştur.

Anahtar kelimeler: deprem, travma düzeyi, varoluşsal kaygı, mekana bağlanma

ABSTRACT
In this research, we will directly experience the February 6 earthquakes, beyond examining the relationships with existential anxiety and attachment to place at the level of post-earthquake trauma. In parallel with the execution plan of the study, descriptive and relational research methods were used. In the target area of the research, adult individuals who experienced the February 6 earthquakes in 11 provinces declared as disaster areas were formed. 456 rights were accessed online via Google forms. The research data survey was formulated. The survey content consists of 4 separate forms. Socio-demographic Information Form, Post-Earthquake Travma Level Determination Scale, Existential Anxiety Scale and Place Attachment Scale are the scales used. Positive aspects and a permanently significant level of vulnerability can be achieved between the participants affective sub-dimension scores of the behavior of the determining the level of trauma and the sub-dimension scores of the settlement, attachment feature, neighborhood, district and city sub,dimensions. The characteristics of the participants affective scores, the circles,

neighborhood, district and city sub-dimension points of the place attachment study can also be permanently meaningful. It was determined that there were negative aspects and significant prominence between the existential anxiety general scores of the participants in the research, the meaninglessness anxiety subscale scores of the scale, and the circles, building, neighborhood, district and city subscale scores of the appearance connected to the view. The participants meaninglessness anxiety scores and the general scores revealed by existential anxiety decrease significantly as honesty, spatial functionality apartments, building, neighborhood, district and city sub-dimension scores. As a result of the results obtained from all the flaws of the resarch, various suggestions were made.

Keywords: earthquake, trauma level, existential anxiety, place attachment

GİRİŞ

Kahramanmaraş ili, Pazarcık ve Elbistan merkezli iki ayrı deprem; 6 Şubat 2023 günü, aynı gün içerisinde, meydana gelmiştir. Depremlerin şiddeti 7.8 ve 7.5 olarak tespit edilmiştir. Doğu Anadolu ve Güney Anadolu bölgesindeki vilayetleri, şiddetli bir şekilde etkileyen bu felaket, binlerce insanın ölümüne ve çokça yıkıma sebep olmuştur (AFAD, 2023). AFAD tarafından, 11 il afet bölgesi ilan edilmiştir (Kahramanmaraş, Malatya, Elazığ, Adıyaman, Gaziantep, Diyarbakır, Şanlıurfa, Gaziantep, Kilis, Osmaniye, Adana). Ağır can ve mal kaybına neden bu afet, belirtilen vilayetlerin ötesinde ulusal ve ekonomik etkilere sebep olmuştur. Son bir yıl içerisinde bölgesel olarak binlerce artçı deprem meydana gelmiştir (Özsalman ve Yıldırım, 2024).

Uzun yıllardır yapılan araştırmalar göstermektedir ki, bir insanın yaşam boyunca travmatik olaylara (güven ve rahatlığı bozan acı verici deneyimler) maruz kalma yüzdesi %21.84- %89.6 olarak bulgulanmıştır. Bu travmatik etkilerin arasında ise sıklıkla deprem felaketine değinilmektedir (Aker, 2006). Deprem sonrası travmatik sürecin tesiri uzun bir zaman almakta ve kitlelere sirayet edebilmektedir. Alan yazınına bakıldığında, doğal afetlerin, özellikle anormal psikoloji ve patolojik terminoloji ile incelendiği sıklıkla görülmektedir. Bireyler, maruz kaldıkları acı veren deneyimler neticesinde, uzun bir süre yaşamın anlamını ve yaşamaya devam etme gayesinin ne olduğuna dair içsel sorgulamalarla baş başa kalmaktadır. Korunaklı vew güven veren alanını kaybeden ya da tehlike duygusunun ajitasyonunun güdümünde birey, varoluşusal kaygılar ile baş etmeye çalışmaktadır (Muldoon vd., 2017).

Sosyal anlamda insan, bir bakım veren ya da sevgi nesnesine yönelik bağ duygusu geliştirerek evrimsel olarak yaşama tutulmaktadır. Bağ duyulan bu nesne figürü, sosyal grup ve çevre ekseninde “mekan aidiyeti” ile benzeşik nitelikler taşır (Peterson, 2003). Bireyin ait olduğu ve bilişsel kodları ile güven duyduğu “kişiselleşmiş” alanlar, en büyük zararı deprem gibi doğal afetlerde almaktadır (Tanberken, 2005).

Travmatik yaşantıların insanlar üzerindeki tesiri üzerinde en temel ayrım bireysel faktörler olarak bilinmektedir. Aynı yıkıcı duurma maruz kalan iki kişinin birbirinden oldukça farklı tepkiler ve anlamlandırmalara sahip olması, her koşulda her bireyin aynı tanı sınıflamasına maruz kalmadığını ortaya koymaktadır. Bir dğer ayrım ise, akut stres ya da TSSB belirtileri gösteren kişilerin, aynı travmadan etkilenmiş olmasına rağmen farklı bilişsel süreçlerle bu semptomları gelişitrdiği gözlemlenmektedir (Özçetin ve ark., 2008).

Travmatik olaylar içerisinde, bir doğal afet olarak deprem; ölüm ve yaralanma riskinin yoğun olduğu, kişinin barınma ve güvende olma halini tehdit eden, sonrasında uzun vadede gelişen güçlükler ile ayrı bir tesire sahiptir. Yer kabuğunun sarsıntıları ve uzun vadede artçı sallnamalarla zeminde gerçekleşmesi, bireylerde ya da kitlelerde kronik davranış ve duygudurum değişimlerine neden olailmektedir (Sabuncuoğlu ve ark, 2003).

Travmatik Belirtilere Yönelik Risk Faktörleri

Gerçekleşen bir fiilin, her bireyde farklı tesirlerinin ve kişinin bilşsel yapılanması, sosyal etmenlerle doğrudan bir etkisi olduğu bilinmektedir. Olayın büyüklüğü, kaynağı ve süreğen olup olmaması, bireydeki travmatik izlerle bağıntılı olarak gelişmektedir. Ayrıca bireysel kriterler ve çevresel değişkenler, travmatik semptomların risk faktörleridir (İşmen, 2006). Bireysel etmenler arasında, kişinin geçmiş yaşam deneyimleri, kişilik dinamikleri ve ek bir tanısal duruma sahip olup olmadığı en temel kriterlerdir. Çevrsel ve toplumsal faktörler ise, yalnızca bireye özgü değil kültürel yapı, toplumun travmatik geçmişi bilinen risk faktörleri olarak bilinmektedir (Bilgiç, 2011).

Varoluşsal Kaygı

Kaygı, bireyde huzursuzluğa neden olan, günlük yaşam dinemiğinde gerginliğe neden olup dengede olma halini engelleyen duygulanımın genel adıdır (TDK, 2015). Kaygı ve korku kavramı, her ne kadar birbirinin yerine geçebilen ve karışıtrılan iki kavram olsa da, kaygının belirgin bir hedef nesnesi yoktur. Ve bu durum kaygıyı korkudan uzaklaştıran en temel ayrımdır (Budak, 2003). Freudyen ekol ve klasik psikanalitik öğretileri başat noktada; bireyde kompleks duruma neden olan ve sebebi net olarak bilinmez bir şekilde ortaya çıkan kaygı duygulanımını, kendi ekolünün prensipleri ile açıklamış olsa da, Irvin Yalom (2018)'un günümüze kadar getirmiş olduğu varoluşçu bakış açısı, bireyin varoluşu ile yüzleşmesini kaynak olarak göstermektedir. Bu yaklaşıma göre, ne içgüdüler ne de onay ve güven ihtyacı başrolde değildir. Duygunun özünde ve kişinin evrende "öz ben"ini bulma ve varlığını bir oluşuma bağlama ihtiyacı yattığı savını ortaya koymaktadır. Varoluşsal kaygı mefhumunu, "nihai kaygılar" olarak adlandıran Yalom ekolüne göre, bu kaygıları dört ana ilkede toparlamıştır. Ölüm, Özgürlük, Varoluşsal Yalıtım ve Yalnızlık, Yalomcu Varoluşsal Psikolojinin anahtar kavramlarını oluşturmaktadır (Küçük, 2023).

Mekâna Bağlanma

Çocukluk çağı deneyimleri ve psikoloji disiplininde önemli bir yere sahip olan bağlanma kavramı, mekana geliştirilen aidiyet ile örtüşen bir nitelik göstermektedir. Ferdi deneyimlerle bütünleşen öznel algı, yalnızca davranışsal öğrenmelerle değil, bilişsel mekanizmalarla (mekansal belleğin oluşumu) eklemsel olarak oluşmaktadır (Ujang, 2012). Dünyaya geldiği andan itibaren insan yavrusu, bakım verene duduğu aidiyet duygusunu, çemberi genişleterek barındığı odaya ve eve, ardından kendinden bağımsız ancak bir o kadar da simbiyotik hale gelen çevreye aktarmaktadır. Aileden, evrene doğrusal olarak ilerleyen bağlanma, tanıdık-yabancı, güven-tehlike ikilemleri kılavuz olarak edinilmektedir. Bu kategorizasyonun yaratımında, kişisel algılama süreçleri ve mekansal belleğin oluşumu temel aktörler halini almaktadır (Fried, 2000).

Bir fiziksel koşula ve bir yere ait olma duygusu ve güdüsü, temelinde evrimsel olarak bireyin "güvenlik" talebi ile şekillenmektedir. Low ve Altman (1992), bu güvenlik ihtiyacı neticesinde, bireyden topluluğa varana kadar bir kimlik yaratımını doğal olarak ortaya çıkarmaktadır. Psikososyal ve sosyokültürel boyutta elde edilen mekansal kimlik, güvenlik ihtiyacını ve bağlılık duygusunun tatminini sağlamaktadır. Mekana bağlanma Göregenli (1997) tarafından beş nitelikte standardize edilmiştir;

1. Bağlanmayı sağlayan insana özgü nitelikler (biliş, algı, duyum, bellek)
2. Değişkenlik gösteren fiziksel alanlar, farklı mekanlar
3. Değişken rol oynayan sosyal dinamikler (birey, topluluk, kültürel aktarım)
4. Değişken sosyal ilişkiler
5. Zamansal dinamikler (doğrusal ve döngüsel).

Mekan çalışmaları ve kuramcılar ekseninde, mekana bağlanmanın yalnızca bireyin duygusal yönü ile açıklanmasını yetersiz bulunmasıyla beraber, Scannel ve Gifford (2010), oluşturduğu sosyal psikolojik model sayesinde, üç kategoride tanımlamalar yapmıştır. Kişi, süreç ve mekan ekseninde, bireyin öznel algısı ve ferdi aktarımları birinci boyutu, tüm bu duygusal ve davranışsal etmenler ikinci yani süreç boyutunu ve fiziki-sosyal çevre ekseninin mekan boyutu olan üçüncü

boyutu oluşturduğunu vurgulamaktadır. Yürütülen model ile, yere bağlılığın bir mefhum olarak yalnızca birey boyutu ile incelenmesine karşı durulan bir bakış açısı geliştirilmiştir (Kanık, 2018).
Tanberken (2005), mekan bağlılığını, 1999 Marmara Depremi sonrası geçici konutlarda şkamet eden depremzede katılımcılar ile yürütmüştür. Tarihsel ve psikolojik tüm yönleriyle yere bağlılığı, mekan-zaman-bağlılık ekseninde incelemiştir. Yazılı ve sözlü veri toplama sistemi ile bireylerin deprem öncesi ve deprem sonrası ikamet ettikleri konutları arasındaki bağlılık, araştırılmıştır.
Tanhan ve Kayri (2013), 2012 yılında Van ilinde meydana gelen yıkıcı deprem felaketi sonrası, Deprem Sonrası Travma Düzeyini Belirleme Ölçeğini geliştirmiş ve geçerlilik-güvenirlik çalışmasını 2013 yılında yürütmüşlerdir. Van depremini doğrudan yaşamış 1505 katılımcı ile yürütülen çalışmanın neticesinde, 20 maddeden oluşan, beş boyutlu bir ölçek ortaya çıkmıştır. Cronbach Alpha güvenirlik değeri .87 olarak belirlenen çalışma neticesinde, ölçek puan aralığı 52,38 olarak bulunmuş ve ortalama olarak bu puan skalasının, bireyin travmtize olup olmadığını belirlediği tespit edilmiştir. Bu puan eşiğinin deprem sonrası travmatize olmada belirleyici olduğu neticesine ulaşılmıştır.
Yıkılmaz (2016), doktora tez araştırması amacıyla, üniversite öğrenimi gören yetişkin bireylerle, varoluşsal kaygı mefhumunu şemalar , kontrolcülük ve travma sonrası süreçler açısından ele almıştır. Araştırma, tüm alt değişkenleri ve cinsiyet faktörü ile 831 üniversite öğrencisinin gönüllü katılımı ile yürütülmüştür. Varoluşsal kaygı alt boyutlarına göre (ölüm, özgürlük, yalıtım, anlamsızlık), orta düzeyin altında oldukları görülmüştür. Zedelenmiş otonomi, ayrılma-reddedilme, başkalarına yönelimlilik, yüksek standartlar şema alanları ve kontrol odağının varoluşsal kaygıyı etkin bir ilişkiye sahip olduğu neticesine ulaşılmıştır. Travmatik deneyimleri olan araştırma kitlesinde ise travma sonrası büyüme ve hayatı tehdit edici olay yaşama kavramları da anlamlı bir korelasyon ortaya koymuştur. Varoluşsal kaygı alt boyutları ile travmatik süreçler arasından anlamlı düzeyde ve araştırma değişkenleri arasında yordayıcı bir ilişki olduğu gözlemlenmiştir.
Yenice Kanık, 2018 senesinde yaptığı yüksek lisans çalışmasında, mekana bağlanma mefhumunu, mekan kimliği ve diğer gruplarla ilişkiler üzerindeki tesirini ele almıştır. Bu çalışma, İstanbul kentinde farklı ilçelerde ikamet eden ve mekana bağlanma düzeyi perspektifinde (ev, bina, mahalle, ilçe, il), mekan kimliğinin ve diğer sosyal gruplar dinamiği ile korelasyonel bir araştırma olarak yürütülmüştür. 17-65 yaş arası 242 katılımcı ile çalışılmıştır. Araştırmaya dahil eden kişilerin en çok eve ve sırasıyla bina, mahalle v kente dair bir aidiyet geliştirdikleri sonucuna ulaşılmıştır. Kente bağlanmanın, ilçede ikamet etme süresinin bir yordayıcı etmen olduğu verisine ulaşılmıştır.
Ilovan ve Markuszewska (2022), yer kimliği ve yere bağlanma mefhumunun çoklu faktörleriyle ele almış, mekan duygusu ile ilişkisini incelemektedir. Çevre psikologları tarafından alan yazınına sunulan bu çalışmada, beşeri coğrafyanın niteliksel yönünü ve bireyin duygussl süreçleri, bağlılık ekseninde kapsamlı bir yayın haline geitirlmiştir. Bireysel ve kolektif olarak mekana bağlanma kavramını, yer kimliği açısından ortaya koymaktadır.
Eren ve Akoğlu, 2024 yılında yayımladıkları makalede, deprem afetine maruz kalmış kişilerde TSSB ile yaşam anlamı arasındaki bağıntıda umut duygusunun aracı rolünü ele almışlardır. 6 Şubat depremlerine doğrudan maruz kalmış 412 katılımcı ile gerçekleştirilen araştırmada, ekonomik güçlükler yaşayan katılımcıların, TSSB ve anlam arayışı ölçekleri arasında anlamlı bir ilişki tespit edilmiştir. Göçük altında kalmış katılımcıların, kalmayanlara göre TSSB değerleri yüksek, yaşamda anlam, anlamın varlığı alt ölçeklerinin yüksek olduğu gözlemlenmiştir. Depremde evini ve yaşam alanını kaybetmiş bireylerin evleri az hasarlı olup yaşama devam edenlere göre TSSB değerli yüksek olduğu sonucuna varılmıştır. Yaşamın anlamı ve umut arasında pozitif korelasyon, yaşam anlamı ve TSSB arasında umut duygusunun kısmi bir yordayıcı etkisine ulaşılmıştır.
Zhou ve arkadaşları (2017), TSSB bulguları ışığında, travma sonrası gelişim, umut ve benlik saygısının aracı rolünü incelemeyi hedeflemişlerdir. Çin'in Lushan kentinde yaşayan ve

depremden etkilenen 397 ergen birey üzerinden veriler elde edilmiştir. Depremin üzerinde iki buçuk yıl sonra yürütülen bilimsel çalışmada, sosyal desteğin negatif yönde bir korelasyona sahip olduğu, benlik saygısı ile umut mefhumunun aracı ilişkisi olduğu ve pozitif bir korelasyonu ortaya koyduğu gözlemlenmiştir. Artan sosyal destek ile benlik saygısının arttığı, TSSB belirtilerinin azalıp travma sonrası gelişime katkı koyduğu bulgulanmıştır.

YÖNTEM

Evren ve Örneklem

Bu araştırmada, 6 Şubat depremlerini yaşamış bireylerin, deprem sonrası travma düzeyleri, varoluşsal kaygı ve mekana bağlanma ile ilişkisinin incelenmesi amaçlanmıştır. Araştırmanın evrenini deprem yaşamış yetişkin bireyler oluşturmaktadır. Bu çalışmanın örneklemi oluşturulurken ise amaçlı örneklem grubunun alt çeşidi ölçüt örneklem yöntemi ile belirlenmesi sağlanmıştır. Örneklem grubu belirlenirken, araştırma değişkenlerine bağlı olarak 6 Şubat depremlerini doğrudan yaşama durumu ölçüt alınmıştır. Çalışmanın ölçütüne göre belirlenen hedef grubu, 6 Şubat 2023 tarihinde Kahramanmaraş merkezli depremleri, AFAD tarafından afet bölgesi ilan edilen 11 ilde doğrudan yaşamış (Kahramanmaraş, Malatya, Adıyaman, Hatay, Adana, Osmaniye, Elazığ, Şanlıurfa, Gaziantep, Kilis, Diyarbakır) yetişkin bireylerden oluşmuştur. Bu çalışmada 456 katılmcıya, google forms üzerinden online olarak ulaşılmıştır.

Veri Toplama Araçları

Araştırmanın bulguları, ölçekler tarafından oluşturulan yazılı anket biçiminde elde edilmiştir. Çalışmanın veri toplama araçları 4 ayrı alt tür formdan oluşmaktadır. Sosyodemografik Bilgi Formu, araştırmacı tarafından oluşturulmakta, katılımcı bireylerin sosyo-demografik özelliklerine yönelik sorular yöneltilmekte ve deprem süreci ve öncesine dair, araştırmayla ilişkili sorular sorulmaktadır. Bu form 9 sorudan oluşmaktadır. Deprem Sonrası Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekana Bağlanma Ölçeği, anket formunda yer alan diğer alt ölçeklerdir.

6 Şubat Depremlerini Yaşamış Bireylerin Betimsel Özellikleri

Araştırmaya katılan bireylerin %12,28'inin 25 yaş ve altında, %32,89'unun 26-35 yaş arasında, %26,97'sinin 36-45 yaş arasında, %27,85'inin 46yaş ve üzerinde olduğu, %59,43'ünün kadın, %40,57'sinin erkek olduğu,%19,74'ünün eğitim durumunun lise ve altı, %663,38'inin eğitim durumununönlisans/lisan mezunu, %16,89'unun eğitim durumunun yüksek lisans veya üzerindeolduğu, %28,29'unun medeni durumunun bekar, %64,25'inin medeni durumununevli, %7,46'sının boşanmış olduğu, %62,94'ünün çocuk sahibi olduğu, %37,06'sınınçocuğunun olmadığı, %14,69'unun deprem öncesinde düşük gelir sahibi,%75,88'inin deprem öncesinde orta düzey gelir sahibi, %9,43'ünün depremöncesinde yüksek gelir düzeyine sahip olduğu, %40,57'sinin kamu sektöründe,%24,56'sının özel sektörde, %11,62'sinin kendi işyerinde çalıştığı, %23,25'inin çalışmadığı, %44,74'ünün deprem sonrasında evinden taşınmak zorunda kaldığı,%55,26'sının deprem sonrasında evinden taşınmak zorunda kalmadığı, %24,12'sinindeprem sonrasında yaşadığı şehirden taşınmak zorunda kaldığı, %75,88'inin depremsonrasında şehirden taşınmak zorunda kalmadığı tespit edilmiştir.

BULGULAR

Tablo 1.

Katılımcıların Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekana Bağlanma Ölçeği puanları

	N	$\bar{x}$	s	Min	Max
Davranış problemleri	456	10,82	4,05	4	20
Heyecansal sınırlık	456	14,07	5,65	5	25
Duyuşsal	456	12,84	3,80	4	20
Bilişsel yapılandırma	456	14,97	4,13	4	20
Uyku problemleri	456	8,91	3,81	3	15
Travma Düzeyi Belirleme Ölçeği	456	61,63	18,37	20	100
Anlamsızlık kaygısı	456	24,14	8,28	10	50
Ölüm kaygısı	456	11,16	4,62	5	25
Yalıtılmışlık kaygısı	456	12,84	4,94	5	25
Özgürlük kaygısı	456	11,14	4,17	5	25
Varoluşsal Kaygı Ölçeği	456	59,28	14,25	26	99
Daire	456	37,67	9,09	12	60
Bina	456	37,25	8,84	12	60
Mahalle	456	37,25	8,83	12	60
İlçe	456	36,94	8,98	12	60
Şehir	456	37,29	9,16	12	60

Tablo 1'de katılımcıların Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekana Bağlanma Ölçeği puanları verilmiştir.

Tablo 1 incelendiğinde, araştırmaya katılan bireylerin Travma Düzeyi Belirleme Ölçeğine ait Davranış problemleri alt boyutundan ortalama 10,82±4,05, minimum 4, maksimum 20 puan, Heyecansal sınırlık alt boyutundan ortalama 14,07±5,65, minimum 5, maksimum 25 puan, Duyuşsal alt boyutundan ortalama 12,84±3,80, minimum 4, maksimum 20 puan, Bilişsel yapılandırma alt boyutundan ortalama 14,97±4,13, minimum 4, maksimum 20 puan, Uyku problemleri alt boyutundan ortalama 8,91±3,81, minimum 3, maksimum 15 puan, Travma Düzeyi Belirleme Ölçeği genelinden ortalama 61,63±18,37, minimum 20, maksimum 100 puan aldıkları belirlenmiştir.

Katılımcıların Varoluşsal Kaygı Ölçeğine ait Anlamsızlık kaygısı alt boyutundan ortalama 24,14±8,28, minimum 10, maksimum 50 puan, Ölüm kaygısı alt boyutundan ortalama 11,16±4,62, minimum 5, maksimum 25 puan, Yalıtılmışlık kaygısı alt boyutundan ortalama 12,84±4,94, minimum 5, maksimum 25 puan, Özgürlük kaygısı alt boyutundan ortalama 11,14±4,17, minimum 5, maksimum 25 puan, Varoluşsal Kaygı Ölçeği genelinden ortalama 59,28±14,25, minimum 26, maksimum 99 puan aldıkları görülmüştür.

Katılımcıların Mekana Bağlanma Ölçeğine ait Daire alt boyutundan ortalama 37,67±9,09, minimum 12, maksimum 60 puan, Bina alt boyutundan ortalama 37,25±8,84, minimum 12, maksimum 60 puan, Mahalle alt boyutundan ortalama 37,25±8,83, minimum 12, maksimum 60 puan, İlçe alt boyutundan ortalama 36,94±8,98, minimum 12, maksimum 60 puan ve Şehir alt boyutundan ortalama 37,29±9,16, minimum 12, maksimum 60 puan aldıkları tespit edilmiştir.

Tablo 2.
Katılımcıların Cinsiyete göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanlarının Karşılaştırılmaları

	Cinsiyet	**n**	$\bar{x}$	**s**	**t**	**p**
Davranış problemleri	Kadın	271	11,28	4,07	2,955	0,003*
	Erkek	185	10,15	3,95		
Heyecansal sınırlık	Kadın	271	14,74	5,81	3,082	0,002*
	Erkek	185	13,10	5,26		
Duyuşsal	Kadın	271	13,50	3,65	4,569	0,000*
	Erkek	185	11,88	3,84		
Bilişsel yapılandırma	Kadın	271	15,42	4,01	2,796	0,005*
	Erkek	185	14,32	4,21		
Uyku problemleri	Kadın	271	9,34	3,94	2,905	0,004*
	Erkek	185	8,29	3,54		
Travma Düzeyi Belirleme Ölçeği	Kadın	271	64,28	18,51	3,788	0,000*
	Erkek	185	57,74	17,48		
Anlamsızlık kaygısı	Kadın	271	23,58	8,35	-1,769	0,077
	Erkek	185	24,97	8,12		
Ölüm kaygısı	Kadın	271	11,84	4,85	3,863	0,000*
	Erkek	185	10,16	4,06		
Yalıtılmışlık kaygısı	Kadın	271	13,25	5,06	2,153	0,032*
	Erkek	185	12,24	4,69		
Özgürlük kaygısı	Kadın	271	11,14	4,42	0,026	0,979
	Erkek	185	11,13	3,78		
Varoluşsal Kaygı Ölçeği	Kadın	271	59,80	15,12	0,958	0,339
	Erkek	185	58,50	12,87		
Daire	Kadın	271	37,93	9,16	0,738	0,461
	Erkek	185	37,29	9,00		
Bina	Kadın	271	37,32	8,92	0,231	0,817
	Erkek	185	37,13	8,75		
Mahalle	Kadın	271	37,32	8,78	0,220	0,826
	Erkek	185	37,14	8,92		
İlçe	Kadın	271	36,69	8,83	-0,732	0,465
	Erkek	185	37,31	9,21		
Şehir	Kadın	271	37,11	8,92	-0,506	0,613
	Erkek	185	37,56	9,53		

**p<0,05*

Tablo 2'de katılımcıların cinsiyetine göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanları bağımsız örneklem t testi kullanılarak karşılaştırılmış ve sonuçları verilmiştir.

Tablo 2 incelendiğinde, araştırmaya katılanların cinsiyetine göre Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları arasında istatistiksel olarak anlamlı düzeyde fark olduğu tespit edilmiştir ($p<0,05$). Kadın katılımcıların Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri puanları ile Travma Düzeyi

Belirleme Ölçeği genel puanları, erkek katılımcıların Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri puanları ile Travma Düzeyi Belirleme Ölçeği genel puanlarından istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur.

Katılımcıların cinsiyetine göre Varoluşsal Kaygı Ölçeğine ait Ölüm kaygısı ve Yalıtılmışlık kaygısı alt ölçek puanları arasında istatistiksel açıdan etkin bir ayrım olduğu belirlenmiştir ($p<0,05$). Kadın katılımcıların Ölüm kaygısı ve Yalıtılmışlık kaygısı alt ölçek puanları, erkek katılımcıların Ölüm kaygısı ve Yalıtılmışlık kaygısı alt ölçek puanlarından istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. Katılımcıların cinsiyetine göre Varoluşsal Kaygı Ölçeği genel puanları ve ölçeğe ait Anlamsızlık kaygısı ve Özgürlük kaygısı alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark yoktur ($p>0,05$).

Katılımcıların cinsiyetine göre Mekâna Bağlanma Ölçeğine ait Daire, Bina, Mahalle, İlçe ve Şehir alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark olmadığı saptanmıştır ($p<0,05$). Kadın ve erkek katılımcıların Daire, Bina, Mahalle, İlçe ve Şehir alt ölçek puanları benzerdir.

Tablo 3.
Katılımcıların Eğitim Durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanlarının Karşılaştırılmaları

	Eğitim durumu	**n**	$\bar{x}$	**s**	**Min**	**Max**	**F**	**p**	**Fark**
Davranış problemleri	Lise ve altı	90	10,46	4,18	4	20	1,133	0,323	
	Ön Lisans/Lisans	289	10,79	4,05	4	20			
	Lisansüstü	77	11,39	3,92	4	20			
Heyecansal sınırlık	Lise ve altı	90	14,37	6,11	5	25	0,165	0,848	
	Ön Lisans/ Lisans	289	13,98	5,65	5	25			
	Lisansüstü	77	14,10	5,13	5	25			
Duyuşsal	Lise ve altı	90	12,99	4,03	4	20	0,272	0,762	
	Ön Lisans/ Lisans	289	12,74	3,75	4	20			
	Lisansüstü	77	13,04	3,76	5	20			
Bilişsel yapılandırma	Lise ve altı	90	15,48	4,12	4	20	1,153	0,317	
	Ön Lisans/ Lisans	289	14,76	4,16	4	20			
	Lisansüstü	77	15,18	4,01	6	20			
Uyku problemleri	Lise ve altı	90	9,13	4,15	3	15	1,124	0,326	
	Ön Lisans/ Lisans	289	8,72	3,73	3	15			
	Lisansüstü	77	9,39	3,69	3	15			
Travma Düzeyi Belirleme Ölçeği	Lise ve altı	90	62,42	18,82	20	100	0,508	0,602	
	Ön Lisans/ Lisans	289	60,99	18,45	20	100			
	Lisansüstü	77	63,10	17,64	31	95			
Anlamsızlık kaygısı	Lise ve altı	90	25,09	8,95	10	46	5,706	0,004*	1-3
	Ön Lisans/ Lisans	289	24,61	8,01	10	50			2-3
	Lisansüstü	77	21,30	7,94	10	48			
Ölüm kaygısı	Lise ve altı	90	11,50	4,94	5	25	0,710	0,492	
	Ön Lisans/ Lisans	289	10,96	4,48	5	23			
	Lisansüstü	77	11,49	4,77	5	24			
Yalıtılmışlık kaygısı	Lise ve altı	90	12,74	5,43	5	25	0,622	0,537	
	Ön Lisans/ Lisans	289	13,01	4,84	5	25			
	Lisansüstü	77	12,31	4,69	5	23			
Özgürlük kaygısı	Lise ve altı	90	11,71	4,30	5	22	4,279	0,014*	1-3
	Ön Lisans/ Lisans	289	11,28	4,34	5	25			2-3

	Lisansüstü	77	9,94	3,03	5	16			
	Lise ve altı	90	61,04	15,15	27	96	4,399	0,013*	1-3
Varoluşsal Kaygı Ölçeği	Ön Lisans/ Lisans	289	59,85	14,22	26	99			2-3
	Lisansüstü	77	55,04	12,55	31	80			
	Lise ve altı	90	37,32	10,20	14	56	4,678	0,010*	1-3
Daire	Ön Lisans/ Lisans	289	37,01	8,79	13	60			2-3
	Lisansüstü	77	40,52	8,34	12	56			
	Lise ve altı	90	37,06	10,03	14	56	4,359	0,013*	1-3
Bina	Ön Lisans/ Lisans	289	36,60	8,46	13	60			2-3
	Lisansüstü	77	39,91	8,38	12	56			
	Lise ve altı	90	37,61	9,81	14	55	2,615	0,074	
Mahalle	Ön Lisans/ Lisans	289	36,62	8,53	13	60			
	Lisansüstü	77	39,16	8,56	12	56			
	Lise ve altı	90	37,83	9,79	14	55	2,249	0,107	
İlçe	Ön Lisans/ Lisans	289	36,28	8,75	13	60			
	Lisansüstü	77	38,39	8,71	12	56			
	Lise ve altı	90	38,53	9,70	14	55	2,287	0,103	
Şehir	Ön Lisans/ Lisans	289	36,60	9,11	12	60			
	Lisansüstü	77	38,45	8,51	12	54			

**p<0,05*

Tablo 3'te katılımcıların eğitim durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanları Anova testi kullanılarak karşılaştırılmış ve sonuçları verilmiştir.

Tablo 3 incelendiğinde, araştırmaya katılanların eğitim durumuna göre Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları arasında istatistiksel olarak anlamlı düzeyde fark olmadığı görülmektedir (p>0,05). Katılımcıların eğitim durumları fark etmeksizin Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri puanları ile Travma Düzeyi Belirleme Ölçeği genel puanları benzer bulunmuştur.

Katılımcıların eğitim durumuna göre Varoluşsal Kaygı Ölçeği genel puanları ve ölçeğe ait Anlamsızlık kaygısı ve Özgürlük kaygısı alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark olduğu belirlenmiştir (p<0,05). Lisansüstü mezunu olan katılımcıların Anlamsızlık kaygısı ve Özgürlük kaygısı alt ölçek puanları ile Varoluşsal Kaygı Ölçeği genel puanları, lise ve daha düşük eğitim seviyesine sahip olan katılımcılar ile önlisans/lisans mezunu olan katılımcıların Anlamsızlık kaygısı ve Özgürlük kaygısı alt ölçek puanları ile Varoluşsal Kaygı Ölçeği genel puanlarından istatistiksel olarak anlamlı düzeyde düşük bulunmuştur. Katılımcıların eğitim durumuna göre Ölüm kaygısı ve Yalıtılmışlık kaygısı alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark yoktur (p>0,05).

Katılımcıların eğitim durumuna göre Mekâna Bağlanma Ölçeğine ait Daire ve Bina alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark vardır (p<0,05). Lisansüstü mezunu olan katılımcıların Daire ve Bina alt ölçek puanları, lise ve daha düşük eğitim seviyesine sahip olan katılımcılar ile önlisans/lisans mezunu olan katılımcıların Daire ve Bina alt ölçek puanlarından istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. Katılımcıların eğitim durumuna göre Mahalle, İlçe ve Şehir alt ölçek puanları arasında istatistiksel olarak anlamlı düzeyde fark yoktur (p>0,05).

Tablo 4.
Katılımcıların Deprem Sonrası Evden Taşınmak Zorunda Kalma Durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanlarının Karşılaştırılmaları

	Taşınma	**n**	$\bar{x}$	**s**	**t**	**p**
Davranış problemleri	Evet	204	11,19	4,11	1,742	0,082
	Hayır	252	10,53	3,99		
Heyecansal sınırlık	Evet	204	14,32	5,52	0,847	0,398
	Hayır	252	13,87	5,75		
Duyuşsal	Evet	204	13,28	3,77	2,230	0,026*
	Hayır	252	12,48	3,80		
Bilişsel yapılandırma	Evet	204	15,06	4,09	0,396	0,692
	Hayır	252	14,90	4,16		
Uyku problemleri	Evet	204	9,22	3,85	1,520	0,129
	Hayır	252	8,67	3,77		
Travma Düzeyi Belirleme Ölçeği	Evet	204	63,07	18,00	1,510	0,132
	Hayır	252	60,46	18,62		
Anlamsızlık kaygısı	Evet	204	23,97	8,49	-0,415	0,678
	Hayır	252	24,29	8,12		
Ölüm kaygısı	Evet	204	11,11	4,63	-0,188	0,851
	Hayır	252	11,19	4,61		
Yalıtılmışlık kaygısı	Evet	204	13,49	4,99	2,555	0,011
	Hayır	252	12,31	4,84		
Özgürlük kaygısı	Evet	204	11,43	3,94	1,363	0,174
	Hayır	252	10,90	4,33		
Varoluşsal Kaygı Ölçeği	Evet	204	60,00	14,23	0,976	0,330
	Hayır	252	58,69	14,27		
Daire	Evet	204	37,67	9,07	0,010	0,992
	Hayır	252	37,66	9,12		
Bina	Evet	204	37,11	8,90	-0,288	0,773
	Hayır	252	37,35	8,81		
Mahalle	Evet	204	37,47	9,07	0,478	0,633
	Hayır	252	37,07	8,65		
İlçe	Evet	204	37,29	9,26	0,745	0,457
	Hayır	252	36,66	8,75		
Şehir	Evet	204	37,80	9,59	1,060	0,290
	Hayır	252	36,88	8,80		

**p<0,05*

Tablo 4'te deprem sonrası evden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanları bağımsız örneklem t testi kullanılarak karşılaştırılmış ve sonuçları verilmiştir.

Tablo 4 incelendiğinde, araştırmaya katılanların deprem sonrası evden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeğine ait Duyuşsal alt boyut puanları arasında istatistiksel olarak etkin bir ayrım olduğu saptanmıştır ($p<0,05$). Deprem sonrası evden taşınmak zorunda kalan katılımcıların Duyuşsal puanları, deprem sonrası evden taşınmak zorunda kalmayan

katılımcıların Duyuşsal puanlarından istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. Katılımcıların deprem sonrası evden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Davranış problemleri, Heyecansal sınırlık, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları arasında istatistiksel olarak anlamlı düzeyde fark yoktur (p>0,05).

Tablo 5.

Katılımcıların Deprem Sonrası Şehirden Taşınmak Zorunda Kalma Durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanlarının Karşılaştırılmaları

	Taşınma	**n**	$\bar{x}$	**s**	**t**	**p**
Davranış problemleri	Evet	110	11,58	4,18	2,259	0,024*
	Hayır	346	10,58	3,99		
Heyecansal sınırlık	Evet	110	14,03	5,56	-0,101	0,920
	Hayır	346	14,09	5,68		
Duyuşsal	Evet	110	13,20	3,67	1,140	0,255
	Hayır	346	12,73	3,84		
Bilişsel yapılandırma	Evet	110	14,76	3,96	-0,612	0,541
	Hayır	346	15,04	4,18		
Uyku problemleri	Evet	110	8,58	3,93	-1,051	0,294
	Hayır	346	9,02	3,77		
Travma Düzeyi Belirleme Ölçeği	Evet	110	62,15	18,04	0,345	0,730
	Hayır	346	61,46	18,49		
Anlamsızlık kaygısı	Evet	110	23,95	8,93	-0,290	0,772
	Hayır	346	24,21	8,07		
Ölüm kaygısı	Evet	110	11,00	4,37	-0,411	0,681
	Hayır	346	11,21	4,70		
Yalıtılmışlık kaygısı	Evet	110	13,23	4,98	0,950	0,343
	Hayır	346	12,71	4,92		
Özgürlük kaygısı	Evet	110	11,24	3,70	0,290	0,772
	Hayır	346	11,10	4,31		
Varoluşsal Kaygı Ölçeği	Evet	110	59,41	14,72	0,112	0,911
	Hayır	346	59,23	14,12		
Daire	Evet	110	38,01	9,73	0,453	0,651
	Hayır	346	37,56	8,89		
Bina	Evet	110	37,22	9,55	-0,037	0,970
	Hayır	346	37,25	8,62		
Mahalle	Evet	110	37,28	9,37	0,049	0,961
	Hayır	346	37,23	8,67		
İlçe	Evet	110	37,31	9,70	0,493	0,622
	Hayır	346	36,82	8,75		
Şehir	Evet	110	37,51	10,15	0,283	0,778
	Hayır	346	37,23	8,84		

**p<0,05*

Tablo 5'te deprem sonrası şehirden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanları bağımsız örneklem t testi kullanılarak karşılaştırılmış ve sonuçları verilmiştir.

Tablo 5 incelendiğinde, araştırmaya katılanların deprem sonrası şehirden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeğine ait Davranış problemleri alt boyut puanları arasında istatistiksel olarak anlamlı düzeyde fark olduğu saptanmıştır (p<0,05). Deprem sonrası şehirden taşınmak zorunda kalan katılımcıların Davranış problemleri puanları, deprem sonrası şehirden taşınmak zorunda kalmayan katılımcıların Davranış problemleri puanlarından istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. Katılımcıların deprem sonrası şehirden taşınmak zorunda kalma durumuna göre Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları arasında istatistiksel olarak anlamlı düzeyde fark yoktur (p>0,05).
Tablo 6.

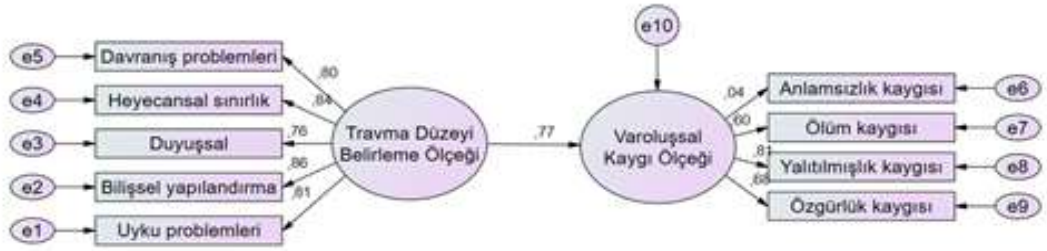
Katılımcıların Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği Puanlarının Arasındaki Korelasyonlar

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Davranış problemleri (1)	r	1															
Heyecansal sınırlık(2)	r	**0,679***	1														
Duyuşsal(3)	r	**0,632***	**0,609***	1													
Bilişsel yapılandırma(4)	r	**0,667***	**0,720***	**0,689***	1												
Uyku problemleri(5)	r	**0,687***	**0,661***	**0,589***	**0,698***	1											
Travma Düzeyi Belirleme Ölçeği (6)	r	**0,853***	**0,882***	**0,811***	**0,881***	**0,841***	1										
Anlamsızlık kaygısı (7)	r	-0,070	0,077	**-0,232***	**-0,140***	-0,053	-0,082	1									
Ölüm kaygısı (8)	r	**0,350***	**0,420***	**0,350***	**0,434***	**0,384***	**0,456***	-0,024	1								
Yalıtılmışlık kaygısı (9)	r	**0,462***	**0,653***	**0,452***	**0,507***	**0,548***	**0,624***	**0,140***	**0,433***	1							
Özgürlük kaygısı (10)	r	**0,305***	**0,425***	**0,367***	**0,398***	**0,355***	**0,437***	0,004	**0,496***	**0,555***	1						
Varoluşsal Kaygı Ölçeği (11)	r	**0,322***	**0,531***	**0,242***	**0,351***	**0,387***	**0,444***	**0,623***	**0,605***	**0,730***	**0,647***	1					
Daire (12)	r	0,055	-0,026	**0,094***	0,009	0,009	0,028	**-0,190***	-0,084	-0,005	-0,013	**-0,143***	1				
Bina (13)	r	0,040	-0,037	0,083	0,015	0,001	0,018	**-0,183***	-0,091	-0,044	0,015	**-0,146***	**0,955***	1			
Mahalle (14)	r	0,042	-0,052	**0,093***	-0,001	-0,016	0,009	**-0,169***	**-0,108***	-0,051	-0,027	**-0,159***	**0,860***	**0,906***	1		
İlçe (15)	r	0,043	-0,043	**0,098***	-0,006	-0,013	0,012	**-0,144***	**-0,095***	-0,065	-0,034	**-0,147***	**0,799***	**0,849***	**0,944***	1	
Şehir (16)	r	0,028	-0,045	**0,102***	-0,008	-0,021	0,007	**-0,148***	**-0,111***	-0,047	-0,041	**-0,150***	**0,801***	**0,825***	**0,922***	**0,957***	1

**p<0,05*

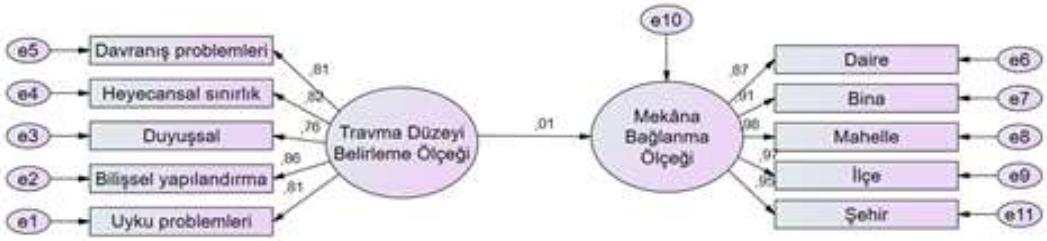
Tablo 6'da katılımcıların Travma Düzeyi Belirleme Ölçeği, Varoluşsal Kaygı Ölçeği ve Mekâna Bağlanma Ölçeği puanlarının arasındaki korelasyonlar verilmiştir. Tablo 2 incelendiğinde, araştırmaya katılanların Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları ile Varoluşsal Kaygı Ölçeği genel puanları ve ölçeğe ait Ölüm kaygısı, Yalıtılmışlık kaygısı ve Özgürlük kaygısı alt ölçek puanları arasında pozitif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu tespit edilmiştir (p<0,05). Buna göre katılımcıların Ölüm kaygısı, Yalıtılmışlık kaygısı ve Özgürlük kaygısı alt ölçek puanları ile Varoluşsal Kaygı Ölçeği genel puanları arttıkça, Travma Düzeyi Belirleme Ölçeği genel puanları ve ölçeğe ait Davranış problemleri, Heyecansal sınırlık, Duyuşsal, Bilişsel yapılandırma ve Uyku problemleri alt boyut puanları istatistiksel olarak anlamlı düzeyde artmaktadır. Katılımcıların Travma Düzeyi Belirleme Ölçeğine ait Duyuşsal ve Bilişsel yapılandırma alt boyut puanları ile Varoluşsal Kaygı Ölçeğine ait Anlamsızlık kaygısı alt boyut puanları arasında ise negatif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu tespit edilmiştir (p<0,05). Katılımcıların Anlamsızlık kaygısı puanları arttıkça, Duyuşsal ve Bilişsel yapılandırma puanları istatistiksel olarak anlamlı düzeyde azalmaktadır. Katılımcıların Travma Düzeyi Belirleme Ölçeğine ait Duyuşsal alt boyut puanları ile Mekâna Bağlanma Ölçeğine ait Daire, Mahalle, İlçe ve Şehir alt boyut puanları arasında pozitif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu saptanmıştır (p<0,05). Katılımcıların Duyuşsal puanları arttıkça, Mekâna Bağlanma Ölçeğine ait Daire, Mahalle, İlçe ve Şehir alt boyut puanları da istatistiksel olarak anlamlı düzeyde artmaktadır.
Araştırmaya katılanların Varoluşsal Kaygı Ölçeği genel puanları ve ölçeğe ait Anlamsızlık kaygısı alt ölçek puanları ile Mekâna Bağlanma Ölçeğine ait Daire, Bina, Mahalle, İlçe ve Şehir alt boyut puanları arasında negatif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon olduğu tespit edilmiştir (p<0,05). Katılımcıların Anlamsızlık kaygısı puanları ile Varoluşsal Kaygı Ölçeği genel puanları arttıkça, Mekâna Bağlanma Ölçeğine ait Daire, Bina, Mahalle, İlçe ve Şehir alt boyut

puanları istatistiksel olarak anlamlı düzeyde azalmaktadır. Katılımcıların Varoluşsal Kaygı Ölçeğine ait Ölüm kaygısı puanları ile Mekâna Bağlanma Ölçeğine ait Mahalle, İlçe ve Şehir alt boyut puanları arasında negatif yönde ve istatistiksel olarak anlamlı düzeyde korelasyon vardır (p<0,05). Katılımcıların Ölüm kaygısı puanları arttıkça, Bağlanma Ölçeğine ait Mahalle, İlçe ve Şehir alt boyut puanları istatistiksel olarak anlamlı düzeyde azalmaktadır.



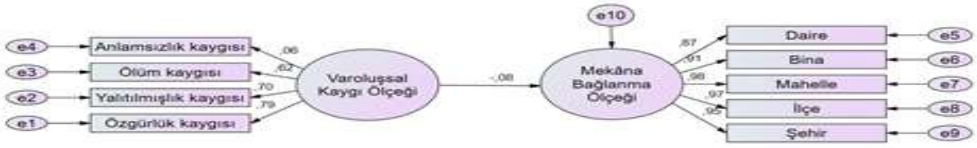
Şekil 1. *Katılımcıların Travma Düzeyi Belirleme Ölçeği puanlarının Varoluşsal Kaygı Ölçeği puanlarını yordama durumu*

Şekil 1'de gösterilen katılımcıların Travma Düzeyi Belirleme Ölçeği puanlarının Varoluşsal Kaygı Ölçeği puanlarını yordama durumu incelendiğinde, katılımcıların Travma Düzeyi Belirleme Ölçeği puanlarının Varoluşsal Kaygı Ölçeği puanlarını istatistiksel olarak anlamlı düzeyde yordadığı tespit edilmiştir (β=0,77;p<0,05).



Şekil 2. *Katılımcıların Travma Düzeyi Belirleme Ölçeği puanlarının Mekâna Bağlanma Ölçeği puanlarını yordama durumu*

Şekil 2'de gösterilen katılımcıların Travma Düzeyi Belirleme Ölçeği puanlarının Varoluşsal Kaygı Ölçeği puanlarını yordama durumu incelenmiş olup, Travma Düzeyi Belirleme Ölçeği puanlarının Varoluşsal Kaygı Ölçeği puanlarını istatistiksel olarak anlamlı düzeyde yordamadığı tespit edilmiştir (β=0,01;p>0,05).



Şekil 3. *Katılımcıların Varoluşsal Kaygı Ölçeği puanlarının Mekâna Bağlanma Ölçeği puanlarını yordama durumu*

Şekil 3'te araştırmadaki katılımcıların Varoluşsal Kaygı Ölçeği puanlarının Mekâna Bağlanma Ölçeği puanlarını yordama durumu incelenmiştir. Şekil 3.'e göre araştırma kapsamına alınan

Varoluşsal Kaygı Ölçeği puanlarının Mekâna Bağlanma Ölçeği puanlarını istatistiksel olarak anlamlı düzeyde yordamadığı belirlenmiştir (β=-0,08;p>0,05).

TARTIŞMA VE SONUÇ

Araştırma sonuçları neticesinde, yaş grupları arasında varoluşsal kaygı düzeyine ait yalıtılmışlık kaygısı alt boyutunda anlamlı bir fark olduğunu ortaya koymuştur. Bu bağlamda, 25 yaş ve altında olan katılımcıların yalıtılmışlık kaygısı düzeyleri, 46 yaş ve üzerinde olan katılımcıların yalıtılmışlık kaygısı düzeylerinden anlamlı düzeyde yüksek, 26-35 yaş arasında olan katılımcıların yalıtılmışlık kaygısı düzeyleri, 46 yaş ve üzerinde olan katılımcıların yalıtılmışlık kaygısı düzeylerinden anlamlı düzeyde yüksek bulunmuştur. Bu sonuçlar, farklı yaş gruplarındaki bireyler arasında varoluşsal kaygıya bağlı olarak yalıtılmışlık kaygısının değişebileceğini göstermektedir. Özellikle, genç ve orta yaş grubundaki katılımcıların daha yüksek bir yalıtılmışlık kaygısı düzeyine sahip olduğu görülmektedir. Bu durum, yaşın varoluşsal kaygı ile ilişkili belirli alt boyutlarda farklılıklara neden olabileceğini ve bu farklılıkların dikkate alınması gerektiğini düşündürmektedir. Andrews (2016) tarafından yapılan bir çalışma, varoluşsal krizlerin genellikle genç yetişkinlik döneminde başladığını ve bu dönemdeki bireylerin kimlikleri ve gelecekleri hakkında sorularla mücadele ettiklerini belirtmektedir. Ayrıca, varoluşsal krizlerin toplumsal sorunların bir yansıması olarak da görülebileceğini öne sürmektedir. Bu bağlamda, genç yetişkinlerin yalıtılmışlık kaygısı yaşama olasılıklarının daha yüksek olması, toplumsal değişimler ve bireysel kimlik arayışları ile ilişkilendirilebilir. Rumelili (2021) ise varoluşsal kaygının uluslararası ilişkilerde bir kamuoyu ruh hali olarak etkili olduğunu ve toplumların dünyaya karşı kolektif bir uyum içinde olduğunu ifade etmektedir. Bu durum, genç bireylerin toplumsal ve küresel sorunlara karşı daha hassas olabileceğini ve bu nedenle yalıtılmışlık kaygısını daha yoğun hissedebileceğini göstermektedir. Sonuç olarak, bu araştırmanın bulguları, varoluşsal kaygının yaş gruplarına göre değişkenlik gösterdiğini ve özellikle genç yetişkinlerde daha belirgin olduğunu desteklemektedir. Bu bulgular, toplumsal dinamikler ve bireysel gelişim süreçleri ile ilişkili olabilir ve bu konuda daha fazla araştırma yapılmasını gerektirebilir.

Araştırma sonuçlarına göre, cinsiyet temelli olarak incelendiğinde, travma düzeyini belirleme seviyeleri ile davranış problemleri, heyecansal sınırlılık, duyuşsal, bilişsel yapılandırma ve uyku problemleri alt boyut seviyeleri arasında anlamlı farklılıklar tespit edilmiştir. Bu bağlamda, kadın katılımcıların davranış problemleri, heyecansal sınırlılık, duyuşsal, bilişsel yapılandırma ve uyku problemleri ile travma düzeyini belirleme seviyelerinin erkek katılımcılarınkine kıyasla daha yüksek olduğu görülmüştür. Alan yazın gözden geçirildiğinde, kadın ve erkeklerin travma deneyimlerinde cinsiyet temelli belirgin farklar saptanmıştır; Lehner (2021) bu durumu doğrulamaktadır. Olff (2017) ve Tekin ve diğerleri (2016) tarafından yapılan çalışmalar, kadınların ömür boyu Travma Sonrası Stres Bozukluğu (TSSB) geliştirme riskinin %10-12 arasında, erkeklerin ise %5-6 arasında olduğunu belirtmektedir. Rybojad ve diğerlerinin (2016) yaptığı bir araştırmada, kadın sağlık çalışanlarının erkeklere göre daha fazla travma yaşadığı tespit edilmiştir. Şahin ve Cerit'in (2019) Türkiye'deki çalışması da kadın sağlık çalışanlarının travma düzeylerinin istatistiksel olarak anlamlı bir farklılık gösterdiğini cinsiyet ve travma belirtileri arasında anlamlı bir ilişki olduğunu ortaya koyarak mevcut çalışmanın sonuçlarını desteklemektedir.

Araştırma kapsamında, cinsiyet temelli analizlerde varoluşsal kaygı düzeyine ait ölüm kaygısı ve yalıtılmışlık kaygısı alt boyut seviyeleri arasında anlamlı farklar tespit edilmiştir. Bu bağlamda, kadın katılımcıların ölüm kaygısı ve yalıtılmışlık kaygısı alt boyut seviyelerinin erkek katılımcılarınkine kıyasla anlamlı derecede daha yüksek olduğu belirlenmiştir. Bu sonuçlar, cinsiyetin varoluşsal kaygı düzeyleri üzerinde belirleyici bir rol oynayabileceğini düşündürmektedir. Farhane-Medina ve diğerlerinin (2022) yaptığı bir sistematik inceleme, anksiyete bozukluklarının prevalansı ve komorbiditesinde kadınlar ve erkekler arasında önemli farklılıklar olduğunu, araştırmaların kadınları daha fazla etkilediğini gösterdiğini belirtmektedir. Bu inceleme, anksiyete gelişiminde maskülenliğin koruyucu bir faktör olabileceğini, feminenliğin ise bir risk faktörü olabileceğini öne sürmektedir.

Araştırma sonuçlarına göre, eğitim düzeyine göre varoluşsal kaygı düzeyleri ile anlamsızlık kaygısı ve özgürlük kaygısı alt boyut düzeyleri arasında anlamlı farklar bulunmuştur. Bu bağlamda, lisansüstü eğitim almış katılımcıların anlamsızlık kaygısı ve özgürlük kaygısı alt boyut düzeyleri ile varoluşsal kaygı düzeylerinin, lise ve daha düşük eğitim seviyesine sahip olan katılımcılar ile ön lisans/lisans mezunu olan katılımcılarınkiyle karşılaştırıldığında anlamlı derecede daha düşük olduğu belirlenmiştir. Bu bulgular, eğitim seviyesinin bireylerin varoluşsal kaygılarını yönetme yeteneği üzerinde olumlu bir etkiye sahip olabileceğini düşündürmektedir. Tomaszek ve Muchacka-Cymerman (2022) tarafından yapılan bir çalışma, öğrenci tükenmişliği ve varoluşsal kaygının öğrencilerin travma sonrası stres bozukluğu semptomları ile önemli bir ilişkisi olduğunu ortaya koymuştur. Bu çalışma, yüksek eğitim düzeyine sahip bireylerin eğitimle ilişkili stres ve kaygıları daha iyi yönetebileceğini ve bu sayede travma sonrası semptomların azaltılmasına yardımcı olabileceğini göstermektedir. Diğer bir çalışma olan Jalali-Azar ve diğerlerinin (2023) araştırması, Kabul ve Kararlılık Terapisinin üniversite öğrencilerinin intihar düşünceleri, kendine zarar verme eğilimleri ve varoluşsal kaygı üzerinde önemli bir etkisi olduğunu belirtmektedir. Bu terapi yönteminin, öğrencilerin varoluşsal kaygılarını azaltmada etkili olduğu gözlemlenmiştir. Bu bulgular ışığında, eğitim düzeyinin varoluşsal kaygı düzeyleri üzerindeki etkisinin bireylerin yaşadıkları stres ve kaygıları yönetme becerileri ile doğrudan ilişkili olabileceği sonucuna varılabilir. Lisansüstü eğitim gören bireylerin, daha karmaşık düşünme becerilerine ve kaygıları ele alma stratejilerine sahip olmaları, bu düşük kaygı düzeylerinin bir açıklaması olabilir. Bu sonuçlar, eğitim seviyesinin sadece akademik başarıyı değil, aynı zamanda bireylerin psikolojik sağlığını da etkileyebileceğini göstermektedir.

Araştırma kapsamında, eğitim düzeyine göre mekâna bağlanma düzeylerinin daire ve bina alt boyutları arasında anlamlı farklılıklar olduğu belirlenmiştir. Bu bağlamda, lisansüstü eğitim almış katılımcıların daire ve bina alt boyut düzeylerinin lise ve daha düşük eğitim seviyesine sahip katılımcılar ile ön lisans/lisans mezunu katılımcılarınkine kıyasla anlamlı derecede daha yüksek olduğu gözlemlenmiştir. Bu sonuçlar, eğitim düzeyinin bireylerin yaşadıkları mekânlarla kurdukları ilişkinin derinliği ve niteliği üzerinde belirleyici bir rol oynayabileceğini düşündürmektedir. Ilovan ve Markuszewska (2022) tarafından yapılan bir çalışmada, eğitim düzeyinin yüksek olmasının bireylerin mekân kimliği, aidiyet duygusu ve mekâna bağımlılık gibi kavramlarla olan ilişkilerini güçlendirebileceğini öne sürmektedir. Jack (2010) ise çocukların refahı üzerinde mekâna bağlanmanın önemini vurgulayan bir araştırma yapmıştır. Bu araştırma, mekâna bağlanmanın bireylerin kimlik gelişimi, güvenlik ve aidiyet duygusu üzerinde önemli bir etki yaratabileceğini göstermektedir.

Araştırmanın başka bir bulgusu, medeni duruma göre varoluşsal kaygıya ait yalıtılmışlık kaygısı alt boyut düzeyleri arasında anlamlı farklılıkların olduğunu ortaya koymuştur. Bu bağlamda, bekar katılımcıların yalıtılmışlık kaygısı alt boyut düzeylerinin evli katılımcılarınkine kıyasla anlamlı derecede daha yüksek olduğu belirlenmiştir. Bu sonuçlar, medeni durumun varoluşsal kaygı üzerinde etkili bir faktör olabileceğini göstermektedir. Alkhalifah ve diğerlerinin (2024) yapmış olduğu bir çalışma, varoluşsal kaygının bireylerin algıları, davranışları, refah duygusu, akademik performansı ve kararları üzerinde derin bir etki yaratabileceğini belirtmektedir. Bu çalışma, evlilikle ilişkili sorumluluk ve karmaşıklıkların, özellikle iş yerinde veya toplumda yapay zekanın potansiyel bozulmaları bağlamında, varoluşsal kaygı duygusunu artırabileceğini vurgulamaktadır. Bu, bekar bireylerin evli bireylere göre daha yüksek yalıtılmışlık kaygısı düzeyleri yaşamasının potansiyel bir açıklaması olabilir. Diğer bir çalışma olan Abdekhodaie'nin (2021) araştırması, bireylerin evlilik tatmininde Bilişsel Davranışçı Terapi ve Varoluşçu Terapi arasındaki etkinlik, istikrar ve değişim mekanizmalarını karşılaştırmaktadır. Bu çalışma, terapilerin evlilik tatmini üzerindeki etkilerinin zamanla istikrarlı olduğunu ve her iki yaklaşımın da evlilik tatmininde önemli iyileşmeler sağladığını göstermektedir. Bu bulgular, evlilik durumunun bireylerin varoluşsal kaygı düzeylerini etkileyebileceğini ve bu kaygıların yönetilmesinde psikoterapinin potansiyel bir rol oynayabileceğini düşündürmektedir.

Araştırma kapsamında, çocuk sahibi olma durumuna göre varoluşsal kaygı düzeyleri ile yalıtılmışlık kaygısı alt boyut düzeylerinde anlamlı farklar tespit edilmiştir. Bu doğrultuda, çocuğu olmayan katılımcıların yalıtılmışlık kaygısı düzeyleri ile varoluşsal kaygı genel düzeyleri, çocuğu olan katılımcılarınkine kıyasla anlamlı derecede daha yüksek bulunmuştur. Bu sonuçlar, çocuk sahibi olmanın bireylerin varoluşsal kaygılarını azaltabileceğini düşündürmektedir. Shumaker (2017) tarafından yapılan bir çalışmada, çocuk sahibi olmanın bireylerin varoluşsal kaygılarıyla başa çıkma yeteneklerini artırabilecek bir koruyucu faktör olabileceğini öne sürmektedir. De Boni (2023) ise çocuklarda varoluşsal kaygı ile başa çıkma yollarını tartışan bir makalede, çocukların büyük sorular sorma eğiliminde olduğunu ve bu tür soruların yetişkinler tarafından nasıl ele alınması gerektiğini belirtmiştir. Bu çalışma, çocuk sahibi olmanın bireylerin varoluşsal kaygılarına karşı daha dirençli olmalarını sağlayabileceğini ve bu kaygıların çocuklarla olan ilişkiler yoluyla yönetilebileceğini vurgulamaktadır. Sonuç olarak, araştırmanızın bulguları, çocuk sahibi olmanın bireylerin varoluşsal kaygı düzeylerini etkileyebileceğini ve özellikle çocuğu olmayan bireylerin yalıtılmışlık kaygısı alt boyutlarında daha yüksek düzeylerde kaygı yaşayabileceğini; çocuk sahibi olmanın bireylerin psikolojik sağlığı üzerinde olumlu bir etkiye sahip olabileceğini göstermektedir.

Araştırma bulgusunda, deprem öncesi gelir durumuna göre varoluşsal kaygıya ait yalıtılmışlık kaygısı alt boyut düzeylerinde etkin bir ayrım olduğu bulgulanmıştır. Buna göre, deprem öncesi geliri düşük olan katılımcıların yalıtılmışlık kaygısı düzeyleri, deprem öncesi geliri orta düzeyde olan ve yüksek düzeyde olan katılımcıların yalıtılmışlık kaygısı düzeylerinden anlamlı düzeyde daha yüksek bulunmuştur. Bu sonuçlar, ekonomik faktörlerin varoluşsal kaygı üzerinde önemli bir etkiye sahip olabileceğini düşündürmektedir. Güler ve diğerlerinin (2024) yaptığı bir çalışma, deprem sonrası bireylerin gelecek kaygısı ve doomscrolling (kötü haber arayışı) düzeylerinin yüksek olduğunu göstermiştir. Bu çalışma, özellikle düşük gelirli bireylerin, deprem sonrası psikolojik stres ve kaygı düzeylerinin arttığını ve bu durumun onların bilgi arayış davranışlarını tetiklediğini belirtmektedir. Kartol ve diğerlerinin (2023) araştırması ise deprem sonrası bireylerin psikolojik sıkıntı düzeylerinin ve karanlık gelecek algılarının gelir düzeyine bağlı olarak değişkenlik gösterdiğini ortaya koymuştur. Bu çalışma, düşük gelirli bireyleri, deprem sonrasında daha fazla psikolojik sıkıntı yaşadığını ve geleceğe dair daha karanlık bir görüşe sahip olduklarını göstermiştir. Sonuç olarak, araştırma bulguları, deprem öncesi gelir düzeyinin bireylerin yalıtılmışlık kaygısı düzeyleri üzerinde etkili olabileceğini desteklemektedir. Bu sonuçlar, ekonomik güvencesizliğin bireylerin varoluşsal kaygılarını artırabileceğini ve bu kaygıların yönetilmesinde sosyoekonomik destek mekanizmalarının potansiyel bir rol oynayabileceğini göstermektedir.

Araştırma kapsamında, deprem sonrası evden taşınmak zorunda kalma durumuna göre travma düzeyi belirlemeye ait duyuşsal alt birimleri arasında etkin bir ayrım olduğu tespit edilmiştir. Buna göre, deprem sonrası evden taşınmak zorunda kalan katılımcıların Duyuşsal puanları, deprem sonrası evden taşınmak zorunda kalmayan katılımcıların Duyuşsal düzeylerinden anlamlı düzeyde yüksek bulunmuştur. Araştırmalar, insanların kendileri için değerli olan ve güvenli bir sığınak olarak gördükleri evlerinin yıkılmasının beklenmedik ve kontrol edilemeyen bir biçimde gerçekleşmesinin, ölüm tehlikesi barındırmasının ve bu tür stres verici olayların süresinin artmasının travma oluşum riskini yükselttiğini göstermektedir. Bu sonuçlar, Baştuğ ve Arslantaş (2021), Chan ve diğerleri (2011), Morishima ve diğerleri (2020), Shiba ve diğerleri (2019), Zhou ve diğerlerinin (2019) yaptığı çalışmalar tarafından desteklenmektedir.

Araştırmada, deprem sonrası şehirden taşınmak zorunda kalma durumuna göre travma düzeyi belirlemeye ait davranış problemleri alt boyut nitelikleri açısından anlamlı düzeyde bir ayrım olduğu tespit edilmiştir. Buna göre, deprem sonrası şehirden taşınmak zorunda kalan katılımcıların davranış problemleri düzeyleri, deprem sonrası şehirden taşınmak zorunda kalmayan katılımcıların davranış problemleri düzeylerinden anlamlı düzeyde yüksek bulunmuştur. Bu sonuçlar, deprem gibi travmatik bir olayın ardından yaşanan taşınma sürecinin, bireylerin

psikolojik sağlığı üzerinde ek bir stres faktörü olarak işlev görebileceğine işaret etmektedir. Bu nedenle, deprem sonrası müdahale ve destek programlarında, taşınma sürecinin getirdiği zorlukların ve psikolojik etkilerin dikkate alınması gerekmektedir. Alan yazında yapılan araştırmalar bu araştırma bulgusunu desteklemektedir (Karabacak-Çelik, 2023; Tanhan ve Kayri, 2013).

Araştırmanın bir diğer bulgusunda, deprem sonrası şehirden taşınmak zorunda kalma durumuna göre varoluşsal kaygı düzeyleri ve anlamsızlık kaygısı, ölüm kaygısı, yalıtılmışlık kaygısı ve özgürlük kaygısı alt boyut düzeyleri arasında anlamlı düzeyde fark olmadığı tespit edilmiştir. Bu sonuç, deprem sonrası taşınmanın bireylerin varoluşsal kaygılarını anlamlı derecede etkilemediğini göstermektedir. Ancak, bu bulgu, deprem sonrası taşınmanın psikolojik etkilerinin bireyden bireye değişebileceğini ve varoluşsal kaygı düzeylerinin bireysel farklılıklarla ilişkili olabileceğini de göstermektedir. Literatürde yapılan çalışma bu araştırma bulgusunu desteklemektedir (Canlı ve Yılmaz, 2024).

Araştırmanın önemli bir bulgusu, travma düzeyini belirleme genel düzeyleri ile davranış problemleri, heyecansal sınırlık, duyuşsal, bilişsel yapılandırma ve uyku problemleri alt boyut düzeyleri ile varoluşsal kaygı genel düzeyleri ve ölüm kaygısı, yalıtılmışlık kaygısı ve özgürlük kaygısı alt boyut düzeyleri arasında olumlu ve anlamlı bir korelasyon olduğunu ortaya koymuştur. Buna göre, katılımcıların ölüm kaygısı, yalıtılmışlık kaygısı ve özgürlük kaygısı alt boyut düzeyleri ile varoluşsal kaygı genel düzeyleri arttıkça, travma düzeyini belirleme genel düzeyleri ile davranış problemleri, heyecansal sınırlık, duyuşsal, bilişsel yapılandırma ve uyku problemleri alt boyut düzeylerinin anlamlı şekilde arttığı gözlenmiştir. Bu sonuçlar, Tanhan ve Kayri (2013) ile Karabacak-Çelik (2023) gibi önceki çalışmaların bulgularını desteklemekte ve travma sonrası müdahale ve destek programlarının geliştirilmesinde bireylerin varoluşsal kaygılarını ve psikolojik sağlıklarını göz önünde bulundurmanın önemini vurgulamaktadır.

KAYNAKÇA

Abdekhodaie, Z. (2021). Cognitive-Behavioral and Existential Therapies for Marital Satisfaction in Women: A Comparative Investigation of the Efficacy, Stability and Mechanisms of Changes. *Journal of Contemporary Psychotherapy, 51,* 173–179.

Alkhalifah, J. M., Bedaiwi, A. M., Shaikh, N., Seddiq, W., & Meo, S. A. (2024). Existential anxiety about artificial intelligence (AI): Is it the end of humanity era or a new chapter in the human revolution? *Frontiers in Psychiatry, 15.*

AFAD, (2023). 6 Şubat 2023 Kahramanmaraş- Pazarcık depremi raporu. Deprem Dairesi Başkanlığı.

Aker, T. (2006). 1999 Marmara depremi: Epidemiyolojik bulgular ve toplum ruh sağlığı uygulamaları üzerine bir gözden geçirme. Türk Psikiyatri Dergisi, 17 (3), 204-212.

Andrews, M. (2016). The existential crisis. *Behavioral Development Bulletin, 21*(1), 104–109.

Baştuğ, Ö. F. & Arslantaş, H. (2021). Lise öğrencisi ergenlerde travma sonrası stres belirtileri ve ilişkili faktörler. *Psikiyatride Güncel Yaklaşımlar, 13*(1), 110-121.

Baştuğ, Ö. F. (2018). Güneydoğu Anadolu'da lise öğrencisi ergenlerde travma sonrası stres belirtileri ve ilişkili faktörler. (Yüksek Lisans Tezi). *Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü.*

Bilgiç, S. (2011). Travma sonrası stres bozukluğu ve akut stres bozukluğu ile uyum bozukluğunun klinik açıdan karşılaştırılması. Yayınlanmamış yüksek lisans tezi, Osmangazi Üniversitesi, Eskişehir.

Budak, S. (2003). Psikoloji Sözlüğü. Ankara: Bilim ve Sanat.

Canlı, D., & Yılmaz, F. (2024). Deprem sonrasında bireylerin deprem kaygısı, ölüm kaygısı ve psikolojik sağlamlık düzeylerinin değerlendirilmesi. *Bozok Tıp Dergisi, 14*(1), 9-17.

Chan, C. L. W., Wang, C. W., Qu, Z., Lu, B. Q., Ran, M. S., Ho, A. H. Y., ... & Zhang, X. (2011). Posttraumatic stress disorder symptoms among adult survivors of the 2008 Sichuan earthquake in China. *Journal of traumatic stress, 24*(3), 295.

Eren, İ. ve Akoğlu, B. (2024). Deprem yaşayan bireylerde travma sonrası stres bozukluğu ile yaşam anlamı arasındaki ilişkide umut duygusunun aracı rolü. Sağlık ve Yaşam Bilimleri Dergisi.
Farhane-Medina, N. Z., Luque, B., Tabernero, C., & Castillo-Mayén, R. (2022). Factors associated with gender and sex differences in anxiety prevalence and comorbidity: A systematic review. *Science Progress, 105*(4), 1–30.
Fried, I. (2000) The Advantage of an Implicit Correction at Bifurcation. Journal of Sound and Vibration, 235, 153-155.
Göregenli, M. , Karakuş, P., Kösten, E. Yeşim Ö. ve Umuroğlu, İ (2014). Mahalleye Bağlılık Düzeyinin Kent Kimliği ile İlişkisi İçinde İncelenmesi" *Türk Psikoloji Dergisi*.
Güler, A., Gül, S., & Yıldırım, M. (2024). Social comparison, resilience, life satisfaction, depression, and anxiety among earthquake survivors in Turkey. *International Journal of Disaster Risk Reduction, 105,* 104426.
Ilovan, O. R., & Markuszewska, I. (2022). Introduction: Place Attachment – Theory and Practice. In *Preserving and Constructing Place Attachment in Europe* (pp. 1–29).
İşmen, A. E. (2006). Depremin psikolojik etkileri: Daha az zarar görmek mümkün mü? *Fırat Üniversitesi Sosyal Bilimler Üniversitesi*, 16(1), 349-362.
Jack, G. (2010). Place Matters: The Significance of Place Attachments for Children's Well-Being. *The British Journal of Social Work, 40*(3), 755–771.
Jalali-Azar, R., Ebrahimi, M. I., Haddadi, A., & Yazdi-Ravandi, S. (2023). The impact of acceptance and commitment therapy on college students' suicidal ideations, a tendency to self-harm, and existential anxiety. *Current Psychology, 1-10*.
Karabacak Çelik, A. (2023). Deprem Sonrası Travma Belirtileri, Umut ve İyi Oluş Arasındaki İlişkinin İncelenmesi. *TRT Akademi, 8*(18), 574-5911.
Kartol, A., Üztemur, S., & Yaşar, P. (2023). 'I cannot see ahead': psychological distress, doomscrolling and dark future among adult survivors following Mw 7.7. and 7.6 earthquakes in Türkiye. *BMC Public Health, 23,* Article number: 2513.
Küçük, B. (2023). Üniversite öğrencilerinde varoluşsal kaygı ve sosyal medya bağımlılı arasındaki ilişkide gelişmeleri kaçırma korkusunun aracı rolü. *Yüksek Lisans Tezi.*
Lehner, M., Skorzewska, A., & Wislowska-Stanek, A. (2021). "Sex-Related Predisposition to Post-Traumatic Stress Disorder Development-The Role of Neuropeptides". *International Journal of Environmental Research and Public Health, 19*(1).
Low S. M. & Altman I. (1992). Place Attachment.
Morishima, R., Usami, S., Ando, S., Kiyono, T., Morita, M., Fujikawa, S., ... & Kasai, K. (2020). Living in temporary housing and later psychological distress after the Great East Japan Earthquake of 2011: A cross-lagged panel model. *SSM Population Health, 11*(100629), 1-8.
Muldoon, O. T., Acharya, K., Jay, S., Adhikari, K., Pettigrew, J., & Lowe, R. D. (2017).
Olff, M. (2017). Sex and Gender Differences in Post-Traumatic Stress Disorder: An Update. *European Journal of Psychotraumatology, 8*(sup4).

Özsalman, E. ve Yıldırım, U.T. (2024). 6 Şubat 2023 depremlerinin dış tücaret üzerindeki etkileri: 11 il örneği. *Akademik Yaklaşımlar Dergisi*, 15 (1).
Özçetin, A., Maraş, A., Ataoğlu, A. ve İçmeli, C. (2008). Deprem sonucu gelişen travma sonrası stres bozukluğu ile kişilik bozuklukları arasındaki ilişki. *Düzce Tıp Fakültesi Dergisi*, 2, 8-18.
Peterson, C., & Park, N. (2003). Positive Psychology as the Evenhanded Positive Psychologist Views It. Psychological Inquiry, 14, 141-147.
Rumelili, B. (2021). Our age of anxiety: existentialism and the current state of international relations. *Journal of International Relations and Development, 24*, 1020–1036.
Rybojad, B., Aftyka, A., Baran, M., & Rzonca, P. (2016). Risk Factors for Posttraumatic Stress Disorder in Polish Paramedics: A Pilot Study. *The Journal of Emergency Medicine, 50*(2), 270-276.

Sabuncuoğlu, O., Çevikaslan, A. ve Berkem, M. (2003). Deprem sonucu gelişen travma sonrası stres bozukluğu ile kişilik bozuklukları arasında ilişki. *Klinik Psikiyatri*, 6, 189-197.
Scannell, L. & Gifford, R. (2010). Defining Place Attachment: A Tripartite Organizing Framework, *Journal of Environmental Psychology*, 30, 2010, p. 1– 10a.
Shiba, K., Hikichi, H., Aida, J., Kondo, K., & Kawachi, I. (2019). Long-term associations between disaster experiences and cardiometabolic risk: a natural experiment from the 2011 Great East Japan Earthquake and Tsunami. *American Journal of Epidemiology, 188*(6), 1109-1119.
Şahin, E., & Cerit, C. (2019). Ambulans Çalışanlarında Travma Sonrası Stres ve Depresyon Belirtilerinin İncelenmesi: Mersin İlçeleri Örneği. *Kocaeli Üniversitesi Sağlık Bilimleri Dergisi, 5*(3), 156-159.
Shumaker, D. (2017). A Developmental Model of Existential Anxiety During Adolescence. In *Existential-Integrative Approaches to Treating Adolescents*.
Tanberken, O. (2004). Geçici Deprem Konutlarında Barınma ve Mekan Bağlılığı, Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.
Tanhan, F., & Kayri, M. (2013). Deprem Sonrası Travma Düzeyini Belirleme Ölçeğiningeçerlik ve güvenirlik çalışması. *Kuram ve Uygulamada Eğitim Bilimleri, 13*(2), 1013-1025.
Tekin, A., Karadağ, H., Süleymanoğlu, M., Tekin, M., Kayran, Y., Alpak, G., & Şar, V. (2016). prevalence and gender differences in symptomatology of posttraumatic stress disorder and depression among Iraqi yazidis displaced into Turkey. *European Journal of Psychotraumatology, 7*
TDK (Türk Dil Kurumu) (2015). Genel Açıklamalı Sözlük. Ankara: TDK Yayınları.
Tomaszek, K., & Muchacka-Cymerman, A. (2022). Student Burnout and PTSD Symptoms: The Role of Existential Anxiety and Academic Fears on Students during the COVID 19 Pandemic. *Depression Research and Treatment.*
Ujang, N. (2012). "Place Attachment and Continuity of Urban Place Identity" Procedia – Social and Behavioral Sciences, p. 156 – 167.
Yalom, I. (2018). *Varoluşçu Psikoterapi*. 1. Baskı. (Z. Babayiğit Çev.), Pegasus Yayınları.
Yenice Kanık, E. (2018). Mekana bağlanma düzeyinin mekan kimliği ve diğer gruplarla ilişkiler üzerindeki etkisinin incelenmesi, *Yüksek Lisans Tezi*.
Yıkılmaz, M. (2016). Üniversite öğrencilerinde varoluşsal kaygı: erken dönem uyum bozucu şemalar, kontrol odağı ve travma sonrası gelişimin yordayıcılığı. Doktora tezi.
Yıkılmaz, M. (2016). Kontrol odağı ve travma sonrası gelişimin yordayıcılığı. *Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü.*
Zhou, X., Wu, X., & Zhen, R. (2017). Self-esteem and hope mediate the relations between social support and post-traumatic stress disorder and growth in adolescents following the Ya'an earthquake. *Anxiety, Stress, & Coping, 31*(1), 32-45.

THE INTERPLAY BETWEEN COVID-19 AND IABETES: IMPLICATIONS FOR HEALTH OUTCOMES

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The COVID-19 pandemic has highlighted the intricate relationship between viral infections and metabolic disorders, particularly diabetes. Diabetes, both type 1 and type 2, has emerged as a significant risk factor for severe COVID-19 outcomes, including increased morbidity, prolonged hospitalization, and higher mortality rates. The bidirectional nature of this relationship is evident, as COVID-19 can exacerbate pre-existing diabetes, and in some cases, trigger new-onset diabetes. Individuals with diabetes are more susceptible to severe COVID-19 due to underlying chronic inflammation, immune system dysregulation, and endothelial dysfunction associated with hyperglycemia. These conditions heighten the risk of complications such as acute respiratory distress syndrome (ARDS), multi-organ failure, and sepsis. Additionally, people with poorly controlled blood glucose levels are more likely to experience severe infections, compounding their risk.

COVID-19 may also act as a precipitating factor for diabetes onset. Emerging evidence suggests that the virus directly affects pancreatic beta cells, leading to impaired insulin production and hyperglycemia. This phenomenon has been observed in patients who had no prior history of diabetes, raising concerns about the long-term metabolic impacts of SARS-CoV-2 infection. Furthermore, the use of corticosteroids in treating severe COVID-19 can induce hyperglycemia and worsen pre-existing diabetes.

The interplay between COVID-19 and diabetes necessitates careful management of blood glucose levels in both outpatient and hospital settings. Individuals with diabetes should be prioritized for vaccination, and those with COVID-19 require close monitoring and tailored therapeutic approaches to reduce the risk of complications.

In conclusion, the COVID-19 pandemic has underscored the importance of diabetes as a critical comorbidity influencing health outcomes. Further research into the mechanisms underlying the relationship between COVID-19 and diabetes is essential to improve clinical management and mitigate long-term consequences for affected individuals.

Keywords: COVID-19, Diabetes, Hyperglycemia. Severe outcomes, Immune dysregulation

SAĞLIK PERSONELİNE YÖNELİK ŞİDDETİN MESLEKİ MOTİVASYONA ETKİSİ

THE EFFECT OF VIOLENCE AGAINST HEALTH PERSONNEL ON OCCUPATIONAL MOTIVATION

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Özet

Problemin Tanımı: Kasıtlı zarar verme amacı ile hasta, hasta yakını veya başka bir kişiden gelen ölüm, yaralanma veya ruhsal yıkımla sonuçlanabilen sağlık personeline yönelik şiddet girişimleri her geçen gün niceliksel bir artış göstermektedir.

Amaç: Bu çalışmada amaç sağlık personeline yönelik şiddet kavramının ele alınması ve bu durumun mesleki motivasyon üzerindeki etkisinin tartışılması ile sağlık personeline yönelik şiddetin önlenmesi için yapılacak çalışmalara katkı sunulması amaçlanmıştır.

Teorik Çerçeve: Sözlü, fiziksel, cinsel taciz/şiddet ve zorbalık/mobbing olarak uygulanan şiddettin nedenleri prosedürlere uyumsuzluk, memnuniyetsizlik ve iletişim olarak belirtilmektedir. Çoğunluğu poliklinikler ve acil servislerde gözlemlenen şiddet başta doktorlar ve hemşireler olmak üzere yardımcı sağlık personelini de kapsayabilmektedir. Güvenli sağlık ortamının oluşması için personellerin eğitimi ve yöneticilerin üzerine düşen görevi yerine getirmesi ve yasal düzenlemeler gerekmektedir.

Beyaz kod uygulaması sağlık hizmetlerinin sunumu sırasında sağlık personellerinin talebi üzerine kendilerine karşı işlenen ceza hukuku kapsamındaki suçların dava ve kovuşturmalarında T.C. Sağlık Bakanlığı ve bağlı kuruluşları tarafından sunulan bir adli yardım programıdır.

Motivasyon teşvik edilme veya güdülenme anlamı taşımaktadır. Temelde davranışı oluşturma, davranışa yön verme ve sürdürmede rol alan içsel ve dışsal sebeplere bağlı bir işleyiş mekanizmasıdır. Sağlıkta kaliteli hizmet sunumu motivasyonu yüksek çalışanlar tarafından karşılanabilmektedir.

Yapılan çalışmalara göre;

- Herhangi bir iş arkadaşının ölüm haberinin alınması
- Şiddete karşı şiddet eğilimi gelişmesi ile personelin hasta ve hasta yakınlarına bakışının değişmesi
- İş yerinin güvensiz ortam olarak algılanmasından kaynaklı kaygı duyulması
- İş verimliliğin düşmesi
- Haklarını arama başvurusunda bulunan sağlık çalışanlarının çoğunluğunda iki tarafında ceza almaması üzerine adalete olan güvenlerinin sarsılması
- Şiddet ile ilişkili kriz durumunun etkin yönetilememesi
- Mesleki doyumun etkilenmesi
- Tekrar şiddete maruz kalma endişesinin mesleki bağlılığı düşürmesi ve işten ayrılma düşüncesinin güdülenmesi

Şiddetin sağlık personelinin mesleki motivasyonu üzerindeki olumsuz etkileri olarak sayılabilmektedir.
Sonuç: Şiddet her boyutu ile yıkıcı bir tabloya sahiptir. Sağlık sisteminde şiddet hem çalışan güvenliğini hem de hasta güvenliğini zedelemektedir. Gerekli tedbirler alınmadığı takdirde çalışanların halkın gözündeki itibarı düşecek ve değersizleşecektir. Bu durum motivasyon kaybı ile başlayan meslekten ayrılmaya kadar varan sağlıkta iş gücü kaybına yol açan bir sürece dönüşecektir.
Anahtar Kelimeler: Mesleki Motivasyon, Sağlık Çalışanı, Şiddet.

Abstract
Statement of the Problem: Attempts of violence against health personnel, which may result in death, injury or psychological destruction from the patient, patient's relatives or another person with the intent to cause intentional harm, are increasing quantitatively every day.
Objective: The aim of this study was to discuss the concept of violence against healthcare personnel and to contribute to the studies to be carried out to prevent violence against healthcare personnel by discussing the effect of this situation on professional motivation.
Theoretical Framework: The causes of violence, which are verbal, physical, sexual harassment/violence and bullying/mobbing, are stated as non-compliance with procedures, dissatisfaction and communication. Violence, which is mostly observed in outpatient clinics and emergency departments, may also involve auxiliary health personnel, especially doctors and nurses. In order to create a safe health environment, training of personnel, fulfilment of the duty of managers and legal regulations are required.
Code White is a legal aid programme offered by the Republic of Turkey Ministry of Health and its affiliated organisations in cases and prosecutions of crimes under criminal law committed against healthcare personnel upon their request during the provision of healthcare services.
Motivation means being encouraged or motivated. It is basically a functioning mechanism depending on internal and external reasons that take part in creating, directing and maintaining behaviour. Quality service delivery in health can be met by highly motivated employees.
According to the studies;
- Receiving the news of the death of a colleague
- Changes in the perspective of the staff towards patients and their relatives with the development of a tendency towards violence against violence
- Anxiety due to the perception of the workplace as an unsafe environment
- Decrease in work efficiency
- In the majority of health workers who applied to seek their rights, their trust in justice was shaken due to the lack of punishment on both sides.
- Failure to effectively manage the crisis situation related to violence
- Affecting professional satisfaction
- Concern about being subjected to violence again decreases professional commitment and motivates thoughts of leaving the job
It can be counted as the negative effects of violence on the professional motivation of health personnel.
Conclusion: Violence has a devastating picture in every dimension. Violence in the health system damages both employee safety and patient safety. If necessary measures are not taken, the reputation of the employees in the eyes of the public will decrease and be devalued. This situation will turn into a process that starts with loss of motivation and leads to loss of labour force in health, up to leaving the profession.
Keywords: Occupational Motivation, Health Worker, Violence.

SANATTA DERRIDA ETKİSİ

DERRİDA'S INFLUENCE ON ART

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ÖZET
Bu araştırmada, Türkiye'de sanat ile ilgili enstitülerde yapılmış ve aynı zamanda uygulama içeren, yapısöküm üzerine beş adet yüksek lisans tezi belirlenmiştir. Çalışma, benzer bir noktada ele alındığı düşünülen "Post Yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları", "Resim Sanatında Derrida Etkisi: Yapısöküm", "Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük", "Çağdaş Sanat Pratiklerinde Yaratıcı Bir Tavır Olarak Yapıbozum" ve "Resim Sanatında Yaratıcı Bir Tavır olarak Yapıbozum" adlı lisansüstü tezlerin incelenip konu bağlamında benzer ve farklı yönlerini araştırmayı amaçlamaktadır. Bu çalışmanın amaçlarından bir diğeri de felsefi bir yaklaşım olan yapısöküm/yapıbozum kavramının sanat alanında hem de uygulama içeren bir tezde ne şekilde ele alındığını ortaya koymaktır. Böylelikle uygulama yapılan bir alanda felsefi bir yaklaşım içeren tez iskeletinin nasıl oluşturulması gerektiğine dair bir çıkarım yapılmaya çalışılmıştır. Araştırmanın yöntemi olarak literatür tarama yöntemi kullanılmıştır. Araştırmada ele alınan beş tez çalışmasının ortak yönleri olarak gözlemlenen şey; düşünür Jacques Derrida tarafından oluşturulan yapısöküm yönteminin sanat alanında kendisine nasıl yer edindiğinin incelenmiş olmasıdır. Bu bağlamda yapısökümün resim sanatındaki etkisinin önemi vurgulanmıştır. Ele alınan beş tezde yapılan araştırma ve inceleme doğrultusunda sanat alanında gelinen noktada felsefi kuramların sadece metin çözümlemede değil resim okuma yöntemlerine de dahil olduğu ve plastik sanatlar alanında bir çözümleme yöntemi olarak kullanıldığı sonucuna varılmıştır. Bu doğrultuda yapısöküm yönteminin sanat alanında yazılan literatüre giren lisansüstü tezler için başvurulan bir okuma yöntemi olarak kullanıldığı kabul edilebilir. Bundan sonraki çalışmalar için bu veriler göz önüne alınabilir.

Anahtar Kelimeler: Yapısöküm, Derrida, Sanat, Çağdaş Sanat.

ABSTRACT
In this research, five master's theses on deconstruction that were conducted in art-related institutes in Turkey and also include practical applications have been identified. The study aims to examine the similarities and differences between the graduate theses titled "Reflections of Poststructuralist Thought in Contemporary Painting Art," "The Derrida Effect in Painting Art: Deconstruction," "A Deconstructive Reading from a Plastic Perspective: Dada and Surrealism," "Deconstruction as a Creative Attitude in Contemporary Art Practices," and "Deconstruction as a Creative Attitude in Painting Art," which are considered to address similar themes. Another objective of this study is to reveal how the concept of deconstruction, as a philosophical approach, is addressed in the field of art, particularly in theses that include practical applications. Thus, an inference was tried to made to make an inference about how a thesis skeleton containing a philosophical approach should be

created in a field of application. The research method employed is a literature review. A common point observed in the five theses discussed is their examination of how the deconstructive method, developed by philosopher Jacques Derrida, has found its place in the field of art. In this context, the importance of deconstruction's impact on painting art is emphasized. Based on the research and analysis conducted in the five theses, it has been concluded that philosophical theories are not only used in textual analysis but are also included in painting interpretation methods and serve as a tool for analysis in the field of plastic arts. Accordingly, it can be accepted that the deconstructive method is employed as a reading approach in graduate theses that contribute to the literature in the field of art. These findings can be considered for future studies.
Keywords: Deconstruction, Derrida, Art, Contemporary Art.

GİRİŞ

Resim sanatı alanında yapılan tezler genellikle uygulamaya yönelik olduğu için, kimi zaman teorik kısmın mı yoksa uygulama kısmının mı önemseneceği konusunda kafa karışıklığı yaratabilmektedir. Türkiye'de bulunan güzel sanatlar üniversitelerinin bağlı olduğu enstitülerinin tez kuralları incelendiği zaman farklılıklar gözlemlenmektedir. Bazı enstitülerde tez çalışması bağlamında uygulama çalışması yapma zorunluluğu bulunmamaktadır. Bu seçim tamamen tez araştırmacısına bırakılmıştır fakat bazı üniversitelerde ise tez bağlamında uygulama çalışması yapmak esas kılınmıştır. Örnek verecek olursak; Mimar Sinan Güzel Sanatlar Üniversitesinde bir lisansüstü tezi yerine, sanat eseri raporu/eser metni istenmektedir. Anadolu Üniversitesi Güzel Sanatlar Fakültesi ve Dokuz Eylül Güzel Sanatlar Fakültesinde ise uygulamaya dayalı metin yazma zorunluluğu yoktur. Fakat Akdeniz, Selçuk gibi üniversitelerin enstitülerinde ise lisansüstü tezin uygulamaya dayalı metin olma zorunluluğu vardır ve tez savunmasından önce tez çalışmasıyla bağlantılı olarak yapılan işlerin bir sergiye dönüştürülüp savunmadan önce serginin ve uygulamaların değerlendirilmesi yapılmaktadır.

Bu çalışma yazarın kendi tez araştırmasının konusu ve başlığı olan "Postyapısalcılık Bağlamında Güncel Sanatta İmge ve Dil" ile ilgili olarak, yine felsefe alanını kapsadığı için, Plastik sanatlar alanına uzak ve ayrı bir bilim alanı olarak değil, resim sanatının anlaşılmasına ve resim sanatında yayınlanacak araştırmaların üretilmesine katkı sağlayacak bir yapı olarak ele alınmaya çalışılmaktadır. Aynı zamanda yazar kendi tez araştırmasında bir uygulama çalışması bölümüne yer vereceği için bu tezlerin incelenmesi bu araştırmayı önemli kılmıştır.

Disiplinlerarası çalışmaların çözümlenmesinde 21. yüzyılda artık daha çağdaş yaklaşımlar devreye girmektedir. Özellikle 1960'lardan başlayarak güç kazanan yeni düşünce akımları (yapısalcılık, yapısökümcülük vb.) sanat yapıtına yepyeni anlam ve yorum boyutu katmıştır (Kahraman, 2005).

Türkiye'deki enstitülerde, bu kapsamda, bu araştırmada da bu konu hakkında hem uygulama yapılmış hem de teorik araştırmayı içeren beş adet yayımlanmış yüksek lisans tezi tespit edilmiştir. Bunlar: Çanakkale Onsekiz Mart Üniversitesi Sosyal Bilimler Enstitüsü "Post Yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları" (Merve Çalışkan), Samsun Ondokuz Mayıs Üniversitesi Güzel Sanatlar Enstitüsü "Resim Sanatında Derrida Etkisi: Yapısöküm" (Kübra Yıldız), Antalya Akdeniz Üniversitesi Güzel Sanatlar Enstitüsü "Çağdaş Sanat Pratiklerinde Yaratıcı Bir Tavır Olarak Yapıbozum" (Sena Güven), Kastamonu Üniversitesi Sosyal Bilimler Enstitüsü "Resim Sanatında Yaratıcı Bir Tavır olarak Yapıbozum" (Semih Aytekin) ve Bursa Uludağ Üniversitesi Sosyal Bilimler Enstitüsü "Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük" (Pınar Kaya) adlı tezlerdir.

Bu araştırmada bu tezlerde konunun nasıl ele alındığı araştırılmaya çalışılmıştır. Bu üç tezin de en belirgin ortak yönü Jacques Derrida isimli düşünür tarafından ortaya atılmış olan "dekonstrüksiyon" kavramıdır. Yani türkçesi yapısöküm, yapıbozum ve bazı kaynaklarda yapıçözüm olarak çevrilebilen kavramdır. Yukarıda belirtilen bu tez çalışmalarında yapısöküm kavramının tarihi üzerinden nasıl ortaya çıktığına, kökenine dair araştırma yapılmış ve modernizmden, o dönemki sanat anlayışından yapısalcılıktan başlayıp postmodernizm ve sanat,

postyapısalcılık ve derrida kavramları ile devam edip tabi en önemlisi ise o dönemde ortaya çıkan eserler üzerinde nasıl bir yapısökümcü tavır olduğu bolca aktarılmaya çalışılmıştır. Tarihi bir kronolojik sıralamayla tezlerin iskeleti oluşturulmuş en son ise uygulama çalışmaları bölümü ile sonlandırılmıştır.

Bu kavram daha çok metin çözümlemesi için ortaya çıkmış bir kavram olsa da 1980'li yıllarda görsel sanatlara da uygulanmıştır (Glendınnıng, 2014). Yapısökümcülük bir sistemi sökme, parçalara ayırma değil ama bir sistemin zaten kendi kendine çözüldüğünü göstermedir. Egemen olan yeni bir doğru ortaya koymak değil, zaten var olan yapılar üzerinde eleştirel, çoğu zaman da kurulu düşünme yöntemlerini zorlayıcı bir biçimde ele alarak farklı alternatifleri gözler önüne sermektir (Keser, 2009). Bu tez çalışmalarında yapılan uygulama çalışmalarının da burada belirtildiği gibi yapısöküm kavramının hem sanat tarihi boyunca üretilen eserler hem de yazarların uygulama çalışmalarındaki çok katmanlı anlamları üzerinde durulmuştur.

YÖNTEM

Araştırmanın yöntemi olarak literatür tarama yöntemi kullanılmıştır. Yukarıda belirtilen tezler konuyu ele alış biçimlerine göre incelenmiştir. Tez araştırmalarının öncelikle başlıklarına bakılmış, özetleri ve içerik kısmı incelenmiştir. Sonrasında benzer konuyu ele alan bu beş tezin birbirleriyle olan benzerlik ve farklılıkları ortaya konmaya çalışılmıştır. Bulgular bölümünde bu benzerlik ve farklar belirtilmiştir. Sonuç olarak ise; hem felsefi bir konuyu ele alan teorik kısım hem de uygulama kısmı olan resim sanatı alanında yapılmış tezlerin nasıl oluşturulduğuna dair bir çıkarım yapılmıştır. Sonuç kısmında bundan sonraki çalışmalar için önerilerde bulunulmuştur.

ARAŞTIRMALAR VE BULGULAR

Araştırma kapsamında ele alınan "Post yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları", "Resim Sanatında Derrida Etkisi: Yapısöküm", Çağdaş Sanat Pratiklerinde Yaratıcı Bir Tavır Olarak Yapıbozum", "Resim Sanatında Yaratıcı Bir Tavır olarak Yapıbozum" ve "Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük" adlı yüksek lisans tezlerinin özet kısımları incelendiği zaman Kaya'nın "Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük" tezinin başlığından da anlaşılacağı üzere sınırlılığı ve konuyu ele alma biçiminden dolayı diğer dört tezden daha farklı bir yönde sorgulama içine girdiği gözlemlenmiştir.

Çalışkan ve Yıldız'ın tezleri incelendiği zaman bu iki tezin içerik bakımından, araştırmanın amacının ve konuyu ele alış biçimi açısından benzerlikler olduğu saptanmıştır. Her iki tezde de nitel araştırma yöntemi benimsenmiş, kaynak taramasına gidildiği görülmüştür. "Post yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları" adlı tez de yöntem olarak betimsel araştırma yöntemlerinden biri olan tarihsel araştırma yöntemi kullanıldığı belirtilmiştir. Her iki tezin de uygulama çalışmaları olan son bölümünde Derrida'nın "yapısöküm" yöntemiyle eserler okunmuştur. "Resim Sanatında Derrida Etkisi: Yapısöküm" adlı tez de konunun kavranması için belli sanatçılar seçilmiş ve önemli olduğu düşünülen sekiz sanatçı ile sınırlandırılmıştır. Ayrıca Çalışkan'ın ve Yıldız'ın tez araştırmaları konu bağlamında 1960 ve yetmiş sonrasının batı ve Türk sanatı ve sanatçılarına değinilerek sınırlandırılmıştır. Bu iki tezin içeriği, içindekiler ve tezin iskeleti analiz edildiğinde ise yine benzer bir sıralamayla gittiği gözlemlenmiş, konuyu kavrama açısından önce 1960 ve modernizm kavramına yer verilmiş sonrasında yetmişler ele alınıp postmodernizm kavramı açıklanmaya çalışılmış devamında plastik sanatlarda "dekonstrüksiyon" yani yapısöküm kavramının resim sanatına, çağdaş sanata yansımaları incelenmiş ve belirtildiği gibi son bölüm olan uygulama çalışmalarında bu kavramın resimler üzerinden analiz edildiği nasıl çok yönlü bir okuma yapılabileceği anlatılmıştır. Tabi konunun içeriği bakımından her iki tezde modernizm dönemi anlatılırken yapısalcılık kavramına, postmodernizm anlatılırken de postyapısalcılık kavramına dikkat çekmiş ve içerikte bu iki kavrama da yer verilmiştir. Aynı zamanda bu dönem de ortaya çıkan dilbilim çalışmalarının öncüsü olan bir düşünür Ferdinand de Saussure'e de yer verilmiştir. Yazı ve dilin kullanımı bu dönem de ortaya çıktığı için bu kavramlara düşünürler çerçevesinde değinilmiştir. Aynı zamanda Derrida'nın dekonstrüksiyon

kavramı Saussure'ün dilbilim çalışmalarına farklı ve tezat bir yaklaşımla ortaya çıktığı için araştırmacılar tarafından karşılaştırma yapılmıştır. Yine belirtilen her iki tezde de Derrida'nın başka bir kavramı olan "difference" kavramına da alt başlık olarak değinilmiştir. "Post yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları" adlı tezde modernizm ve postmodernizmin tarihi ve yapısöküm kavramı anlatıldıktan sonra son bölüm olan uygulama çalışmaları adlı beşinci bölümden önce "Çağdaş Türk resminde Postyapısalcı Yaklaşımlar" başlığı adı altında bir bölüm daha eklenerek Türkiye'den on dört tane önemli sanatçı seçilmiş ve işleri incelenmiştir. Yıldız'ın tez çalışmasında ise "Resim sanatında yapısöküm" başlıklı üçüncü bölümde konu doğrultusunda seçilmiş sekiz sanatçı ve işleri ile sınırlandırma yapılmış ve iki tane Türk sanatçıya yer verilmiştir. Çalışkan'ın çalışmasında olduğu gibi ayrıca Çağdaş Türk Resim Sanatında yapısöküm şeklinde ekstra bir bölüme yer vermediği ve daha genel bir anlatıma başvurduğu tespit edilmiştir. Bu bağlamda görüldüğü üzere bir bölüm eklenmesi farkı dışında konunun ele alınışı açısından "Post yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları" ve "Resim Sanatında Derrida Etkisi: Yapısöküm" adlı tezler konu, içerik, biçim, amaç, kapsam ve yöntem olarak benzerlikler göstermektedir.

"Resim Sanatında Yaratıcı Bir Tavır olarak Yapıbozum" ve "Çağdaş Sanat Pratiklerinde Yaratıcı Bir Tavır Olarak Yapıbozum" adlı tez çalışmaları incelendiği zaman ise ilk olarak görüldüğü üzere tez başlıklarının benzerliği büyük oranda dikkat çekmektedir. Tezlerin içerik kısmına gelindiği zaman ise seçilen konu doğrultusunda tez araştırmasının nasıl ilerlemesi gerektiği açısından da benzerlikler tespit edilmiştir. Aytekin ve Güven'in araştırma doğrultusunda yaptığı hem tarihi kronolojik sıralamalarındaki gidişat hem de içindekiler kısmında oluşturulan başlık ve alt başlıklar incelendiği zaman büyük ölçüde benzerlikler mevcuttur. İki araştırmacı da tez çalışmalarının iskeletini beş bölüm şeklinde oluşturmuştur. En son bölüm olan beşinci bölümde araştırmacılar konu kapsamında yapılan uygulama çalışmaları bölümüne yer vermiştir. Güven dördüncü bölümde yapıbozum kavramı çerçevesinde dört sanatçı ile araştırmasını sınırlandırmıştır. Bunların ikisi yabancı ikisi Türk sanatçılardır. Aytekin ise Güvenle benzer ilerlediği düşünülen dördüncü bölümde resim sanatında yapıbozum kavramına çağdaş Türk sanatçıları ve eserlerine değinmeyerek sadece dokuz yabancı sanatçıyı seçerek araştırmasını sınırlandırdığı görülür.

"Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük" başlıklı tez incelendiği zaman ise diğer tezlerden arklı olarak postmodern döneme atfedilen yapıbozum/yapısöküm kavramının böyle bir sınırlandırılmaya tabi tutulması bir sorun olarak değerlendirilmiş ve modern sanat akımları olan dada ve gerçeküstücülük ile ele alınıp, sınırlandırılıp bu kavramın okunmasını modern dönemde üretilen işler üzerinde de yapılabileceği tartışmaya açık hale getirilmiştir. Aynı zamanda yukarda bahsedilen tezlerin içerik kısmından farklı olarak tez iskeleti birinci bölümden itibaren yapısöküm kavramına odaklanmış bu kavramın kökenini çağdaş felsefeci Derrida'nın dekonstrüksiyondan başka mevcudiyet metafiziği eleştirisi, söz merkezcilik ve aporia kavramlarına da değinmiştir. İkinci bölümde ise dada ve gerçeküstücülük sanat akımlarına ve o dönem sanatçılarının işlerinin yapısöküm kavramıyla olan ilişkisine değinilmiştir. Üçüncü bölümde ise; temel kavramlar ve teknikler başlığı altında yapısökümle bağlantısı olduğu düşünülen kavramlardan bahsedilmektedir. Bu kavramlar; Serbest Çağrışım (Serbest Bağdaştırma), Oneirizm (Düşçülük) Ruhsal Otomatizm, Hazır Nesne (Ready Made), Deformasyon olarak karşımıza çıkmaktadır. Aynı zamanda yazar bu kavramların resimlerde nasıl uygulandığını göstermek için kendi uygulama yapmış tez içeriğinde bu uygulamaların yapım aşmasında çekilen dijital fotoğraflarına yer vermiştir. Bu kavramların açıklanması dadaist ve sürrealist düşüncede olabilecek yapısökümün anlaşılırlığı açısından önemli bulunmuş bu bağlamda incelenmesi gerekli görülmüştür. Bunlar tezin üçüncü bölümünde yer alan temel kavramlar başlığı altında aynı zamanda teknikler başlığı altında alt başlık olarak da incelenen bir bölüm yer almaktadır. Bu teknikler; Frotaj, Reklaj (Grataj), Kolaj, Damlama, Exquisite Corpse, Kaligram, Fümaj, Fotoğrafik Hile ve Dekalkomani'dir. Aynı zamanda yazar bu tekniklerin resimlerde nasıl

uygulandığını göstermek için kendi uygulama yapmış tez içeriğinde bu uygulamaların yapım aşamasında çekilen dijital fotoğraflarına yer vermiştir. Bu bağlamda görüldüğü üzere diğer tezlerin içerik kısmında olduğu gibi tarihi bir kronolojik sırayla modernizm, postmodernizm, yapısalcılık ve postyapısalcılık gibi kavramlara değinilmemiş içerik kısmında farklılar saptanmıştır. Araştırmanın öneminin bu yön de literatüre katkı sağlayacağı vurgulanmıştır.

20. ve 21. yüzyıl sanatında malzeme meselesinde devrimsel bir yenilik yaparak sanat malzemesini bir kenara bırakıp gündelik hayatımızdaki sıradan nesnelerin sanat bağlamına sokulması yani nesneyi kendisi olmaktan çıkartarak başka bir hale getirebilmesidir. Felsefede buna yapısöküm denmektedir. Çağdaş felsefeci Jacques Derrida'nın çok fazla kullandığı ve üzerinde durduğu yöntemlerden bir tanesidir. Bir şeyin kendisi olmaktan çıkması ve onda saklı olan diğer olanakların kullanılmasına yapısöküm orijinal adıyla "dekonstrüksiyon" denmektedir. Çağdaş Sanatta da özellikle kavramsal sanatçıların bütün işlerinde yapısöküm görülmektedir.

Maurizio Cattelan gibi sanatçılar işleri aracılığıyla her zaman bunu bir şekilde gerçekleştirmektedirler. Yapısöküm yaparak o nesneyi kendisi olmaktan çıkartırlar ve ona başka anlamlar atfederler. Aslında o sanatçının atfetmiş olduğu anlam değildir sadece orada yaratılan bir anlam vardır. Cattelan' ın Comedian adlı işindeki "muz" muz olmaktan çıkıp başka bir şeyin imgesi haline gelmektedir. Biraz daha felsefi bir şekilde düşünmeye başlarsak klasik resimde de buna benzer bir şey vardır çünkü bir resimde boyada boya olmaktan çıkarak imge haline gelmektedir ve o malzemenin ötesine geçer başka bir şeye işaret eder ve orada bir imge dünyası kurulur.

Kavramsal sanatçılardan Joseph Kosuth'un yazmış olduğu metin "Felsefeden Sonra Sanat" adlı metinde çağdaş felsefeden sonra sanat eski sanat değil demek istenmektedir. Çağdaş sanat eşittir felsefe de denilebilir. Artık felsefe yani fikirler sanat deneyiminin ve sanatta biçimin önüne geçmektedir. O yüzden 1950'lerden sonraki sanata felsefeden sonraki sanat yani felsefe denilmektedir.

İncelenen 5 adet tez çalışmasında da yazarlar sanat uygulamaları yapmışlardır. Bu uygulamalardan örneklere bakıldığı zaman da birbiri arasında benzerlikler ve farklılıklar saptanabilir. Örneğin bütün yazarlar yaptıkları çalışmalarda çoğunlukla figüratif bir anlayış kullanmışlar, hatta hepsinde portre çalışmaları görülmektedir. Aynı zamanda Yapısöküm kavramının parçalı yapısından dolayı, biçimde parçalamalara gidildiği görülebilir.

"Resim Sanatında Derrida Etkisi: Yapısöküm" adlı tez çalışmasının yazarı Kübra Yıldız da yaptığı uygulamalarda hem portre hem de parçalı formlar kullanarak, bu eylemi yapısöküme uğratmıştır. "Portre II" adlı çalışmasında devinime benzeyen bir yaklaşımı da bulunmaktadır. Merve Çalışka'nın uygulama çalışması örneğinde ise mekân da resme dahil edilerek çok parçalı çoklu anlam katmanlarıyla yapısöküme uğratılmıştır. Resimde bozulmalar ve parçalanmalar ortaya çıkmaktadır. Yıldız çalışmasında daha gerçekçi bir üslupla portre çalışmasını resmetmiştir. Yapısöküm kavramının parçalanma yönteminin kullanıldığı iki çalışmada da görülmektedir.





Görsel 1: Kübra Yıldız, Portre II, TÜY.B, 35x50, 2018 **Görsel 2:** Merve Çalışkan, T.Ü.K.T, 70x70cm, 2013

Yukarıda uygulama çalışmalarından örnekler yer alan Sena Güven ve Semih Aytekin'in tezlerinin arasında teorik kısımda benzerlikler bulunduğu belirtilmiştir. Yine aynı doğrultuda yaptıkları sanat uygulamalarının da benzer yönleri olduğu kabul edilebilir. Sena Güven'in ve Semih Aytekin'in portre çalışmaları yaptığı görülür. Benzer şekilde, Güven ve Aytekin çalışmalarında Yıldız ve Çalışkan'ın resimlerindeki gibi çoklu bir kompozisyon yerine, tek figürlü bir anlayış tercih etmişlerdir. Aynı şekilde iki yazarın da resimlerinde soyutlamaya gitmeleri ve renkleri yalınlaştırdıkları gözlemlenebilir. Aşağıda yazarların yaptıkları uygulamalardan örnek olarak alınan her iki çalışmada da yapısöküm yönteminin imgeleri bozup yeniden inşa etme yaklaşımı olduğu görülmektedir. Stilize edilmiş portrelerde yapısökümle birlikte belirsizlik hali ve değişen anlam döngüsü olduğu kabul edilebilir.





Görsel 3: Sena Güven, Söylenmeyen İmgeler 8, 25 x 40 cm, 2021 **Görsel 4:** Semih Aytekin, "Otoportre", TÜAB, 35x35 cm, 2019

Konu bağlamında yukarıda ele alınan diğer dört tezden ayrışıp en farklı olduğu düşünülen Dada ve Gerçeküstücülük akımlarıyla sınırlandırılan teorik kısımda da paylaşılan Pınar Kaya'nın tez kapsamında yaptığı uygulama çalışmalarında deneysel yöntemler izlediği görülmüştür. Kaya'nın sanat uygulamalarını yaparken yapılan tez araştırma ve inceleme doğrultusunda tek bir yöntem, teknik ve malzeme uygulamadığı pek çok farklı yöntem ve kavram denediği görülmüştür. "Aporialar" adlı çalışmasında görüldüğü üzere hem Derrida'nın aporia kavramından yola çıkmış, bu kavrama atıfta bulunmuş hem de üst üste getirilen katmanlarla anlam ve görünüm çoğullaştırılarak yapısöküme uğratılmıştır. Aynı zamanda Güven ve Aytekin'in çalışma örneklerinde olduğu gibi soyutlama eğilimi ve sonsuz anlam taşıması dürtüsüyle oluşturulduğu kabul edilebilir. Modern dönemde üretilen teknik ve düşünceleri postmodern anlayışla harmanlayarak uygulamış ve 21. yüzyıl sanatına farklı bakış açıları kazandırmayı amaçlamıştır.



Görsel 5: Pınar Kaya, "Aporialar", K.T., 35x50 cm, 2022

TARTIŞMA VE SONUÇ

Resim sanatında yapılmış bir tezin sadece resim sanatını içeren konulardan ziyade felsefe, sosyoloji, antropoloji, ekonomik olaylar, siyasi gelişmeler ya da bu alanların içerisinden başlıklarla (modernizm, yapısalcılık, dilbilim, postyapısalcılık, postmodernizm, differance, dekonstrüksiyon (yapısöküm/yapıbozum), göstergebilim vb.) ilgili disiplinler arası yaklaşımlarla ele alınmasının sanat alanını da zenginleştirdiği kabul edilebilir. Uygulama çalışmaların teorik kısmı, teorik kısmın da uygulama kısmını güçlendirdiği görülebilir. Ele alınan beş adet yüksek lisans tezinde yapılan araştırma ve inceleme doğrultusunda sanat alanında gelinen noktada felsefi kuramların sadece metin çözümlemede değil resim okuma yöntemlerine de dahil olduğu ve plastik sanatlar alanında bir çözümleme yöntemi olarak kullanıldığı sonucuna varılmıştır.

Bu çalışma hem felsefe alanı hem resim sanatı alanında yapılmış tezleri içerdiğinden, disiplinlerarası bir konunun ne şekilde ele alınabileceğiyle ilgili veriler sunar. Yapısöküm/yapıbozum hakkında resim uygulaması yapmanın, Derrida'nın oluşturduğu bu kendi içerisinde bile karmaşık ve çözümlenemeyen kavramları, iki boyutlu gerçekliğe ve somut bir yüzeye aktarma çalışmalarının araştırılması, kavramların ne yönde ele alınabileceği ile ilgili bir anlam sunabilir. İncelenen tezlerden yola çıkarak belirtilebilir ki bu araştırmanın birinci yazarının kendi tez araştırması için ve bundan sonraki çalışmalar için de bulgular kısmında yapılmış tespitler katkı sağlayacaktır.

Bu araştırma kapsamında ele alınan yüksek lisans tezlerinin son bölümünde yer alan uygulama çalışmaları ayrıntılı bir şekilde incelendiğinde yapısöküm yöntemi üzerinden işlerin yorumlanmaya, okumaya ve çözümlenmeye çalışıldığı görülür. Çalışkan, Yıldız, Güven, Aytekin ve Kaya'nın uygulama çalışmalarından verilen örneklerde görüldüğü üzere yapısöküm/yapıbozum ile birlikte imgeleri bozup, yıkıp yeniden inşa etme yaklaşımı tüm çalışmalara katkı sağlamıştır. Farklı malzeme ve tekniklerle yapılan çalışmalar belirsiz, parçalı ve çoklu anlam katmanları oluşturarak izleyici de her defasında başka bir anlam penceresi açtığı vurgulanmış ve postmodern anlayışla harmanlanarak uygulanmıştır. Bütün çalışmalarda görülen yapısöküm/yapıbozum yönteminin en belirleyici ortak özelliği bu yaklaşımlar üzerinden inşa edilmesidir. Anlam sürekli ertelenir ve resimdeki göstergeler sınırsız anlamlara yol açar.

Bu çalışma sadece yurtiçindeki bir araştırmayı kapsamaktadır. Bundan sonraki çalışmalar için, yurtdışı çalışmaların da ele alınması bir öneri olarak sunulabilir.

KAYNAKLAR

Aytekin, S. (2020). *Resim Sanatında Yaratıcı Bir Tavır olarak Yapıbozum*. Kastamonu: Kastamonu Üniversitesi Sosyal Bilimler Enstitüsü.

Çalışkan, M. (2013). *Post-Yapısalcı Düşüncenin Çağdaş Resim Sanatına Yansımaları*. Çanakkale: Onsekiz Mart Üniversitesi Sosyal Bilimler Enstitüsü.

Glendınnıng, S. (2014). *Derrıda*. Ankara: Dost Kitabevi

Güven, S. (2022). *Çağdaş Sanat Pratiklerinde Yaratıcı Bir Tavır Olarak Yapıbozum*. Antalya: Akdeniz Üniversitesi Güzel Sanatlar Enstitüsü.

Kahraman, H. B. (2005). *Sanatsal Gerçeklikler, Olgular ve Öteleri*. İstanbul: Agora Kitaplığı.

Kaya, P. (2022). *Plastik Açıdan Yapısökümcü Bir Okuma: Dada ve Gerçeküstücülük*. Bursa: Uludağ Üniversitesi Sosyal Bilimler Enstitüsü.

Keser, N. (2009). *Sanat Sözlüğü.* Ankara: Ütopya Yayınevi.

Yıldız, K. (2019). *Resim Sanatında Derrida Etkisi: Yapısöküm.* Samsun: Ondokuz Mayıs Üniversitesi Güzel Sanatlar Enstitüsü.

IMPROVE THE THERMAL CONDUCTIVITY OF ADOBE USING NATURAL SAWDUST

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ABSTRACT
The production of traditional building materials demands substantial amounts of energy and non-renewable resources, leading to considerable environmental impacts. Consequently, incorporating agricultural waste into the production of fired bricks has emerged as a promising and sustainable alternative, gaining increasing attention from the scientific community. This approach not only provides a novel method for valorizing agricultural by-products but also contributes to reducing the waste generated by the sector. This study investigates the effect of adding sawdust on the thermo-mechanical properties of clay bricks. Specimens were prepared by blending clay with sawdust in varying proportions (0, 5, 10, and 15% by weight). The mechanical and thermal properties of the samples were assessed, revealing a decrease in both compressive strength and thermal conductivity as the sawdust content increased. The primary goal of this research is to lower construction costs while mitigating the environmental impact of brick production. To achieve this, the influence of wood sawdust (WS) on brick manufacturing is crucial. In this work, seven different clay-sawdust mixtures, with 0, 4, 8, and 12% by weight of sawdust, were used to create fired bricks at 900°C. The results indicated that increasing sawdust content significantly raised the apparent porosity of the bricks, while compressive strength and thermal conductivity diminished accordingly. The addition of 5-10% sawdust was particularly effective in forming pores in the bricks without compromising acceptable

Keywords
Wood sawyer, clay, thermal conductivity, Adobe, characterization ,environmental.

STATISTICAL DESIGN AND OPTIMIZATION OF NANO-TRANSFERSOMES BASED CHITOSAN GEL FOR TRANSDERMAL DELIVERY OF CEFEPIME

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ABSTRACT

Objectives:
This research aimed to overcome challenges posed by cefepime excessive elimination rate and poor patient compliance by developing transdermal delivery system using nano-transfersomes based chitosan gel.

Methods:
Rotary evaporation-sonication method and the Box-Behnken model were used to prepare cefepime loaded nano-transfersomes (cPe-NtFs). the physiochemical characterization of cPe-NtFs were analyzed including Dls, deformability index, Dsc and antimicrobial study. Optimized cPe-NtFs loaded into chitosan gel and appropriately characterized. In vitro release, ex vivo and in vivo studies were performed.

Results:
The cPe-NtFs were physically stable with particle size 222.6 ± 1.8 nm, polydispersity index 0.163 ± 0.02, zeta potential −20.8 ± 0.1 mv, entrapment efficiency 81.4 ± 1.1% and deformability index 71 ± 0.2. Dsc analysis confirmed successful drug loading and thermal stability. FtiR analysis showed no chemical interaction among the excipients of cPe-NtFs gel. the antibacterial activity demonstrated a remarkable reduction in the minimum inhibitory concentration of cefepime when incorporated into nano-transfersomes. cPe-NtFs based chitosan gel (cPe-NtFs gel) showed significant physicochemical properties. In vitro release studies exhibited sustained release behavior over 24 h, and ex vivo studies indicated enhanced permeation and retention compared to conventional cefepime gel. In vivo skin irritation studies confirmed cPe-NtFs gel was nonirritating and biocompatible for transdermal delivery.

Conclusion:
This research showed nano-transfersomes based chitosan gel is a promising approach for cefepime transdermal delivery and provides sustained release of cefepime.

Key words: Cefepime, Transdermal delivery, Nano-transfersomes, Box-Behnken, Chitosan.

ALMANYA'NIN ENERJİ DÖNÜŞÜMÜNDE RÜZGÂR GÜCÜNÜN SWOT ANALİZİ İLE DEĞERLENDİRİLMESİ

ASSESSMENT OF WIND POWER IN GERMANY'S ENERGY TRANSFORMATION WITH SWOT ANALYSIS

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ÖZET
Bu çalışmanın amacı, enerji dönüşüm sürecinde örnek ülke olan Almanya'nın önemli bir stratejik hedefini oluşturan rüzgâr enerjisindeki gelişmelerin SWOT analizi kapsamında değerlendirilmesidir. Buna bağlı olarak çevre dostu teknolojiler, düşük karbon emisyonları, devre dışı bırakılan nükleer santraller, rüzgâr türbinleri için coğrafi konum (Kuzey Denizi ve Baltık denizi kıyıları), yeniden güçlendirme, enerji pazarındaki rekabet gücü, fiyat belirsizliği riskinin düşüklüğü, enerji arz güvenliği, istihdam, ekonomik büyüme ve sürdürülebilir kalkınma hedefleri, güçlü yönler olarak karşımıza çıkmaktadır. Bununla birlikte insanlar ve canlı yaşamı üzerindeki etkiler, rüzgâr türbinlerinin genişlemesi için sınırlı mekân, güney bölgelerin genellikle güneş enerjisi üretimi için uygunluğu, şebeke altyapısı, enerji üretiminin rüzgârın hızına bağlı olarak kesikli yapısı ve mevsimsel dalgalanmalar, zayıf yönler olarak analiz edilmektedir. İklim değişikliği, finansal yatırımlar, siyasi irade ve teşvikler, depolama sektöründeki teknolojik ilerlemeler, fosil yakıtlara bağımlılığın azaltılması ise fırsatlar olarak değerlendirilmektedir. Sıkı çevre politikaları, projelere karşı yerel toplulukların protestoları, uzun ve karmaşık bürokratik prosedürler, rüzgâr türbinlerinin gerekli asgari mesafelerine ilişkin kısıtlayıcı düzenlemeler, hammadde gereksinimleri ve tedarik darboğazları, dönüşüm sürecinin enerji adaleti algıları ise tehditler kapsamında belirtilmektedir.

Anahtar kelimeler: Enerji dönüşümü, rüzgâr enerjisi, SWOT analizi, Almanya.

ABSTRACT
The aim of the study is to evaluate the developments in wind energy, which constitute an important strategic goal of Germany, which is an exemplary country in the energy transformation process, within the scope of SWOT analysis. Accordingly, environmentally friendly technologies, low carbon emissions, decommissioned nuclear power plants, geographical location for wind turbines (North Sea and Baltic Sea coasts), repowering, competitive power in the energy market, low price uncertainty risk, energy supply security, employment, economic growth and sustainable development goals are the strengths. However, the impacts on people and living beings, limited space for the expansion of wind turbines, the general suitability of southern regions for solar energy production, grid infrastructure, the intermittent nature of energy production depending on wind speed and seasonal fluctuations are analyzed as weaknesses. Climate change, financial investments, political will and incentives, technological advances in the storage sector, and reduced dependency on fossil fuels are considered as opportunities. Strict environmental policies,

protests by local communities against projects, long and complex bureaucratic procedures, restrictive regulations regarding the minimum distances required for wind turbines, raw material requirements and supply bottlenecks, and perceptions of energy justice in the transformation process are stated as threats.

Keywords: Energy transformation, wind energy, SWOT analysis, Germany.

GİRİŞ

Günümüzün en büyük önceliklerinden birisi olan küresel iklim değişikliği, ulusal ve uluslararası düzeyde kolektif eylemlerle birlikte yürütülmektedir. Son değerlendirmeler, iklim değişikliğiyle ilişkili sorunlara yol açan temel belirleyici güçler olarak enerji tüketiminin türüne ve oranına dikkat çekmektedir. İklim değişikliğiyle mücadele çabalarının önemli bir bileşeni olarak yenilenebilir enerjinin geliştirilmesi, kıyı okyanus alanındaki enerji üretim tesislerinin konumlandırılması için itici güç görevi görmektedir. Birçok kıyı ülkesi, açık deniz yenilenebilir enerji gelişimini önemli bir yol olarak görse de çabaların şekillenme hızı ve biçimi önemli ölçüde değişmektedir. İklim değişikliğinin nedenlerini uluslararası anlaşmalar aracılığıyla ele almaya yönelik bazı çok taraflı çabalar kabul görmede yetersiz kalırken, birçok ulus kendi sınırları içindeki nedenleri ele alma çabalarına ağırlık vermektedir (Portman vd., 2009).

Enerji sistemleri, karbon emisyonlarını azaltmak ve iklim değişikliğini hafifletmek için dünya çapında önemli bir dönüşüm geçirmektedir. Bu geçiş, geleneksel fosil yakıtlardan yenilenebilir enerji kaynaklarına geçişle karakterize edilmektedir (Schlemminger vd., 2024). İklim değişikliği ve doğal kaynakların tükenmesiyle mücadele etmek için bir araç olarak rüzgâr ve güneş fotovoltaikleri gibi yenilenebilir enerji kaynakları, küresel ölçekte hızla yaygınlaşmaktadır (Dehler-Holland vd., 2022). Rüzgâr enerjisi üretimi, küresel enerji talebinin büyük bir bölümünü karşılama yeteneği nedeniyle fosil yakıtlardan yenilenebilir enerjiye geçişte önemli bir rol üstlenmektedir (Grau vd., 2021). Enerji dönüşümünün amacı, ekonomik olarak uygulanabilir, çevre dostu ve istikrarlı bir enerji tedarikinin sağlanmasıdır. Sürdürülebilir bir enerji tedarikinin gerçekleştirilmesi, petrol, doğalgaz ve kömür gibi fosil yakıt tüketiminin azaltılmasına bağlıdır. Bu nedenle sürdürülebilir enerjinin üretimi, dönüşümü ve dağıtımı oldukça önemli bir konudur (BMBF, 2024).

Enerji dönüşümü, iklim değişikliğini ele alma ve sera gazı emisyonlarını azaltma ihtiyaçlarına ilişkin artan farkındalıkla birlikte ivme kazanmıştır. 2019 yılındaki ‘Avrupa Yeşil Mutabakatı’, düşük karbonlu bir ekonomiye geçişi hızlandırmak için bir çerçeve sağlamış ve bölge genelinde eylemleri harekete geçirmiştir. Rüzgâr, güneş, hidroelektrik, yeşil hidrojen ve biyometan gibi yenilenebilir gazlara yönelik odaklanma sonucunda yenilenebilir enerji altyapısına yapılan yatırımlarda önemli artışlar olmuştur. Bu ivme, iletim şebekeleri ve enerji depolamasının eylem öncelikleri aracılığıyla sonuçlara yansımıştır. Avrupa’nın enerji manzarası, jeopolitik olaylar, teknolojik gelişmeler ve değişen toplumsal önceliklerin bir kombinasyonu tarafından yönlendirilen derin bir değişim süreci yaşamaktadır. Bölgedeki enerjiyle ilgili öncelikler, enerji güvenliğine yönelik tek bir odak noktasından, güvenlik, eşitlik ve karşılanabilirliği kapsayan daha bütünsel bir yaklaşıma doğru evrilmektedir. Vatandaşların kampanyaları ve çevre grupları tarafından açılan ve geçmiş yıllarda yaygın olan davalar, yasal itirazlar için daha yüksek engeller koyan düzenleyici değişiklikler nedeniyle büyük ölçüde azalmaktadır. Bu değişim, enerji sorunlarının birbirine bağımlılığının giderek daha fazla kabul görmesini ve enerji değer zincirindeki paydaşların farklı ihtiyaç ve endişelerini ele alan kapsamlı çözümlere duyulan ihtiyacı yansıtmaktadır. 2022 yılından itibaren değişimin temel itici güçlerinden birisi, Avrupa’daki enerji piyasaları için geniş kapsamlı etkileri olan Rusya-Ukrayna savaşından kaynaklanan jeopolitik gerginliklerdir. Savaş, sınırlı sayıda enerji tedarikçisine güvenmenin risklerini, enerji kaynaklarını ve tedarik rotalarını çeşitlendirmenin önemini vurgulamaktadır. Bu nedenle politika yapıcılar ve endüstri paydaşları, artan çeşitlilik, yerel enerji üretimine yatırım ve alternatif enerji kaynaklarının geliştirilmesi

yoluyla enerji güvenliğini geliştirmeyi amaçlayan girişimlere öncelik vermektedir (WEC, 2024a; Wehrmann, 2024).

Avrupa, enerji stratejisini uygun fiyatlılık ve sürdürülebilirlikle ilgili olarak güvenliğe yeni bir odaklanma ile yeniden değerlendirmektedir. Özellikle yenilenebilir enerjide çeşitliliğe doğru hızlı hareket etme, acil enerji ihtiyaçları ile uzun vadeli çevresel hedefler arasındaki uyumlaştırmayı ortaya koymaktadır. Fiyat artışları sayesinde tüketicileri korumak için önemli devlet müdahaleleri ve elektrik piyasası reformları teşvik edilmektedir. Enerji piyasasındaki zorlukları, jeopolitik ve enerji egemenliği endişeleri arasında yenilenebilir entegrasyonu, şebeke değişkenliğini ve teknolojik bağımsızlığı dengelemek, dayanıklı, kendi kendine yetebilen ve adil enerji sistemlerine yönelmektir (WEC, 2024b; Wehrmann, 2024). Ancak, bu oldukça değişken enerji biçimini verimli bir şekilde kullanmak ve ulusal enerji karışımlarındaki payını artırmak için mekânsal-zamansal özellikler hakkında kapsamlı bilgiler gerekmektedir. Bir bölgedeki rüzgâr enerjisi potansiyelinin değerlendirilmesi farklı boyutları kapsamaktadır. Meteorolojik rüzgâr enerjisi potansiyeli, rüzgâr hızına göre bir alandaki rüzgârın enerji içeriğini niceliksel olarak belirlemektedir. Rüzgâr hızı, genellikle yüksek mekânsal-zamansal değişkenliği hesaba katan teorik rüzgâr hızı dağılımları kullanılarak modellenmektedir. Coğrafi rüzgâr enerjisi potansiyeli, coğrafi kısıtlamaları dikkate almakta ve rüzgâr türbini kurulumu için mevcut alanı değerlendirmektedir. Bu bağlamda coğrafi kısıtlamalar, rüzgâr enerjisi potansiyelinin değerlendirilmesiyle ilgili oldukça değişken bir konudur (Grau vd., 2021). Özellikle kara rüzgâr enerjisi, çeşitli kriterler üzerindeki olası olumsuz etkileri azaltmak için yeterli konumlandırma zorluğuyla karşı karşıyadır. Kara rüzgâr enerjisinin tahsisi için ilgili kriterler, üretim maliyetlerini en aza indirmekten yerel sakinler için olumsuzlukları azaltmaya, doğayı ve manzarayı korumaya kadar uzanmaktadır. Genellikle bu kriterler heterojen bir şekilde dağıldığı için kriterlerin her biri açısından üretilen optimum tahsis, seçilen kriterlere bağlı olarak farklılık göstermektedir (Dehler-Holland vd., 2022).

AB'nin 2050 yılına kadar iklim nötrlüğüne geçiş hedefinde önem taşıyan kurulu kapasite için genişleme hedefleri, sadece birkaç ülkeden kaynaklanan önemli miktarda kaynak gerektirmektedir. Malzeme çıkarma ve işleme, rüzgâr türbinlerinin zaten sığ olan ekolojik ayak izinin yaklaşık %70-80'ini oluşturmaktadır. Ömrünün sonuna gelmiş rüzgâr türbini kanatçığı malzeme akışlarının yönetimi, aciliyet gerektiren önemli bir zorluk alanıdır. Dolayısıyla dairesel ekonomiye geçiş süreci, rüzgâr enerjisi tedarik zincirlerinin çevresel performansını iyileştirmeyi ve birkaç ülkeden ham madde tedarikine olan bağımlılığı azaltmayı amaçladığı için rüzgâr enerjisi pazarlarında araştırma, politika ve endüstri yoğun ilgi görmektedir. Özellikle Danimarka ve Almanya, tarihsel olarak rüzgâr enerjisi teknolojisinin geliştirilmesinde ve rüzgâr türbinlerinin kurulumunda öncü ülkeler olmuştur (Johst vd., 2024; Kramer vd., 2024; Shammugam vd., 2019).

Avrupa'da 2023 yılında 18,3 gigawatt (GW) yeni rüzgâr gücü kapasitesi kurulmuştur. İnşa edilen bu yeni rüzgâr kapasitesinin %79'u karada yer almıştır. Yeni açık deniz kurulumlarının hacmi ise büyümektedir. Ancak 2030 yılına kadar yeni rüzgâr kurulumlarının 2/3'ünün karada olmaya devam etmesi beklenmektedir. 2024-2030 yılları arasında 260 GW yeni rüzgâr gücü kapasitesi kurulması beklenmektedir. AB'nin 2030 hedefi 425 GW'tır. Avrupa'nın kurulu rüzgâr gücü kapasitesinin aynı zaman diliminde 500 GW'ı aştığı görülmektedir. Danimarka, İrlanda ve Almanya ise sırasıyla, %56, %36 ve %31 oranları ile elektrik karışımlarında en yüksek rüzgâr payına sahip ilk üç ülke olmuştur (WindEurope, 2024).

Avrupa bağlamında özellikle Almanya, tarihsel olarak rüzgâr enerjisi teknolojilerinin geliştirilmesinde, rüzgâr türbinlerinin kurulmasında ve rüzgâr enerjisi üretim kapasitesinde öncü bir ülke olmuştur. Almanya'nın 'enerji dönüşümü (Energiewende)', yenilenebilir enerji kaynaklarına öncelik vermek ve enerji arzının sürdürülebilir bir şekilde geliştirilmesini sağlamak amacıyla Yenilenebilir Enerji Yasası'nın yürürlüğe girmesiyle birlikte önemli ölçüde ilerlemiştir. Bu süreçte sürdürülebilir enerjinin üretimi, dönüşümü ve dağıtımını sağlayan teknolojilere yoğunlaşılmış, enerji verimliliği artmış, diğer yenilenebilir enerji kaynaklarının yanı sıra rüzgâr enerjisi üretimi, enerji sisteminin devam eden geçiş sürecinin merkezine yerleşmiş, ekonomik

olarak uygulanabilir ve çevre dostu istikrarlı bir enerji tedariki sağlanmıştır. Bu nedenle çalışmanın amacı, enerji dönüşüm sürecinde örnek ülke olan Almanya'nın önemli bir stratejik hedefini oluşturan rüzgâr enerjisindeki gelişmelerin SWOT analizi bağlamında değerlendirilmesidir. Giriş bölümünün ardından devam eden başlıklarda Almanya'nın rüzgâr enerjisi görünümüne değinilmekte, alan yazın incelemesi özetlenmekte, bulgular, sonuç ve politika çıkarımlarına yer verilmektedir.

ALMANYA'NIN RÜZGÂR ENERJİSİ GÖRÜNÜMÜ

Almanya'da rüzgâr enerjisinin gelişimi, 1970'lerdeki petrol krizlerine kadar uzanmaktadır. Nükleer reaktörler, 1970'li ve 1980'li yıllarda inşa edilmiş; rüzgâr ve güneş enerjilerine destek, nükleer karşıtı hareket etrafında örgütlenmiştir. Alman Yeşil Partisi, nükleer enerjinin aşamalı olarak kaldırılması için siyasi bir program geliştirmiştir. Energiewende olarak ifade edilen bu enerji sistemi dönüşümü programında, rüzgâr ve güneş enerjileri nükleer enerjiye alternatifler arasında yer almış, yenilenebilir enerji kaynaklarına ayrılan araştırma ve geliştirme harcamaları artırılmıştır. Programla birlikte elektrik piyasaları serbestleştirilmiş, tüketiciye ait üretimin dağıtımını desteklemek için besleme tarifeleri getirilmiştir. 1980'lerin sonunda, projelerden üretilen ve ortak şebekeye beslenen rüzgâr enerjisi için ödemeleri garanti eden ilk dağıtım politikaları yürürlüğe girmiştir. Ancak 1989 yılına kadar pazar genişlemesi sınırlı kalmıştır. 1991 yılında kabul edilen ilk besleme yasası, şebeke bağlantısını ve rüzgâr türbinlerinden gelen elektrik için uygulanabilir ödemeleri garanti etmiştir. Besleme yasası, federal ve eyalet düzeyinde farklı endüstri politikalarıyla desteklenmiştir. Rüzgâr enerjisi sektörü, Danimarka rüzgâr enerjisi şirketlerini satın alarak hızla geliştirilmiştir. Eyaletlerin rüzgâr türbinleri için açık arazi tahsisi, büyük bir ulusal rüzgâr enerjisi endüstrisinin gelişimine neden olmuştur. Almanya'nın sürdürülebilir enerji dönüşümü, 2000 yılında Yenilenebilir Enerji Yasası'nın (Erneuerbare-Energien-Gesetz, EEG) yürürlüğe girmesiyle birlikte önemli ölçüde ilerlemiştir. Yasa, yenilenebilir enerji kaynaklarına öncelik verilmesini, enerji arzının sürdürülebilir bir şekilde geliştirilmesini, üretilen ve tüketilen elektriğin 2050 yılına kadar sera gazı nötr olmasını öngörmekte ve böylece 2030 yılında tüketilen elektriğin %65'inin yenilenebilir kaynaklardan sağlanmasını talep etmektedir. EEG sayesinde yenilenebilir kaynaklardan elde edilen elektrik için sabit besleme tarifeleri getirilmiş, yeni rüzgâr çiftlikleri için devlet desteği açıklanmıştır. İşletmecilere şebekeye sabit oranlarda 20 yıllık bir süre boyunca verilen elektrik için garantili ücretler sağlanmıştır. 2009 yılında 25.7 GW olan kurulu rüzgâr gücü kapasitesi, sonraki yıllarda da büyümeye devam etmiştir. 2011 yılında yaşanan Japonya'nın Fukuşima kentindeki nükleer kazadan sonra toplumun nükleer enerjiye karşı muhalefeti artmış ve Alman hükümeti nükleer enerjiyi aşamalı olarak sonlandırmaya karar vermiştir. Nükleer enerjinin aşamalı olarak kaldırılması hızlandırılmış, rüzgâr enerjisi ve fotovoltaik teknolojilerinin dağıtımı artmaya başlamıştır. Söz konusu olay enerji dönüşümü (geçişi) terimiyle ve yenilenebilir kaynaklara doğru bir rejim değişikliğiyle ilişkilendirilmektedir (Dehler-Holland vd., 2022; Kiunke vd., 2022; Ratinen ve Lund, 2015; Shammugam vd., 2019; Wehrmann, 2024).

Son 30 yıldaki gelişmeler sonucunda, rüzgâr enerjisi Almanya'daki elektrik enerjisi tedarikinin temel noktası haline gelmiştir. Diğer yenilenebilir enerji kaynaklarının yanı sıra rüzgâr enerjisi üretimi, enerji sisteminin devam eden geçiş sürecinin merkezinde yer almıştır (Luther vd., 2017). Enerji sistemini başarılı bir şekilde dönüştürme ihtiyacı son yıllarda önemli ölçüde artmış, Rusya'nın Ukrayna'yı işgalinden sonra dış güvenlik politikası gelişmeleri nedeniyle daha büyük önem kazanmıştır. Dolayısıyla Alman Energiewende sadece bir iklim koruma önlemi olarak değil, aynı zamanda enerji bağımlılığını azaltmak için bir dış politika hedefi olarak da çerçevelenmiştir. İddialı hedefler, siyasi baskıyı artırırken sosyal zorluklar da giderek daha belirgin hale gelmiştir. Güncel deneysel çalışmalar, nüfusun yaklaşık %68'inin enerji sistemi dönüşümünü ulusal bir proje olarak desteklediğini göstermektedir. Bununla birlikte, toplumun önemli bir kesimi Energiewende'nin uygulanması konusunda endişelidir. Araştırmalar, belirli toplumsal grupları

orantısız bir şekilde etkileyen fayda ve yüklerin eşitsiz bir şekilde dağıtılmasının toplumun daha geniş kesimlerini endişelendirdiğine işaret etmektedir. Yenilenebilir enerjinin yerel olarak genişlemesinden etkilenen bölge sakinleri, manzara bozulması, potansiyel sağlık riskleri ve yetersiz mali tazminat gibi ortaya çıkan yüklerin adil olmayan dağıtımını eleştirmektedir (Kerker vd., 2024).

Rüzgâr enerjisi, Almanya'nın enerji dönüşümü için özel bir öneme sahiptir. Bu durumun başlıca nedenleri, kara rüzgâr enerjisinden elektrik üretmenin nispeten düşük maliyetleri, rüzgâr türbinlerinin kısa amortisman süreleri ve birim arazi başına daha yüksek verimdir. Ülkenin 2007 yılında tamamı karada olmak üzere yaklaşık 22.250 megawatt (MW) kurulu rüzgâr enerjisi kapasitesi bulunmaktaydı. 2015 yılında ise rüzgâr enerjisinin toplam kurulu gücü 44.947 MW, rüzgâr yatırımları ise 9.7 milyar avro olmuştur. 2014 yılına göre bu rakam, 12.1 milyar avro yatırım ve 38.115 MW toplam kurulu güç ile yaklaşık %20'lik bir yatırım düşüşünü göstermektedir. Yatırımlardaki bu düşüş, temelde son yıllarda kara rüzgâr enerjisinin kurulum maliyetlerindeki sürekli düşüşten ve halk arasında rüzgâr enerjisi projelerine karşı artan dirençten kaynaklanmıştır (Langer vd., 2018; Portman vd., 2009). Yenilenebilir enerjinin maliyetleriyle ilgili endişeler artmış, kontrolsüz yenilenebilir kapasite genişlemesini sınırlamak için önlemler getirilmiştir. 2017 yılında, belirlenen destek oranlarından türbinlerini işletmek için en düşük garantili ücreti talep eden teklif sahiplerine verilecek açık artırma sistemine geçilmiştir. Genel olarak EEG, ölçek ekonomileri ve üretilen kilovatsaat başına ücretlendirme nedeniyle büyük ölçekli rüzgâr türbinlerini ve rüzgâr parklarını tercih etme eğilimindedir. 2018 yılında destek rejiminde sabit garantili ücretlendirme oranlarından gerekli desteğin açık artırmalar yoluyla belirlendiği bir sisteme geçilmiştir. 2018 yılının sonuna kadar, 6.4 GW açık deniz ve 52.6 GW kara rüzgâr enerjisi kapasitesi kurulmuştur. Ancak kara rüzgâr ihalelerine katılım azalmış ve rüzgâr türbinlerinin yeni kurulumları politik hedeflerin altına düşmüştür. Mevcut inşaat alanı yetersizliği, yatırımcı belirsizliği, kalifiye işgücü eksikliği ve yavaş lisans prosedürleri genişlemenin önündeki başlıca engeller olarak değerlendirilmiştir. Sonraki yıllarda özellikle lisanslama ve arazi kullanımıyla ilgili bir dizi düzenleyici değişikliğin ardından 2023 yılı sonunda ülke genelinde toplam 61 GW kapasiteli, yaklaşık 29.000 rüzgâr türbini faaliyet göstermiştir (Dehler-Holland vd., 2022; Wehrmann, 2024).

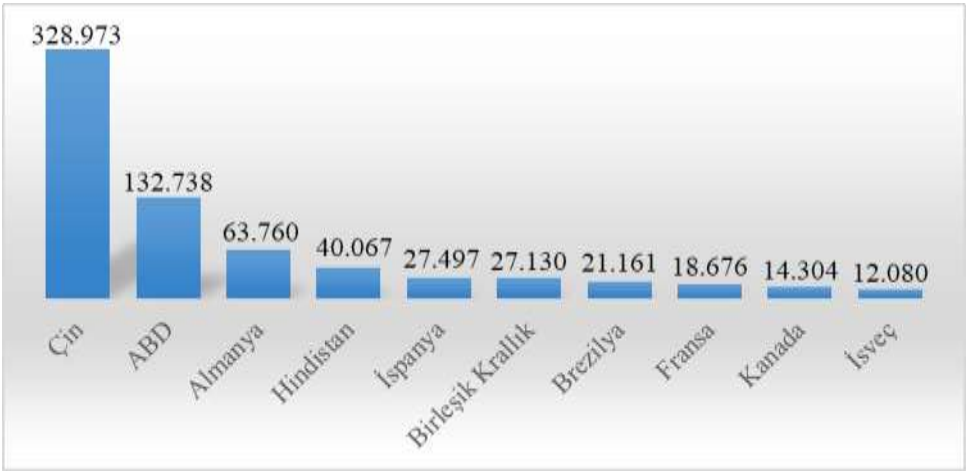
Energiewende, son on yılda ulusal söylemde önemli bir siyasi ilgi görmüştür. Ancak, Energiewende'nin uygulanması, toplumun daha geniş kesimleri arasında dönüşüm sürecinin adaleti konusunda endişelere yol açmıştır (Kerker vd. 2024). Bununla birlikte uygun fiyatlı temiz enerji çözümlerinin sıklıkla göz ardı edilen itici bir gücü ise sözleşme anlaşmalarındaki şeffaflığın olumlu etkisidir. Örneğin, bir kişinin rüzgâr çiftliği kurma girişiminde fiyatlandırma ve sözleşme şartları da dâhil olmak üzere piyasa dinamikleri şeffaf ve kamuoyuna açıktır. Bu durum sadece adil rekabeti değil aynı zamanda düzenleyicilerin, piyasa aktörlerinin ve halkın vergiler, fiyatlandırma yapıları ve diğer proje parametreleri de dâhil olmak üzere güç satın alma anlaşmalarının ayrıntılarını incelemesini de sağlamaktadır. Nükleer enerji, birkaç ülkenin temiz enerji portföyünde yer alırken, Almanya'da aşamalı olarak kullanımdan kaldırılmıştır. Ülkenin 'öncelikli kamu yararı' kavramını titizlikle uygulaması, projelerin etkili bir şekilde gerçekleştirilmesini hızlandırmıştır (WEC, 2024a).

Yenilenebilir enerjinin genişlemesi, enerji tedarikinin bölgesel düzeydeki mekânsal, teknik, ekonomik ve sosyal sonuçlarında belirgin olan merkezi yapıdan uzaklaştırılmasıyla güçlü bir şekilde ilişkilidir. Bu durum, mekânsal boyutu, elektrik sağlamadaki oynaklığı ve çoğunlukla kentsel olmayan alanlardaki ekonomik ve sosyal etkiler göz önüne alındığında rüzgâr enerjisi için özellikle geçerlidir. Farklı doğal koşullara ve federal besleme tarifelerinden gelen güçlü baskılara ek olarak rüzgâr enerjisinin mekânsal-zamansal genişleme modelini açıklamak ve çok düzeyli enerji politikalarının koordinasyonunu iyileştirmek için eyalet, ilçe ve belediye düzeyindeki politikalar ve girişimler dikkate alınmalıdır. Bu kuruluşlar, kendi yenilenebilir enerji hedeflerini belirleme ve yatırım çekme, istihdam fırsatları yaratma, dış enerji kaynaklarından nispeten

bağımsız olma ve diğer sosyal hedefleri gerçekleştirmede yenilenebilir enerjinin genişlemesini teşvik etmektedir. Ülke genelinde yenilenebilir enerjinin genişlemesi için farklı koşullar yaratan sadece yerel ve bölgesel politika yapıcılar değil aynı zamanda sivil toplum kuruluşları ve ağlarıdır. Politika tartışmaları, genellikle yenilenebilir enerji için güçlü federal düzeydeki baskıya, özellikle de EEG ve reformuna odaklanmaktadır. Alt ulusal düzeyde konuyla ilgili tartışmaların çoğu, ülkenin farklı doğal ve coğrafi koşullarının ortaya çıkardığı sorunları ele almaktadır. Bu kapsamda alt ulusal mekânsal düzeylerde yenilenebilir enerjiyi genişletmek için farklı teşvikler hakkında daha fazla bilgi edinmek önemlidir. Bununla birlikte yenilenebilir enerji hedefleri, hükümet ve eyalet düzeyleri arasında büyük ölçüde değişmektedir (Goetzke ve Rave, 2016).

Dünya çapında ülkeler, enerji tedarik faaliyetlerinden kaynaklanan karbon emisyonlarını azaltmak için düşük karbonlu enerji kaynaklarına yönelmektedir. Bu anlamda rüzgâr enerjisi, 2000'li yılların başından sonra önemli bir büyüme yaşayarak küresel elektrik üretiminde önemli bir güç olarak ortaya çıkmıştır. Önde gelen bir rüzgâr enerjisi ülkesi olan Almanya, önemli rüzgâr enerjisi üretim kapasitesine sahiptir. Yenilenebilir enerji, 2007 yılında toplam brüt elektrik tüketiminin %14.2'lik payına ulaşmıştır. Rüzgâr enerjisi, yenilenebilir kaynaklardan üretilen elektriğin en büyük payını sağlamıştır. Ülkedeki yenilenebilir enerji tüketimi, 2010 yılı için belirlenen %12.5'lik Avrupa düzeyindeki hedefi aşmıştır. Ülkede yenilenebilir enerji üretim tesislerinin kurulumu ve işletilmesinden elde edilen ciro 2007 yılında yaklaşık %10 artmış ve 2009 yılında yaklaşık 249.000 kişiye istihdam sağlanmıştır. Rüzgâr gücü, son yıllarda yenilenebilir enerji sektöründe iş yaratan en önemli sektör haline gelmiştir. Alman İstatistik Ofisi verilerine göre, 2019 yılında rüzgâr enerjisi endüstrisi 9.6 milyar avro gelir elde edilmiştir. Bu rakam, yenilenebilir enerji teknolojisindeki toplam gelirin yarısından fazlasını oluşturmuştur. Almanya Federal Çevre Ajansı'nın 2022 yılı analizine göre, 2021 yılında yenilenebilir enerji sektörüyle bağlantılı yaklaşık 344.000 işten yaklaşık 130.000'i rüzgâr enerjisi sektöründe yer almıştır. Ülkenin başarısı, büyük ölçüde rüzgâr gücü, hidroelektrik, jeotermal enerji, çöp gazı, güneş enerjisi ve biyokütle kullanımının teşviki yoluyla yenilenebilir enerji üretimi için hedefleri ortaya koyan 2004 yılı EEG kapsamında teşvik edilen politikalardan kaynaklanmıştır. COVID-19 salgını nedeniyle elektrik tüketiminin aylarca düşük seyrettiği özellikle rüzgârlı 2020 yılı, ülke tarihinde yenilenebilir enerjinin toplam elektrik üretiminde fosil yakıtları geçtiği yıl olmuştur. 2021 yılındaki Alman İklim Koruma Yasası, özellikle yenilenebilir enerji kaynaklarının genişletilmesi yoluyla ülkenin enerji tedarikini 2045 yılına kadar karbondan arındırma hedefini belirlemiştir. 2021 yılında Almanya'daki enerji sektörü, %32 oranla ulusal sera gazı emisyonlarına en büyük katkıyı sağlamıştır. 2022 yılındaki Karasal Alanda Rüzgâr Enerjisi Yasası, lisanslama prosedürlerini hızlandırmak için tüm eyaletlerde türlerin korunması amacıyla standart değerlendirme prosedürleri getirmiştir. 2022 yılında rüzgâr enerjisi, Almanya'nın toplam brüt elektrik üretiminin %21.7'sini oluşturmuştur. Yenilenebilir enerji sektöründe rüzgâr enerjisi, net elektriğin yaklaşık yarısını üretmektedir. Rüzgâr enerjisinin daha fazla yaygınlaşması, çevresel ve ekonomik nedenlerle ülke için önemli bir stratejik hedeftir (Johst vd., 2024; Kiunke vd., 2022; Portman vd., 2009; Risch vd., 2024; Wehrmann, 2024).

Küresel olarak rüzgâr enerjisi ile elektrik üretimi yapan 100'den fazla ülke bulunmaktadır. En fazla rüzgâr enerjisi kapasitesi kurulu gücüne sahip olan ülkelere bakıldığında ise Çin, ABD ve Almanya'nın uzun süredir ilk üç sırada yer aldığı görülmektedir (Enerji Atlası, 2024). 2022 yılı itibarıyla Almanya, Avrupa'daki en büyük kara rüzgâr kapasitesine ve küresel olarak üçüncü en büyük kapasiteye sahiptir (Wehrmann, 2024). Şekil 1, küresel ölçekte rüzgâr santrali kurulu gücü açısından ilk on ülkeyi göstermektedir. Bu bağlamda Avrupa özelinde Almanya'nın 63.760 MW kurulu güce sahip olduğu izlenmektedir.



Şekil 1. Rüzgâr santrali kurulu güç kapasitesi (MW)
Kaynak: Enerji Atlası, 2024.

Kara rüzgâr enerjisi, ulusal enerji sistemlerinin karbondan arındırılmasına önemli katkı sağlamasına rağmen yer kısıtlamaları büyük ölçekli rüzgâr çiftliklerinin başarılı bir şekilde konuşlandırılması için sürekli bir zorluktur. Kara rüzgâr enerjisi olgun, düşük karbonlu bir teknolojidir ve stratejik bir öneme sahiptir. Ülke, kara rüzgâr enerjisinin toplu olarak konuşlandırılmasının on yılın sonuna kadar %80-%100 yenilenebilir elektrik hedeflerine ve enerji bağımsızlığı için gelecekteki hedeflere önemli ölçüde katkıda bulunmasını beklemektedir. Kara rüzgâr enerjisine yönelik güçlü kamu desteğine rağmen projelerin başarılı bir şekilde uygulanması, yerel ölçekte toplumsal kabul sorunundan güçlü bir şekilde etkilenmektedir. Toplulukların projenin ekonomik faydalarına katılmaları için fırsatlar sağlayarak, yeni rüzgâr çiftliklerinin kurulmasını kolaylaştırmayı amaçlayan finansal katılım mekanizmalarının geliştirilmesine yönelik artan bir politika odağı bulunmaktadır. Politika mekanizmalarını bilgilendiren bağlamı ve içeriği anlamak, hızlı bir enerji geçişine daha küçük ölçekli katılımcıları dâhil etme fırsatları ve zorlukları konusunda devam eden tartışmalara katkıda bulunmaktadır. Yenilenebilir enerji ihalelerinin hızla genişlemesi, profesyonel rüzgâr geliştiricilerinin enerji dönüşümünde önemli bir rol oynayacağını ve kara rüzgâr enerjisine yapılan büyük kamu yatırımlarından faydalanacağını vurgulamaktadır. Düşük yoğunluklu, kırsal bölgelerdeki rüzgâr çiftliklerinin sürekli genişlemesi, altyapıya uzun vadeli finansal faydalar sağlayacağı beklentilerine katkıda bulunmaktadır. Ancak, rüzgâr çiftliklerinin yakınındaki yerel sakinlerin katılımının, finansal katılım ve tazminat yoluyla sosyal kabulü artırmayı amaçlayan mekanizmaların rüzgâr ihalesi programlarının temelini oluşturan serbest piyasa ilkeleriyle uzlaştırılmasının zor olduğu görülmektedir (Maitre, 2024; Shammugam vd., 2019).

Almanya'da hâlihazırda kurulu kara rüzgâr türbinlerinin %70'inden fazlası için 2025 yılına kadar besleme tarifesi finansmanı sona erecektir. 2030 yılı sonuna kadar, EEG'den alınan besleme tarifesi finansmanı, yaklaşık 22 GW'a eşit olan 16.000'den fazla kara rüzgâr türbini için bitecektir. Rüzgâr enerjisi, özellikle federal hükümetin 2038 yılına kadar kömür bazlı elektriği aşamalı olarak kaldırma kararının ışığında, 2030 yılına kadar elektrik karışımındaki yenilenebilir enerjinin payını %65'e çıkarmada önemlidir. Rüzgâr enerjisinin hedeflenen genişlemesine ek olarak Almanya, önümüzdeki yıllarda hizmet ömürlerinin sonuna gelen binlerce rüzgâr türbiniyle mücadele edecektir. Buna göre türbinlerin operatörleri, bir rüzgâr türbininin ömrünü uzatmak mı yoksa devre dışı bırakmak mı gerektiği kararıyla karşı karşıya kalacaktır. Rüzgâr enerjisinin genişlemesini ilerletmek ve verimliliğini artırmak için yeniden güçlendirme, rüzgâr enerjisi kullanımındaki yaklaşan değişikliklerle başa çıkmanın umut verici bir yolu olarak kabul edilmektedir. Son yıllarda yeniden güçlendirme, rüzgâr çiftliklerinin ortalama veriminin ve kapasite faktörünün artmasına yol açmıştır. Rüzgâr türbinlerinin modernizasyonu, yenilenebilir enerji için ulusal hedeflere ulaşmada kritik bir unsurdur. Ayrıca modern rüzgâr türbinleri, daha iyi güç kalitesi ve gelişmiş şebeke entegrasyon teknikleri sunduğundan daha iyi şebeke yönetimi

sağlamaktadır. Yeniden güçlendirmenin meteorolojik, coğrafi ve teknik açılardan avantajları, bölgeye özgü rüzgâr rejimi ve mevcut altyapı hakkında bilgi sahibi olmaktır. Mevcut rüzgâr kaynaklarını daha verimli bir şekilde kullanmak için daha az rüzgâr türbini kullanmak, enerji kullanımının sera gazı emisyonlarını ve alan gereksinimlerini en aza indirmekte, daha fazla arazi tüketimini önlemekte ve toplam güç kaynağındaki dalgalanmaları azaltmaktadır. Ancak rüzgâr türbinleri, hâlihazırda var olduğu bölgelerde kabul görse de artan sayıda rüzgâr türbini ve buna bağlı yeniden güçlendirmenin vatandaşlarla çatışmalara yol açtığı bilinmektedir (Grau vd., 2021; Stetter vd., 2022).

Alman politikacıların 2050 yılı hedefi, enerjilerini %100 yenilenebilir kaynaklardan üretmektir. Günümüze kadar kara rüzgâr enerjisi, en yüksek yenilenebilir enerji payına sahip olmuştur. Siyasi olarak kabul edilen enerji geçiş hedeflerine ulaşmak için rüzgâr enerjisi, 2030 yılına kadar üretilen elektriğin en az %26.5'ini karşılamalıdır. Bu rakam, 2030 yılına kadar karadaki rüzgârdan yıllık 150 terawattsaat/yıl elektrik verimi ve 75 GW'a kadar kurulu kapasiteye eşittir. Kara rüzgâr enerjisi, eski türbinleri veya yeni yeşil alan projelerini yeniden güçlendirerek bu hedefe katkıda bulunabilir. Ancak, konutlara ve diğer alanlara gerekli asgari mesafelerle ilgili kısıtlayıcı düzenlemeler her iki genişleme türünü de engellemektedir. Alman federal hükümetinin son mevzuatı, bir rüzgâr türbini ile en yakın konut binaları arasında asgari 1000 metre mesafe öngörmektedir. Yüksek asgari mesafe gereksinimleri gibi kısıtlayıcı düzenlemeler nedeniyle rüzgâr türbinlerinin genişlemesi keskin bir şekilde azalmıştır. Rüzgâr türbinlerindeki yıllık büyüme, ihale süreçlerinin başlatıldığı 2017 yılından bu yana önemli ölçüde düşmüştür. 2017 yılında 2.017 olan ek rüzgâr türbini, 2018 yılında 822'ye, 2019 yılında ise 272'ye düşmüştür. 2020 yılında 2017 yılına kıyasla şebekeye %75 daha az türbin bağlanmıştır. Kara rüzgârı yeşil alan projelerinde iki büyük sorun vardır. Birincisi, yeşil alan projelerinin potansiyeli, artan kurulu kapasitelerle azalmaktadır. İkincisi ise çoğunlukla yapı onaylarına karşı yasal şikayetler nedeniyle yeni projelerin tamamlanması son zamanlarda giderek gecikmektedir (Grau vd., 2021; Kiunke vd., 2022; Stetter vd., 2022). Yetersiz inşaat alanıyla birlikte düzenleyici engeller, karadaki rüzgâr enerjisinin genişlemesindeki düşüşün arkasındaki ana itici güç olmuştur. Alman Rüzgâr Enerjisi Federasyonu'nun 2023 yılı analizine göre, bir rüzgâr çiftliğinin planlanmasından lisanslanmasına kadar geçen ortalama süre dört ila beş yıldır. Eyaletlerin bireysel çabalarının yavaş genişlemenin tamamen sorumlusu olduğu ileri sürülmüştür. Bavyera'nın en az bir türbinin yüksekliğinin on katı kadar bir yerleşim yerinden minimum mesafe gerektiren 10H kuralı gibi katı eyalet düzenlemeleri, güney eyaletindeki enerji geçişinin ilerlemesini engellemiştir (Wehrmann, 2024).

Almanya, geleneksel enerji kaynaklarından yenilenebilir enerji kaynaklarına geçişte Avrupa'da lider ülkedir. Son veriler, ülkenin yenilenebilir enerji üretimi için iddialı hedeflerine ulaşmadaki başarısını vurgulamaktadır. Ülke, kara tabanlı rüzgâr enerjisi sahaları kapasiteye ulaştıkça, daha fazla üretim olanağı için deniz rüzgâr enerjisi sahalarına yönelmektedir. 2025 yılına kadar açık deniz rüzgâr enerjisinin elektrik enerjisi tüketimindeki payını %25'e çıkarmayı hedeflemektedir (Portman vd., 2009). Ancak iklim çeşitliliği ülke genelinde rüzgâr hızlarını etkilemektedir. Kıyı bölgeleri, özellikle açık deniz rüzgâr üretiminin mümkün olduğu Kuzey Denizi ve Baltık Denizi kıyıları boyunca 10 m yükseklikte ortalama 5 m/s'ye kadar daha yüksek rüzgâr hızlarından yararlanmakta ve rüzgâr enerjisi üretimini kolaylaştırmaktadır. Bununla birlikte açık deniz rüzgâr çiftliklerinin görsel etkileri, deniz ortamına verilen zarar ve önerilen projelerin ekonomik olmayan yapısı, açık deniz rüzgâr çiftliklerinin yerel olarak reddedilmesinin ana nedenleri olarak gösterilmektedir. Buna karşılık güney bölgeleri, özellikle Alp Ön Bölgesi ve Bavyera'nın bazı bölgeleri, 1200 kWh/m^2 daha fazla güneş radyasyonu aldığı için güneş enerjisi üretimi için uygundur. Belirtilen farklılıklar, ülkenin yenilenebilir enerji stratejisini etkileyerek rüzgâr ve güneş, enerji geçişinde önemli rol oynamaktadır (Licht-Eggert vd., 2008; Schlemminger vd., 2024).

ALAN YAZIN İNCELEMESİ

Almanya özelinde rüzgâr enerji geçişinin farklı yönlerine vurgu yapan güncel alan yazın incelemesi, söz konusu geçiş sürecindeki olumlu ve olumsuz yönleri açıklamaktadır.

Gee (2010) deniz manzarası algılarına ve açık deniz rüzgâr çiftçiliğine yönelik yerel tutumları şekillendirmede estetik deniz manzarası niteliklerinin rolüne odaklanmaktadır. Dithmarschen ve Kuzey Frizya bölgelerindeki yerel sakinler arasında yapılan ankete dayanan bulgular, estetik deniz manzarası algısının tek başına açık deniz rüzgâr çiftçiliğine yönelik yerel tutumları açıklayamayacağını göstermektedir. Denizin doğal bir alan olduğu yönündeki ve yerel manzaraya ilişkin derin inançlarla yerel kimliğe bağlı görüşler, tutumları belirleyen ana unsurları meydana getirmektedir.

Nolden (2013) Birleşik Krallık'taki enerji topluluğunun gelişimini, özellikle rüzgâr enerjisinin merkezi olmayan yapısı, ölçeği ve sahiplik yapısı açısından Almanya ile karşılaştırarak analiz etmektedir. Bulgularda politika önlemlerinin uygulanmasının ötesinde çeşitliliğe daha fazla bağlılığın, topluluklara ölçek ve sahiplik açısından yeni üretim uygulamaları geliştirme kapasitesi sağlamak için gerekli olduğu ileri sürülmektedir.

Ratinen ve Lund (2015) Danimarka, Almanya, Finlandiya ve İspanya'nın elektrik endüstrisindeki politika süreçlerinde ve sonuçlarında göreli kapsayıcılık derecesinin niş gelişimi üzerindeki etkisini incelemek için tipoloji geliştirmektedir. Bulgular, en kapsayıcı politikaların Danimarka ve Almanya'da olduğunu açıklamaktadır. Politika süreçlerinde ve sonuçlarında nispeten yüksek bir kapsayıcılık derecesinin niş gelişimini artırdığı görülmektedir. Ayrıca hükümetin rolünün genellikle önerilenden daha politik olduğu açıklanmaktadır.

Goetzke ve Rave (2016) 2001-2012 döneminde rüzgâr enerjisi kapasitesinin büyümesini Almanya'nın ilçeleri düzeyinde panel regresyon yöntemini kullanarak incelemektedir. Elde edilen tahminlere dayanarak, bölgesel düzeyden etkilenen faktörlerin ayrı ayrı değiştirildiği karşıt olgusal senaryolar analiz edilmektedir. Bulgular, eyaletler arasında, eyaletler içinde ve farklı ilçe tipleri arasında heterojen teşvikler olduğunu ortaya koymaktadır.

Langer vd. (2016) nitel bir yaklaşım kullanarak Bavyera'da rüzgâr enerjisinin kabulünü etkileyen faktörleri belirlemektedir. Bulgular, rüzgâr türbinleri ile yerleşim alanları arasındaki minimum mesafenin önerilen rüzgâr türbininin yüksekliğinin en az on katı olması gerektiğini belirten 10H düzenlemesinin yakın zamanda yürürlüğe girmesi gibi siyasi süreçlerin kabulü etkilediğini göstermektedir. Yasanın yeni kurulan rüzgâr enerjisi santrallerinin sayısını önemli ölçüde azalttığı belirtilmektedir. Ayrıca rüzgâr türbinlerinin dağıtım adaletinin önemi açıklanmaktadır.

Langer vd. (2018) vatandaşların rüzgâr enerjisini kabul etme ve etmeme durumlarını etkileyen faktörleri, 1400 katılımcıyla yapılan anketle değerlendirmektedir. Ana faktörler, algılanan yan etkiler, süreçle ilgili değişkenler, kişisel özellikler, teknik ve coğrafi sorunlar olmak üzere dört kategoriye ayrılmaktadır. Bulgularda, rüzgâr türbinlerinin uygulanmasını zorlaştıran bir neden olarak genellikle görsel manzara bozulması gibi yerel çevresel etkilere atıfta bulunulmaktadır. Rüzgâr türbinlerinin sayısının sürekli artmasının ve yenilenmesinin bölge sakinleriyle çatışmalara neden olduğu ifade edilmektedir. Özellikle türbinlere yakın yerlerde yaşayanların rüzgâr enerjisine karşı olumsuz duygulara sahip olduğu ve türbinlerin bir bölgede nasıl dağıtıldığına dair algılanan adaletin de kabul durumlarını etkileyebildiği belirtilmektedir. Ayrıca rüzgâr enerjisinin uygulanmasındaki en büyük zorluklardan biri olarak daha yüksek rüzgâr hızları nedeniyle türbinlerin ülkenin kuzey kesiminde daha yoğun olmasına bağlı olarak şebeke entegrasyonu ve güvenilirliği olduğu söylenmektedir.

Shammugam vd. (2019) rüzgâr enerjisi sektörünün gelişimi için gelecekteki hammadde gereksinimlerinin kapsamlı bir değerlendirmesini yapmaktadır. Bulgularda, bakır ve disprozyumun rüzgâr türbinlerinin işlevselliği için temel olduğu açıklanmakta ve belirtilen malzemeler tedarik darboğazları olasılığı nedeniyle en kritik malzemeler olarak tanımlanmaktadır. Söz konusu metallerin yenilenebilir enerji teknolojileri için ayrılan payları açıkça aştığı ve hammadde temininde diğer sektörlerden güçlü bir rekabetle karşı karşıya kaldığı belirtilmektedir.

Ayrıca geri dönüşümün darboğaz risklerini azaltabileceği, ancak tamamen ortadan kaldıramayacadığı ifade edilmektedir.

Engelhorn ve Müsgens (2021) kara rüzgâr enerjisi örneğini kullanarak yenilenebilir enerji kaynakları için tanıtım planlarının verimliliğini tartışmaktadır. İki adet minimum maliyetli kıyaslama senaryosu üretmek için bir model geliştirilerek, planların minimum maliyetli kapasite artışını teşvik edip etmediği analiz edilmekte ve 1995-2015 dönemindeki tarihsel kapasite artışıyla karşılaştırılmaktadır. Bulgulara göre iki maliyet azaltıcı kıyaslama senaryosunun maliyetleri, büyük ölçüde daha yüksek verimlilik nedeniyle tarihsel artışın maliyetlerinden önemli ölçüde daha düşüktür. Daha az türbin inşa edilmesine rağmen bunların daha iyi rüzgâr sahalarına yerleştirildiği ve böylece yıllık rüzgâr enerjisi üretiminin değişmediği belirtilmektedir. Dolayısıyla, toplam türbin arazi kullanımının da bu senaryolarda önemli ölçüde düştüğü ifade edilmektedir. Kara rüzgâr enerjisine verilen destek örneğinde teşvikler, en maliyet etkin rüzgâr türbinlerinin inşa edilip edilmeyeceği kararını belirlemektedir.

Grau vd. (2021) 2021-2040 döneminde rüzgâr türbinlerini yeniden güçlendirme potansiyelini değerlendirmektedir. Bulgular, güçlendirme potansiyelinin yeniden düzenlenen coğrafi kısıtlamalardan ve rüzgâr türbini kategorilerinden büyük ölçüde etkilendiğini göstermektedir. En yüksek potansiyel rüzgâr enerjisi üretimi, çevredeki yerleşim alanlarına 500 metrelik düşük mesafe kısıtlamaları altında elde edilmektedir. Aynı zamanda sadece yeniden güçlendirmenin gelecek 20 yılda ülkenin enerji karışımındaki rüzgâr enerjisi payını önemli ölçüde artıramayacağına işaret edilmektedir.

Dehler-Holland vd. (2022) rüzgâr enerjisinin yakın zamanda bir dizi dava ve azalan yatırım faaliyetiyle karşı karşıya kalması nedeniyle, 2009-2018 döneminde dört ulusal gazetenin makalelerini analiz ederek rüzgâr enerjisinin kabulünü değerlendirmektedir. Bulgular, farklı konuların geçici olarak gündemde öne çıktığını, rüzgâr enerjisinin kabulünün insanlar, hayvanlar ve manzaralar üzerindeki olumsuz etkileri nedeniyle giderek daha fazla sorgulandığını açıklamaktadır.

Kiunke vd. (2022) Aşağı Saksonya'nın Wattenmeer bölgesinde, doğal koruma bölgelerinin yakınında kara rüzgâr enerjisinin gelişimi için kolaylaştırıcı ve engelleyici faktörleri güçlü ve zayıf yönler, fırsatlar ve tehditler çerçevesinde gruplandırarak belirlemektedir. Bulgular, rüzgâr enerjisi genişlemesini olumlu yönde etkileyen faktörlerin engelleyici faktörleri aştığını göstermektedir. Sektörün daha fazla gelişmesini etkileyen engeller ve belirsizlikler, katı ekolojik koruma yasaları ve yeni projeler için sınırlı mekânsal fırsatlarla ilgilidir.

Knauf (2022) elektrik indiriminin, belediyeye yapılan ödemelerin ve sosyal amaçlı ödemelerin toplulukların yerel rüzgâr enerjisi projesi hakkındaki kabulünü nasıl değiştirdiğini açıklamayı amaçlamaktadır. 811 Alman vatandaşı arasında yapılan seçim tabanlı ortak analiz, finansal faydaların vatandaşların evlerinin yakın çevresinde varsayımsal bir rüzgâr enerjisi projesinin kabulünü artırdığını göstermektedir.

Sheykhha vd. (2022) alternatif yenilenebilir enerji açık artırma planlarının yenilenebilir enerjinin teşviki üzerinde etkisini ulusal, kuzey/güney ve federal eyaletler düzeyinde incelemektedir. Bulgular, ülkenin güney federal eyaletlerinde önemli ölçüde kullanılmayan kara rüzgâr potansiyelini ve güney federal eyaletlerinden daha fazla teklif sahibinin bölgesel açık artırmada kazanabileceğini göstermektedir. Bölgesel açık artırmaların önemli destek ödeme tasarruflarına yol açabileceği ve bu nedenle yenilenebilir enerji destek politikası tasarımında dikkate alınması gerektiği sonucuna ulaşılmaktadır.

Stetter vd. (2022) aynı yükseklikte daha verimli teknolojiye sahip yeniden güçlendirilemeyen, ancak iyi yerleştirilmiş alanların potansiyelinin, daha yüksek rüzgâr türbinleri aracılığıyla yeniden güçlendirme için uygun olan sahaların neredeyse iki katı olduğunu göstermektedir. Rüzgâr türbinlerinin yerleşim yerlerinden ve diğer korunan alanlardan gerekli asgari mesafelerine ilişkin kısıtlayıcı düzenlemelerin, yeniden güçlendirmeyi engelleyebildiğini belirtmektedir. Bir rüzgâr türbini ile en yakın konut binası arasında mevzuatta öngörülen asgari 1.000 metre mesafenin kara

rüzgâr enerjisinin genişlemesini yavaşlatacağı ve iklim nötrlüğe katkısını azaltacağı ifade edilmektedir.

Liñeiro ve Müsgens (2023) kara rüzgâr enerjisi açık artırma programından alınan verileri ayrı projelere ayırarak, açık artırmaların rekabetçi fiyatlarla dağıtım ve çeşitlilik hedeflerine ulaşmadaki katkısını değerlendirmekte, politikanın başarısını veya başarısızlığını etkileyen tasarım öğelerini vurgulamaktadır. Bulgular, açık artırma planının rekabetçi fiyatlarla rüzgâr dağıtımını teşvik edemediğini, çeşitlilik hedeflerini teşvik etmek için kullanılan tasarım öğelerinin amaçlanan hedeflere ulaşmada yetersiz kaldığını ve piyasadaki büyük aktörlerin sistemi önlemek için teşvikler yarattığını göstermektedir.

Tafarte ve Lehmann (2023) mekânsal uzlaşmaları nicelleştirerek, Pareto sınırları ve Gini katsayısına benzer potansiyel bir uzlaşma göstergesi kullanarak yeni bir yaklaşım önermektedir. Analiz, coğrafi bilgi sistemi verilerini kullanan mekânsal bir optimizasyon modeline dayanmaktadır. Bulgularda incelenen kriterler arasındaki mekânsal uzlaşmaların önemli olduğu görülmektedir. Uzlaşmanın boyutu, her kriterin mekânsal heterojenliğine ve kriterler arasındaki mekânsal korelasyona bağlı olarak incelenen kriterlere göre önemli ölçüde değişmektedir. Mekânsal uzlaşmalar, özellikle rüzgâr gücüne duyarlı kuşlar üzerindeki etkilerle ölçülen doğa koruma ve diğer kriterler arasında belirgindir.

Brandes vd. (2024) Alman federal eyaletlerindeki dönüşüm yolları için öncü bir sektörel optimizasyon yaklaşımı sunmaktadır. Yaklaşım, eyaletlerdeki yüksek nihai enerji talebi ile yenilenebilir enerji kaynakları potansiyeli arasındaki uyumsuzluğu gidermek için enerji dağıtımını ayarlama zorunluğunu vurgulamaktadır. Karşılaştırma, mekânsal çözünürlüğü artırmanın enerji sistemi dönüşümünün genel maliyetini önemli ölçüde etkilemediğini göstermektedir. Bulgular, 2045 yılına kadar birincil enerji arzının bol miktarda yenilenebilir kaynağa sahip eyaletlere kayacağını açıklamaktadır. Mekânsal esneklik, eyalet bağlantıları aracılığıyla elektrik talebini, güneş ve rüzgâr potansiyelini dengelemek için önemlidir.

Johst vd. (2024) devre dışı bırakılan rüzgâr türbinlerinin 2050 yılına kadar türbin kanatçığı kütlesini tahmin etmek için rüzgâr türbini kanatçığı malzemesi, bileşimi ve coğrafi dağılımını tahmin etmektedir. Bulgular, 492 kt cam elyaf takviyeli polimer rüzgâr türbini kanatçığı ve yaklaşık 12.4 kt karbon elyaf takviyeli polimer kütle payına sahip 206 kt hibrit rüzgâr türbini kanatçığı malzemesinden oluşan toplam 698 kt ömrünün sonuna gelmiş rüzgâr türbini kanatçığı malzeme kütlesinin beklendiğini göstermektedir.

Kerker vd. (2024) Aralık 2020-Mayıs 2022 dönemi arasında enerji altyapı projeleri konusunda çatışmalar yaşayan Ahrweiler, Ferdinandshof ve Spremberg kırsal bölgelerindeki vatandaşlar arasındaki enerji adaleti algılarını ve deneyimlerini incelemektedir. Temel sorunlar arasında finansal kaynak tahsisi, prosedürel adalet konusundaki dağıtım endişeleri, vatandaş katılımının derecesi ve doğası hakkındaki tartışmalar yer almaktadır.

Kramer vd. (2024) Danimarka ve Almanya'nın kara rüzgâr piyasalarında devre dışı bırakılan rüzgâr türbinlerinin izlediği dairesel ekonomi yollarına ilişkin ampirik veriler toplamaktadır. Ayrıca kanat geri dönüşüm kapasitesinin daha güvenilir bir şekilde planlanması için yeni bir bileşen ve malzeme akışı tahmin modeli önermektedir. Bulgular, devre dışı bırakılan türbinlerin yaklaşık %50-60'ının diğer Avrupa ülkelerine ihraç edildiğini ortaya koymaktadır. Geçmişteki ikinci yaşam döngüsü uygulamalarının gelecekte devam edeceği varsayımında, önümüzdeki on yılda Almanya için yıllık olarak yerel geri dönüşüm kanat kütlelerinin yaklaşık 4.400-11.300 ton arasında değişmesi beklenmektedir. Ekonomik olarak uygulanabilir bir kanat geri dönüşüm tesisi için kanat hacimlerinin eşik değerlerine ulaşılabileceği belirtilmektedir.

Maitre (2024) Almanya, Danimarka, Birleşik Krallık ve İrlanda'daki politikaların uyumunu karşılaştırarak, topluluk paydaşlarının rollerinin AB'nin kara rüzgârı dağıtımını hızlandırma taahhüdüyle nasıl bağlantılı olduğunu araştırmaktadır. Bulgular, rüzgâr enerjisinin gelişimine yönelik piyasa ve topluluk tabanlı yaklaşımlar arasındaki etkileşimin, finansal faydaların boyutunu, ölçeğini ve resmiyetini artırırken, küçük ölçekli topluluk liderliğindeki rüzgâr enerjisine

yönelik desteklerin önemli ölçüde azaldığını vurgulamaktadır. Paradigma değişimi, rüzgâr çiftliklerine topluluk katılımının kapsamını daraltmakta, yerel enerji geçişlerinde toplulukların rolüyle ilgili değerlendirmeler ve paradokslar sunmaktadır.

Schlemminger vd. (2024) yoğun nüfuslu ve sanayileşmiş, yüksek enerji talebine sahip ülke örneği olarak doğrusal optimizasyon kullanan enerji sistemi modelini uygulayarak, arazi rekabetinin arazi yoğun yenilenebilir enerji ekonomisini nasıl etkilediğini değerlendirmektedir. Bulgular, toplam arazinin yalnızca %6'sını gelecekteki enerji sistemine ayırmanın, arazi alanı kısıtlanmadığında hesaplanan maliyet minimizasyonuna yakın bir sisteme izin verdiğini göstermektedir. Uygun maliyetli yenilenebilir enerji sistemlerine yönelik devlet politikaları geliştirilirken arazi değerinin mümkün olduğunca erken dikkate alınmasının gerekli olduğunu vurgulamaktadır.

Schmidt vd. (2024) Kuzey Almanya'daki havadan rüzgâr enerjisi ve rüzgâr çiftliğini yapılandırılmış anketler kullanarak bölge vatandaşları açısından görsel, ses, güvenlik, konum ve ekolojik açılardan derecelendirmektedir. Saha operasyonunu daha adil ve şeffaf olarak değerlendiren vatandaşların, havadan rüzgâr enerjisine karşı daha olumlu tutum geliştirdiği ve daha az gürültü rahatsızlığı yaşama eğiliminde olduğu görülmektedir.

BULGULAR

Bu çalışmanın amacı, enerji dönüşüm sürecinde örnek ülke olan Almanya'nın önemli bir stratejik hedefini oluşturan rüzgâr enerjisindeki gelişmelerin nitel analiz yöntemi kullanılarak SWOT analizi kapsamında değerlendirilmesidir. Dolayısıyla çalışma, ülkedeki stratejik öneme sahip büyük ölçekli rüzgâr enerjisinin mevcut durumunu ve gelecek zorluklarını açıklamaktadır. Bu bağlamda analiz, güçlü yönler, zayıflıklar, fırsatlar ve tehditler başlıkları altında ele alınmaktadır.

Güçlü Yönler

Antropojenik sera gazlarının çoğu, enerji sektöründen kaynaklandığı için fosil yakıtlı enerji santrallerinin alternatif yenilenebilir enerji kaynaklarıyla giderek daha fazla değiştirilmesi gerekmektedir. Düşük CO_2 emisyonları nedeniyle rüzgâr enerjisi, düşük karbonlu bir ekonomiye dönüşüm sürecinde önemli bir teknoloji olarak kabul edilmektedir. Bu geçiş sürecine, Almanya'nın Ruhr bölgesindeki kömür madenciliğinin 2000'lerin başında aşamalı olarak kaldırılması örnek olarak verilebilir. Mevcut teknolojiler arasında rüzgâr yoluyla enerji üretimi, kurulu kapasite açısından hidroelektrikten sonra en güçlü potansiyeli sağlamaktadır. EEG'nin 2000 yılında yürürlüğe girmesinden sonra rüzgâr enerjisinin teknolojisini ve maliyetlerini optimize etmede önemli ilerlemeler kaydedilmiştir. Maliyetler açısından kara rüzgâr enerjisi teknolojisi, hâlihazırda geleneksel enerji santralleriyle rekabet edebilmektedir. Rüzgâr enerjisi üretimi, diğer yenilenebilir elektrik kaynaklarına kıyasla maliyet açısından en rekabetçi alternatif olarak kabul edilmektedir. Ekonomik açıdan rüzgâr enerjisi, teknik olarak olgunlaştığı için maliyet açısından etkin bir kaynak olarak görülmektedir. Aynı zamanda herhangi bir yakıta ihtiyaç duymaması nedeniyle rüzgâr enerjisinin fiyat belirsizliği riski düşüktür. Belirtilen nedenler ülkenin yenilenebilir enerji pazarındaki rekabet gücünü artırmıştır (Arslan ve Ağpak, 2012; Kiunke vd., 2022; WEC, 2024a).

2011 yılında yaşanan Fukuşima nükleer santralindeki kazadan sonra halkın nükleer enerjiye karşı muhalefeti artmış, Alman hükümeti nükleer enerjiyi aşamalı olarak sonlandırmaya karar vermiştir. Bu doğrultuda 2023 yılında tüm nükleer santrallerin devre dışı bırakılması, belirlenen bir diğer güçlü yönü oluşturmaktadır. Kuzey Denizi ve Baltık denizi kıyıları, rüzgâr enerjisinin gelişmesi için seçilen coğrafi konumu ifade etmektedir. Rüzgâr türbinlerinin büyük çoğunluğu, elverişli rüzgâr koşullarının 1990'larda endüstrinin erken gelişimine fayda sağladığı kuzey Almanya'da inşa edilmiştir. Yüksek enerji verimi ve türbin başına daha fazla çalışma saati, rüzgâr türbinlerini daha önce cazip olmayan konumlara inşa etmeyi mümkün kılarak daha zayıf rüzgârlara sahip iç bölgeleri yatırımcılar için çekici hale getirse de, genişleme seviyeleri kuzeydekilerin çok gerisinde kalmıştır (Arslan ve Ağpak, 2012; Dehler-Holland vd., 2022; Ratinen ve Lund, 2015; Wehrmann, 2024).

Avrupa'daki kara rüzgâr türbinleri giderek ilk yaşam döngülerinin sonuna yaklaşmaktadır. Rüzgâr enerjisinin 1990'larda ve 2000'lerin başlarında yaygınlaştığı ülkelerde, rüzgâr türbinleri son yıllarda hizmet ömürlerinin sonuna gelmeye başladı. Bir rüzgâr türbininin hizmet ömrü sonu, yaklaşık 20-25 yıl olarak derecelendirildiği için önümüzdeki yıllarda sayılarının giderek artmaya devam edeceği bilinmektedir. Devre dışı bırakıldıktan sonraki dairesel tedarik zincirleri, yenileme veya geri dönüşüm tesisleri kurulmasını gerektirmektedir. Eskiyen rüzgâr türbinlerinin artan payıyla başa çıkmanın önemli bir yolu yeniden güçlendirmektir. Yeniden güçlendirme, genellikle rüzgâr türbini bileşenlerini veya tüm rüzgâr türbinlerini rüzgâr kaynağını verimli bir şekilde kullanan yenileriyle değiştirmek olarak adlandırılmaktadır. Yeniden güçlendirmeyi teşvik eden ana etken, aynı alandan elde edilen enerji verimindeki artış veya daha küçük bir alandan elde edilen korunan enerji verimidir (Grau vd., 2021; Kramer vd., 2024).

Rüzgâr enerjisi, ülkenin sürdürülebilir kalkınma hedeflerine ulaşmasında kritik bir role sahipken aynı zamanda ekonomik büyüme, istihdam yaratma ve enerji güvenliği faydaları da sunmaktadır. Almanya'da enerji sistemini başarılı bir şekilde dönüştürme ihtiyacı son yıllarda önemli ölçüde artmış, Rusya'nın Ukrayna'yı işgalinden sonra dış ve güvenlik politikası gelişmeleri nedeniyle büyük önem kazanmıştır. Bu bağlamda Energiewende, sadece bir iklim koruma önlemi olarak değil aynı zamanda enerji bağımlılığını azaltmak için bir dış politika hedefi olarak da çerçevelenmiştir. Kara rüzgâr enerjisi, net sıfır elektrik sistemine, tedarik güvenliğine ve enerji bağımsızlığına yönelik temel bir katkı olarak görülmektedir. Enerji güvenliğini artıracak ve emisyonları azaltmada katkı sağlayacak stratejik bir kaynak olarak öne çıkmaktadır. 2022 ve 2023 yıllarındaki Kuzey Denizi Zirveleri'nin ardından Belçika, Danimarka, Almanya, Hollanda, Norveç, Birleşik Krallık, İrlanda, Lüksemburg ve Fransa, AB, İngiltere ve Norveç'in net sıfır hedefine ulaşmasını ve enerji güvenliğini artırmasını desteklemek için 2050 yılına kadar Kuzey Denizlerinde yaklaşık 300 GW açık deniz yenilenebilir enerji kapasitesi geliştirmeyi taahhüt etmişlerdir (Damyan, 2024; Kerker vd., 2024; Maitre, 2024).

Zayıflıklar

Literatür kanıtlarından rüzgâr türbinlerinin yakınlarında yaşayan sakinler için manzara kalitesinde değişiklikler ve doğa korumayla çatışmalar gibi olumsuz etkilerinin olduğuna ulaşılmaktadır. Bu bağlamda vatandaşların rüzgâr türbinlerinden yayılan gürültü emisyonlarından etkilenmeleri, çevredeki manzaranın ciddi şekilde bozulduğu algısı, kırpışma etkisi oluşturma, rüzgâr enerjisi santrallerinin bulunduğu bölgelerde göçmen kuşların artan ölüm oranı, erozyon, nesli tükenmekte olan türlerin yaşam alanlarının sona ermesi, deniz ortamına verilen zarar ve yerel bitki örtüsünün bozulması gibi etkiler söz konusu olumsuzluklar arasında sıralanmaktadır (Arslan ve Ağpak, 2012; Dehler-Holland vd., 2022; Gee, 2010; Kerker vd., 2024; Kiunke vd., 2022; Langer vd., 2018; Licht-Eggert vd., 2008; Tafarte ve Lehmann, 2023).

Rüzgâr türbinlerinin genişlemesi için sınırlı mekân unsuru, bir diğer zayıflık faktörüdür. Yer kısıtlamaları, büyük ölçekli rüzgâr çiftliklerinin başarılı bir şekilde konuşlandırılması için önemli bir güçlüğü oluşturmaktadır. Enerji sistemi modellemesindeki güncel zorluklardan birisi, yüksek zamansal ve mekânsal çözünürlüğü tek bir modelde teknolojilerin ve sektör bağlantılarının ayrıntılı bir gösterimiyle bütünleştirmektir (Brandes vd. 2024; Maitre, 2024; Shammugam vd., 2019).

Almanya, açık deniz rüzgâr santrallerinden yeşil hidrojen ve elektrik üretme kapasitesini artırmaya hazırlanmaktadır. Uzak denizlerdeki rüzgâr potansiyelinden yararlanarak enerji dönüşümünde önemli bir adım atmak istemektedir. Ancak ülkenin enerji stratejisinin önemli bir parçası olarak görülen açık deniz rüzgâr santralleri, özellikle kuzey denizlerinde kurulacak tesislerle büyük ölçüde yenilenebilir enerji elde edilmesini sağlayacaktır. Bununla birlikte bu tesislerin karadan uzaklığı, üretilen elektriğin doğrudan karasal şebekelere taşınmasını zorlaştırmaktadır. Enerji şebekeleri, kuzey eyaletlerindeki yüksek rüzgâr gücü yoğunluğunu ve rüzgârlı bölgelerde üretilen elektriği güney eyaletlere taşımakta yetersiz kalmaktadır (Arslan ve Ağpak, 2012; Damyan, 2024; Langer vd., 2018; Wehrmann, 2024).

İklim çeşitliliği, ülke genelinde rüzgâr hızlarını etkilemektedir. Bu kapsamda enerji üretiminin rüzgârın hızına bağlı olarak değişen kesikli yapısı ve mevsimsel dalgalanmalar rüzgâr enerjisi üretimini kısıtlamaktadır. Rüzgâr enerjisi sürekli olarak bulunmadığı için enerji tedariki büyük enerji santrallerine kıyasla daha az istikrarlıdır. Kıyı bölgeleri, özellikle açık deniz rüzgâr üretiminin mümkün olduğu Kuzey Denizi ve Baltık Denizi kıyıları daha yüksek rüzgâr hızlarından yararlanmakta ve rüzgâr enerjisi üretimini kolaylaştırmaktadır. Buna karşılık güney bölgeleri, özellikle Alp Ön Bölgesi ve Bavyera'nın bazı bölgeleri ise daha fazla güneş radyasyonu aldığı için güneş enerjisi üretimi için uygundur (Arslan ve Ağpak, 2012; BMBF, 2024; Damyan, 2024; Licht-Eggert vd., 2008; Schlemminger vd., 2024).

Fırsatlar

Enerji dönüşümü, iklim değişikliği sorununu ele alma ihtiyacına ilişkin artan farkındalıkla birlikte ivme kazanmıştır. Geleneksel fosil yakıtlardan yenilenebilir enerji kaynaklarına geçişle karakterize edilen enerji geçişi, iklim değişikliğini hafifletmek için kritik bir öneme sahiptir. İklim değişikliği ve doğal kaynakların tükenmesiyle mücadele etmek için bir araç olarak rüzgâr ve güneş fotovoltaikleri gibi yenilenebilir enerji kaynakları, hızla yaygınlaşmaktadır. Rüzgâr enerjisi üretimi, ülkenin enerji talebinin büyük bir bölümünü karşıladığı için fosil yakıtlardan yenilenebilir enerjiye geçişte önemli bir rol üstlenmektedir. Sürdürülebilir, uygun fiyatlı ve güvenli bir enerji sisteminin önemini vurgulayan Avrupa İklim Yasası geçerlidir. Kömür ve nükleerin aşamalı olarak kaldırılması, yenilenebilir enerji gelişimi için önemli bir tetikleyicidir. 2038 yılına kadar sosyal olarak katlanılabilir ve ekonomik olarak uygulanabilir bir yapısal geçişin gerçekleştirilmesi planlanmaktadır. Almanya'da, Yüksek Mahkeme'nin daha iddialı ve katı iklim yasaları lehine verdiği bir karar, küresel ısınmaya karşı mücadelede tarihi bir başarı olarak kabul edilmektedir (BMBF, 2024; Dehler-Holland vd., 2022; Grau vd., 2021; Kiunke vd., 2022; Schlemminger vd., 2024; WEC, 2024a; Wehrmann, 2024).

Toplulukların rüzgâr enerjisini kabul etmesini teşvik etme çabaları, ticari rüzgâr çiftliklerine yakın sakinlere odaklanan bir dizi finansal katılım mekanizmasını içermektedir. Bunlar arasında topluluk yararına fonlama, vatandaş için yatırım fırsatları, rüzgâr çiftliklerine yakın haneler için teşvikler ve rüzgâr çiftliklerinin topluluk mülkiyetini teşvik etmek için idari destekler yer almaktadır. Rüzgâr enerjisi operatörleri için siyasi irade ve teşvikler, rüzgâr enerjisi gelişimi için hayati öneme sahiptir. Son zamanlarda bölgesel, ulusal ve alt ulusal düzeylerde siyasi anlaşmalar ve iklimle ilgili çeşitli hedefler kabul edilerek kamuoyuna duyurulmuştur. Önemli bir dönüm noktası, Avrupa Yeşil Mutabakatı ve Avrupa'nın CO_2 emisyonlarını 2030'a kadar %55 oranında azaltma hedefidir (Engelhorn ve Müsgens, 2021; Kiunke vd., 2022; Knauf, 2022; Maitre, 2024).

Rüzgâr enerjisi üretiminin yoğun olduğu zamanlarda üretilen fazla enerji için depolama çözümlerine ve akıllı güç şebekelerine ihtiyaç bulunmaktadır. Akümülatörler, enerji üretimi ile enerji tüketimi arasındaki boşluğu kapatmaktadır. 'Enerji depolama finansman girişimi' gerekli teknolojik atılımları sağlamayı ve yeni enerji depolama teknolojilerinin hızla piyasaya sürülmesini kolaylaştırmayı amaçlamaktadır (BMBF, 2024).

Tehditler

Sıkı çevre politikaları, rüzgâr enerjisi genişlemesi için bir tehdit oluşturmaktadır. Avrupa ve Alman tür koruma yasaları, rüzgâr enerjisi sahaları planlanırken doğa ve nesli tükenmekte olan türler üzerindeki etkilerin hesaba katılmasını gerektirmektedir. Dolayısıyla ulusal düzeyde tür koruma için yasal rejim, rüzgâr enerjisi kapasitesinin genişletilmesi için önemli bir engel olma potansiyeline sahiptir. Bu çatışmalara örnek olarak bir rüzgâr türbininin rotor kanatlarının, kuşların ve yarasaların hava sahasına doğrudan müdahale ederek çarpışmalara ve ölümlere neden olması, rüzgâr türbinlerine yakın yerel, rüzgâr enerjisine duyarlı kuş popülasyonlarının yaşam alanı kaybıdır (Kiunke vd., 2022).

Rüzgâr enerjisi hükümetin iddialı enerji geçiş planlarında önemli bir rol oynasa da rüzgâr enerjisi endüstrisi, düşen genişleme hacimleri, tesis kapanışları ve sürekli bürokratik engellerle

boğuşmaktadır. Ulusal ve alt ulusal düzenlemeler ile bürokratik engeller rüzgâr enerjisi şirketleri için belirsizliğe yol açmaktadır. Bu, rüzgâr enerjisi genişlemesi için ihale süreçlerinin başlatıldığı 2017 yılından bu yana yeni rüzgâr santrallerinin gelişiminin gecikmesinde yansıtılmaktadır. Açıklamalar geciken inşaat onayları, karmaşık başvuru gereklilikleri, davalar ve asgari mesafe gereklilikleri ile ilişkilidir (Kiunke vd., 2022; Wehrmann, 2024).

Yerel paydaşların yenilenebilir enerji projelerinin yerleştirilmesini onaylaması anlamına gelen topluluk kabulü, enerji geçişinin hızını artırmak için kritik öneme sahiptir. Almanya'da rüzgâr enerjisi projelerine karşı yerel muhalefetin artması, genellikle gecikmelere veya başarısızlığa neden olmaktadır. Projelere karşı yerel protesto ve direniş, rüzgâr enerjisinin genişlemesini etkilemektedir. Yeni rüzgâr parklarının inşasına karşı yerel direniş, karmaşık ve çok katmanlı bir toplumsal olgudur. 'Benim Arka Bahçemde Değil Fenomeni', yerleşim alanlarının yakınında rüzgâr parklarının inşasına karşı muhalif tutumları temsil etmektedir. Belirtilen protestolar, bekleyen davalar ve kasıtlı ablukalar, projelerde önemli ek maliyetlere ve olumsuzluklara sebep olmaktadır (Dehler-Holland vd., 2022; Kerker vd., 2024; Kiunke vd., 2022; Knauf, 2022; Langer vd., 2018).

Rüzgâr türbinlerinin büyük ölçekli konuşlandırılması, önemli hammadde gereksinimleri anlamına gelmektedir. Kritik metallerin varlığıyla artan talep, rüzgâr türbinlerinin maliyet düşüşlerini azaltabilecek ve böylece geniş ölçekli bir konuşlandırmayı aksatabilecek arz risklerine yol açabilecektir. Dolayısıyla arz darboğazlarının erken tespiti, gelecekte ekonomik bir büyük ölçekli konuşlandırmanın sağlanması için bir ön koşuldur (Maitre, 2024; Shammugam vd., 2019).

Konutlara ve diğer alanlara gerekli asgari mesafelerle ilgili kısıtlayıcı düzenlemeler, rüzgâr enerjisinin genişleme türünü engelleyebilmektedir. Alman federal hükümetinin son mevzuatı, bir rüzgâr türbini ile en yakın konut binaları arasında asgari 1.000 m mesafe öngörmektedir. Eski türbinlerin yeniden güçlendirilmesiyle ilgili olarak yeniden güçlendirilemeyen bir alan, mevcut Alman mesafe düzenlemelerine uymayan bir rüzgâr türbini konumu olarak tanımlanmaktadır. Yüksek asgari mesafe gereksinimleri gibi kısıtlayıcı düzenlemeler nedeniyle rüzgâr türbinlerinin genişlemesinin keskin bir şekilde azaldığı görülmektedir (Langer vd., 2016; Stetter vd., 2022).

Düşük karbonlu bir ekonomiye geçişin en büyük güçlüklerinden birisi, toplum genelinde faydaların eşit bir şekilde dağıtıldığı adil ve eşit bir geçişi sağlamaktır. Energiewende şeklinde bilinen Alman enerji dönüşümü, son on yılda ulusal söylemde önemli bir siyasi ilgi görmüştür. Ancak Energiewende'nin uygulanması, toplumun daha geniş kesimleri arasında dönüşüm sürecinin adaleti konusunda endişelere neden olmaktadır. Özellikle türbinlere yakın yerlerde yaşayan sakinlerin türbinlerin bir bölgede nasıl dağıtıldığına dair algıladıkları adaletin kabul durumlarını etkileyebildiği bilinmektedir (Kerker vd., 2024; Langer vd., 2016; Langer vd., 2018; Schmidt vd., 2024; WEC, 2024a).

SONUÇ VE POLİTİKA ÇIKARIMLARI

Avrupa'nın enerji manzarası, teknolojik yenilikler, jeopolitik olaylar ve değişen toplumsal önceliklerin sonuçları tarafından yönlendirilen derin bir dönüşüm süreci geçirmiştir. Bölgenin enerjiyle ilgili öncelikleri, enerji güvenliğine yönelik tek bir odaktan uzaklaşılarak eşitlik, güvenlik ve karşılanabilirliği kapsayan daha bütünsel bir yaklaşıma doğru evrilmiştir. 2019 yılında açıklanan 'Avrupa Yeşil Mutabakatı', düşük karbonlu bir ekonomiye geçişi hızlandırmak için temel bir çerçeve sağlayarak, bölge genelinde eylemlere ivme kazandırmıştır. Avrupa bağlamında özellikle Almanya, tarihsel olarak rüzgâr enerjisi teknolojilerinin geliştirilmesinde, rüzgâr türbinlerinin kurulmasında ve rüzgâr enerjisi üretim kapasitesinde öncü bir ülke olmuştur. Belirtilen nedenlere bağlı olarak bu çalışmada, enerji dönüşüm sürecinde örnek ülke olan Almanya'nın önemli bir stratejik hedefini oluşturan rüzgâr enerjisindeki gelişmeleri SWOT analizi kapsamında incelenmiştir.

Almanya, rüzgâr enerjisi kaynağını üretim maliyetleri açısından fosil yakıtlarla doğrudan rekabet edebilen ve gelecek vaat eden bir yeşil enerji kaynağı olarak görmektedir (Kiunke vd., 2022). Ancak nitel analiz yöntemi kullanılarak ulaşılan bulgularda görüldüğü gibi dikkate alınması

gereken bazı zayıflıklar ve tehditler bulunmaktadır. Bulgulara dayanılarak oluşturulan SWOT analizi sonuçları, Tablo 1 içerisinde yer almaktadır. Bu kapsamda, Almanya'nın rüzgâr enerjisi araştırma odağı ile ilişkili olarak ekonomik, çevresel ve toplumsal alanlara yansıyan üç farklı zorluk alanı bulunmaktadır.

Tablo 1. Almanya'da rüzgâr enerjisi gelişimi için SWOT analizi

	Olumlu	**Olumsuz**
İç faktörler	Güçlü Yönler S1: Düşük karbon emisyonları S2: Devre dışı bırakılan nükleer santraller S3: Rüzgâr türbinleri için coğrafi konum (Kuzey Denizi ve Baltık denizi kıyıları) S4: Yeniden güçlendirme S5: Enerji pazarındaki rekabet gücü S6: Fiyat belirsizliği riskinin düşüklüğü S7: Enerji arz güvenliği S8: İstihdam S9: Ekonomik büyüme S10: Sürdürülebilir kalkınma	Zayıf Yönler W1: İnsanlar ve canlı yaşamı üzerindeki etkiler W2: Rüzgâr türbinlerinin genişlemesi için sınırlı mekân W3: Güney bölgelerin genellikle güneş enerjisi üretimi için uygunluğu W4: Şebeke altyapısı W5: Enerji üretiminin rüzgârın hızına bağlı olarak kesikli yapısı ve mevsimsel dalgalanmalar
Dış faktörler	Fırsatlar O1: İklim değişikliği O2: Finansal yatırımlar O3: Siyasi irade ve teşvikler O4: Depolama sektöründeki teknolojik ilerlemeler O5: Fosil yakıtlara bağımlılığın azaltılması	Tehditler T1: Sıkı çevre politikaları T2: Projelere karşı yerel toplulukların protestoları T3: Uzun ve karmaşık bürokratik prosedürler T4: Rüzgâr türbinlerinin gerekli asgari mesafelerine ilişkin kısıtlayıcı düzenlemeler T5: Hammadde gereksinimleri ve tedarik darboğazları T6: Dönüşüm sürecinin enerji adaleti algıları

Almanya'da rüzgâr enerjisi genişlemesinin ekonomik yönleriyle ilgili yapılan araştırmalar, parasal fırsatları ve olumsuzlukları analiz ederken, teknik perspektifler teknolojik ve maddi özelliklere odaklanmaktadır (Kiunke vd., 2022). Yenilenebilir enerjinin yüksek paylara sahip olduğu gelecekteki bir enerji sisteminin teknik uygulanabilirliğini sağlamak için kritik hammaddelerin temini önem arz etmektedir. Bu kapsamda olası arz darboğazlarının erken tespiti, gelecekte ekonomik bir büyük ölçekli konuşlandırmanın sağlanması için ön koşul olarak değerlendirilmelidir. Malzeme araştırmaları, sadece enerji üretim tesislerinin iyileştirilmesi için değil, aynı zamanda enerji verimliliğinin artırılması ve fosil yakıtlı enerji santrallerinin Energiewende'ye uyarlanması için de gereklidir. Bu malzemeler, rüzgâr türbinlerinin istikrarına katkıda bulunabilir ve bileşenlerini enerji açısından verimli ve uygun maliyetli hale getirebilir. Malzeme araştırma konuları, 'enerji dönüşümü için malzeme araştırması' finansman girişiminin odak noktasını oluşturmalıdır. Alternatif türbin tasarımları, verimli üretim teknikleri, güvenilir bileşenler ve malzeme ikamesi yoluyla malzeme verimliliğini artırmak için daha fazla çaba gerektirmektedir. Enerji tedarik sisteminin doğası, geleneksel yani merkezi büyük enerji santrallerine bağımlı bir sistemden, çok sayıda küçük enerji üretim sistemine sahip merkezi olmayan bir yapıya dönüşmektedir. Dönüşüm devam ederken, bölgesel ve belediye dağıtım ağları da değişmelidir. Üreticileri, tüketicileri, depolama tesislerini ve ağ yapılarını birbirine bağlayan akıllı şebekelere doğru bir eğilim vardır. Şebeke altyapısının genişletilmesi, iletim ve dağıtım

ağlarında yenilenebilir enerjinin kullanımının artırılmasına yönelik araştırmalar, 'akıllı elektrik şebekeleri' araştırma girişiminin bir parçası olarak yürütülmelidir. Üretim ve depolama tesislerinin sektörel birleştirilmesi de dâhil olmak üzere iletim ve dağıtım arasında karmaşık birlikte çalışabilirlik analizleri yapılmalıdır. Energiewende'nin yenilenebilir enerji kaynaklarının genişlemesinin ardından gelen ikinci ayağı, enerji verimliliğinde önemli artış sağlanmasıdır. Potansiyel çözümler, enerji santrallerinin modernizasyonundan, enerji verimli motorlara ve enerji tasarruflu endüstriyel süreçlere, enerji verimli bina yenilemelerine ve ev eşyalarına kadar uzanmaktadır (BMBF, 2024; Luther vd., 2017; Shammugam vd., 2019). Ülke, yıllardır teknolojide verimlilik kazanımları ve maliyet düşüşleri sağlayan dünyanın en büyük kara rüzgâr enerjisi kapasitelerinden birine sahiptir. Yeni kurulumlar, yeniden güçlendirme prosedürleriyle eski türbinler değiştirilirse daha fazla güç üretilebilir ve belirli bir konumdaki çıktıyı büyük ölçüde artırabilir. Bazı durumlarda 20 yıldan uzun süredir faaliyette olan eski modellerin yeniden güçlendirme yoluyla değiştirilmesi, rüzgâr enerjisinin payını hızla artırmanın en umut verici yollarından biri olarak görülmektedir. Lisanslama ve arazi kullanımındaki reformların inşaatları desteklemesi beklenmektedir (Wehrmann, 2024). İyi işleyen yenilenebilir enerji açık artırmaları, ücretlendirme teklif sahiplerinin maliyetlerine yakın olduğu için ekonomik olarak verimli olsa da, güneşli veya rüzgârlı alanlar gibi çoğu üretken alanda daha yüksek bir yenilenebilir enerji teknolojisi konsantrasyonuna neden olabilir. Yenilenebilir enerji kapasitelerinin mekânsal olarak yoğunlaştırılmasına yönelik bu verimsiz teşvik, potansiyel tıkanıklığa neden olabilir ve orta vadede iletim hatlarının genişletilmesini gerektirebilir (Sheykhha vd., 2022).

Çevreye odaklı bilimsel araştırmalar, rüzgâr enerjisi genişlemesinin iklim değişikliği, karbon emisyonları ve doğal sistemler üzerindeki etkisini incelemeye yöneliktir (Kiunke vd., 2022). Enerji sektöründe rüzgâr enerjisi, düşük sera gazı emisyonlarına sahip bir enerji sistemine geçişe katkıda bulunmaktadır (Dehler-Holland vd., 2022). Rüzgâr enerjisi, Almanya'nın en önemli yenilenebilir elektrik kaynağıdır ve fosil yakıtlardan uzaklaşma sürecinde ülkenin tüm enerji sisteminin temeli haline gelmesi öngörülmektedir (Wehrmann, 2024). Almanya'nın enerji stratejisinin önemli bir parçası olarak görülen açık deniz rüzgâr santralleri, özellikle kuzey denizlerinde kurulacak tesislerle birlikte büyük ölçüde yenilenebilir enerji elde edilmesini sağlayacaktır. Ancak bu tesislerin karadan uzaklığı, üretilen elektriğin doğrudan karasal şebekelere taşınmasını zorlaştırmaktadır. Bu sorunu aşmak için rüzgâr enerjisinin bir kısmının doğrudan yeşil hidrojene dönüştürülmesi ve depolanıp taşınması önerilmektedir. Hidrojen, enerji güvenliğini artıran ve emisyonların azaltılmasına katkı sağlayan stratejik bir kaynak olarak öne çıkmaktadır. Dolayısıyla ülkenin 2030 ve 2045 yılları için belirlediği iklim hedeflerine ulaşmasına da yardımcı olacaktır. Yeşil hidrojen, sanayi, ulaşım ve enerji sektörlerinde karbon emisyonlarını azaltmada kilit bir rol oynayacaktır (Damyan, 2024).

Toplumsal faktörler kapsamında düşük karbonlu bir ekonomiye geçişin en büyük güçlüklerinden birisi, toplum genelinde faydaların eşit bir şekilde dağıtıldığı adil ve eşit bir geçiştir. Bu zorluğun üstesinden gelmek için politika yapıcılar, endüstri paydaşları, yerel topluluklar, sivil toplum örgütleri ve işçi sendikaları da dâhil olmak üzere çok çeşitli paydaşları içeren kapsayıcı karar alma süreçlerine daha fazla vurgu yapılmalıdır (WEC, 2024a). Kabul, teknolojilerin gelişiminin erken aşamalarında ve kaynak akışlarının yanı sıra teknoloji yaşam döngüsü boyunca kamu ve siyasi desteğin sürdürülmesinde başarıyı belirleyen önemli bir faktördür. Uzun zaman dilimleri boyunca ortaya çıkan sürdürülebilirlik geçişlerinde, sürdürülebilirlik için hayati önem taşıdığı belirlenen teknolojilerin kabulünün sürdürülmesi önemli bir zorluk haline gelmektedir. Politika yapıcılar ve proje geliştiriciler, vatandaş katılımı ve yerel kâr dağıtımı gibi pragmatik kabulün yönlerini ele alabilirler (Dehler-Holland vd., 2022). Finansal faydalar, topluluk kabulünü teşvik etmek için enerji paydaşları arasında giderek daha popüler hale gelmektedir. Yerel paydaşlara doğrudan veya dolaylı ödemeleri içeren finansal faydalar, toplum desteğinin eksikliğini telafi etmenin bir yolu olarak ele alınabilir. Bu faydalar, önerilen rüzgâr türbini sahalarının yakınında yaşayan insanların kabulünü artırabileceğine dair deneysel kanıtlara dayanmaktadır (Knauf, 2022). Alman federal

eyaletlerinin bölgesel hükümetleri, farklı önlemler alarak rüzgâr enerjisinin kabulünü teşvik edebilir. Şebeke sistemi, rüzgâr enerjisini düşük rüzgârlı bölgelere dağıtmak için ülkenin güney kesimine doğru genişletilebilir. Bölge sakinlerinin rüzgâr enerjisi projelerinde kabulü sağlamak amacıyla enerji kooperatifleri, insanları rüzgâr enerjisi projelerine finansal olarak dâhil etmek için bir araç olarak kullanılabilir. Rüzgâr enerjisi projelerinin giderek artan bir şekilde reddedilmesinin potansiyel tehdidine karşı koymak için bu teknolojinin kabulünü artıran veya azaltan faktörlerin hangileri olduğunu bilmek önemlidir (Langer vd., 2018). Vatandaş katılımı için coğrafi yakınlık ölçütleri konusunda esneklik ihtiyacı, toplulukları paylaşılan faydaların yönetimine ve dağıtımına dâhil etme yaklaşımları, yatırımların kara rüzgâr enerjisini teşvik etme potansiyeli göz önünde bulundurulmalıdır (Maitre, 2024). Politika yapıcılar için öneriler arasında teknoloji etkilerinin azaltılmasını, adil ve etkili proje geliştirmeyi sağlamak için kanıta dayalı stratejilerin uygulanması yer almaktadır. Sürdürülebilir enerjinin dağıtımı, sakinler üzerindeki etkiyi azaltmak ve yenilenebilir enerjinin genişlemesini yavaşlatan yerel muhalefeti önlemek için insanların bu yenilikleri nasıl algıladığını ve bunlara nasıl yanıt verdiğini dikkate almalıdır. Yeni enerji teknolojilerinin evrimi, hâlihazırda geliştirme aşamasında olan sosyal ihtiyaçları, endişeleri ve değerleri dikkate alma fırsatı sunmalıdır (Schmidt vd., 2024).

KAYNAKLAR

Arslan, İ., & Ağpak, F. (2012). Türkiye'de rüzgâr enerjisi için bir durum değerlendirmesi: A'WOT uygulaması. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *9*(20), 59-72.

Brandes, J., Jürgens, P., Kaiser, M., Kost, C., & Henning, H. M. (2024). Increasing spatial resolution of a sector-coupled long-term energy system model: The case of the German states. *Applied Energy*, *372*, 1-14.

Damyan, D. (2024). Almanya'da açık deniz rüzgâr santrallerinden yeşil hidrojen ve elektrik üretiminin artırıllması planlanıyor. [Çevrim-içi: https://temizenerji.org/2024/09/13/almanyada-acik-deniz-ruzgar-santrallerinden-yesil-hidrojen-ve-elektrik-uretiminin-artirilmasi-planlaniyor/], Erişim Tarihi: 22 Eylül 2024.

Dehler-Holland, J., Okoh, M., & Keles, D. (2022). Assessing technology legitimacy with topic models and sentiment analysis - The case of wind power in Germany. *Technological Forecasting and Social Change*, *175*, 1-21.

Enerji Atlası (2024). Ülkelere göre rüzgar enerjisi. [Çevrim-içi: https://www.enerjiatlasi.com/ulkelere-gore-ruzgar-enerjisi.html], Erişim Tarihi: 22 Eylül 2024.

Engelhorn, T., & Müsgens, F. (2021). Why is Germany's energy transition so expensive? Quantifying the costs of wind-energy decentralisation. *Resource and Energy Economics*, *65*, 1-18.

Federal Ministry of Education and Research (BMBF) (2024). German energy transition. [Çevrim-içi: https://www.bmbf.de/bmbf/en/research/energy-and-economy/german-energy-transition/german-energy-transition_node.html], Erişim Tarihi: 22 Eylül 2024.

Gee, K. (2010). Offshore wind power development as affected by seascape values on the German North Sea coast. *Land Use Policy*, *27*(2), 185-194.

Goetzke, F., & Rave, T. (2016). Exploring heterogeneous growth of wind energy across Germany. *Utilities Policy*, *41*, 193-205.

Grau, L., Jung, C., & Schindler, D. (2021). Sounding out the repowering potential of wind energy - A scenario-based assessment from Germany. *Journal of Cleaner Production*, *293*, 1-11.

Johst, P., Bühl, M., Enderle, C., Kupfer, R., Modler, N., & Böhm, R. (2024). Forecasting wind turbine blade waste with material composition and geographical distribution: Methodology and application to Germany. *Resources, Conservation and Recycling*, *211*, 1-11.

Kerker, N., Kuhlmann, L., & Marg, S. (2024). Fair enough? Unraveling justice perspectives on Germany's energy system transformation. *Energy Research & Social Science*, *116*, 1-19.

Kiunke, T., Gemignani, N., Malheiro, P., & Brudermann, T. (2022). Key factors influencing onshore wind energy development: A case study from the German North Sea region. *Energy*

Policy, *165*, 1-11.
Knauf, J. (2022). Can't buy me acceptance? Financial benefits for wind energy projects in Germany. *Energy Policy*, *165*. 1-13.
Kramer, K. J., Abrahamsen, A. B., Beauson, J., Hansen, U. E., Clausen, N. E., Velenturf, A. P. M., & Schmidt, M. (2024). Quantifying circular economy pathways of decommissioned onshore wind turbines: The case of Denmark and Germany. *Sustainable Production and Consumption*, *49*, 179-192.
Langer, K., Decker, T., Roosen, J., & Menrad, K. (2016). A qualitative analysis to understand the acceptance of wind energy in Bavaria. *Renewable and Sustainable Energy Reviews*, *64*, 248-259.
Langer, K., Decker, T., Roosen, J., & Menrad, K. (2018). Factors influencing citizens' acceptance and non-acceptance of wind energy in Germany. *Journal of Cleaner Production*, *175*, 133-144.
Licht-Eggert, K., Gee, K., & Kannen, A. (2008). The human dimension in ICZM: Addressing peoples' perceptions and values in integrative assessments. In: Krishnamurthy, R., Kannen, A., Ramanathan, A. L., Tinti, S., Glavovic, B., Gren, D.R., Han, Z., Agardy, T. (Eds.), Integrated Coastal Zone Management (ICZM). New Delhi: Research Publishing Services.
Liñeiro, T. B., & Müsgens, F. (2023). Evaluating the German onshore wind auction programme: An analysis based on individual bids. *Energy Policy*, *172*, 1-14.
Luther, M., Rohrig, K., & Winter, W. (2017). Wind power in the German system - research and development for the transition toward a sustainable energy future. In Letcher, T. M. (Ed.) Wind energy engineering a handbook for onshore and offshore wind turbines. United Kingdom: Elsevier, (pp. 95-124).
Maitre, J. L. (2024). Price or public participation? Community benefits for onshore wind in Ireland, Denmark, Germany and the United Kingdom. *Energy Research & Social Science*, *114*, 1-16.
Nolden, C. (2013). Governing community energy-feed-in tariffs and the development of community wind energy schemes in the United Kingdom and Germany. *Energy Policy*, *63*, 543-552.
Portman, M. E., Duff, J. A., Köppel, J., Reisert, J., & Higgins, M. E. (2009). Offshore wind energy development in the exclusive economic zone: Legal and policy supports and impediments in Germany and the US. *Energy Policy*, *37*(9), 3596-3607.
Ratinen, M., & Lund, P. (2015). Policy inclusiveness and niche development: Examples from wind energy and photovoltaics in Denmark, Germany, Finland, and Spain. *Energy Research & Social Science*, *6*, 136-145.
Risch, S., Weinand, J. M., Schulze, K., Vartak, S., Kleinebrahm, M., Pflugradt, N., Kullmann, F., Kotzur, L., McKenna, R., & Stolten, D. (2024). Scaling energy system optimizations: Techno-economic assessment of energy autonomy in 11 000 German municipalities. *Energy Conversion and Management*, *309*, 1-20.
Schlemminger, M., Lohr, C., Peterssen, F., Bredemeier, D., Niepelt, R., Bensmann, A., Hanke-Rauschenbach, R., Breitner, M. H., & Brendel, R. (2024). Land competition and its impact on decarbonized energy systems: A case study for Germany. *Energy Strategy Reviews*, *55*, 1-14.
Schmidt, H., Leschinger, V., Müller, F. J. Y., Vries, G. d., Renes, R. J., Schmehl, R., & Hübner, G. (2024). How do residents perceive energy-producing kites? Comparing the community acceptance of an airborne wind energy system and a wind farm in Germany. *Energy Research & Social Science*, *110*, 1-15.
Shammugam, S., Gervais, E., Schlegl, T., & Rathgeber, A. (2019). Raw metal needs and supply risks for the development of wind energy in Germany until 2050. *Journal of Cleaner Production*, *221*, 738-752.
Sheykhha, S., Borggrefe, F., & Madlener, R. (2022). Policy implications of spatially differentiated renewable energy promotion: A multi-level scenario analysis of onshore wind auctioning in Germany. *Energy Policy*, *169*, 1-16.

Stetter, C., Wielert, H., & Breitner, M. H. (2022). Hidden repowering potential of non-repowerable onshore wind sites in Germany. *Energy Policy*, *168*, 1-8.
Tafarte, P., & Lehmann, P. (2023). Quantifying trade-offs for the spatial allocation of onshore wind generation capacity – A case study for Germany. *Ecological Economics*, *209*, 1-13.
Wehrmann, B. (2024). German onshore wind power – output, business and perspectives. [Çevrim-içi: https://www.cleanenergywire.org/factsheets/german-onshore-wind-power-output-business-and-perspectives], Erişim Tarihi: 22 Eylül 2024.
WindEurope (2024). Wind energy in Europe: 2023 Statistics and the outlook for 2024-2030. [Çevrim-içi: https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-2023-statistics-and-the-outlook-for-2024-2030/], Erişim Tarihi: 22 Eylül 2024.
World Energy Council (WEC) (2024a). World energy ıssues monitor 2024. [Çevrim-içi: https://www.worldenergy.org/publications/entry/world-energy-issues-monitor-2024], Erişim Tarihi: 22 Eylül 2024.
World Energy Council (WEC) (2024b). World energy trilemma ındex 2024. [Çevrim-içi: https://www.worldenergy.org/publications/entry/world-energy-trilemma-report-2024], Erişim Tarihi: 22 Eylül 2024.

GENÇLİK VE SPOR İL MÜDÜRLÜĞÜ PERSONELİNİN FİZİKSEL AKTİVİTE YAPMA DURUMLARINA GÖRE MENTAL İYİ OLUŞ DÜZEYLERİNİN İNCELENMESİ

EXAMINATION OF MENTAL WELL-BEING LEVELS OF THE PROVINCIAL DIRECTORATE OF YOUTH AND SPORTS PERSONNEL ACCORDING TO THEIR PHYSICAL ACTIVITY STATUS

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Özet
Bu çalışmanın amacı, Gençlik ve Spor İl Müdürlüğünde görev yapan personelin fiziksel aktivite yapma durumlarına göre mental iyi oluşlarını incelemektir. Araştırmanın örneklemini Şırnak Gençlik ve Spor İl Müdürlüğünde görev yapan bireyler oluşturmaktadır. Araştırma, toplam 186 kişiden (75 kadın ve 111 erkek) oluşmaktadır. Anketler, Şırnak Gençlik ve Spor merkezinde ve ilçelerinde yer alan merkezlerde yüz yüze anket yolu ile toplanmıştır. Araştırmada; "Kişisel Bilgi Formu" ve "Warwinck- Edinburg Mental İyi Oluş Ölçeği" kullanılmıştır. Veriler SPSS programı kullanılarak analiz edilmiştir. Verilerin normal dağılım gösterip göstermediğinin tespit edilmesinden sonra analizler gerekli testler ile yapılmıştır. Katılımcıların demografik verilerinin dağılımının belirlenmesi için betimsel istatistik yöntemleri uygulanmıştır. Katılımcıların mental iyi oluş düzeyleri birçok değişken çerçevesinde değerlendirilmiş olup, cinsiyet, sigara kullanımı, haftalık spor yapma saati, spor türü, spor yapan ve yapmayanlar arasındaki saat farkının mental yönden bireyler üzerinde etkiye sahip olduğu söylenebilir. Çalışma sonuçlarında görüldüğü gibi cinsiyet faktörü perspektifinden değerlendirildiğinde erkek katılımcıların mental iyi oluş düzeylerinin kadınlara oranla daha iyi durumda olduğu görülmektedir. Fakat evli ya da bekar olma durumu, bireysel veya takım sporuyla uğraşma, yaş, eğitim durumu, kurumdaki çalışma yılı gibi pek çok değişkenin ise bireylerin mental iyi oluşları sürecinde bir etki oluşturmadığı sonucuna varılmıştır.

Anahtar kelimeler: Fiziksel aktivite, mental iyi oluş, spor, egzersiz.

Abstract
The aim of this study is to examine the physical activity levels and mental well-being of the personnel working in the Provincial Directorate of Youth and Sports and to determine the relationship between them. The sample of the study consists of individuals working in the Şırnak Provincial Directorate of Youth and Sports. The study consists of a total of 186 individuals (75 female and 111 male). The surveys were collected through face-to-face surveys in the Şırnak Youth and Sports Center and in the centers located in the districts. In the study; "Personal Information Form" and "Warwinck-Edinburgh Mental Well-Being Scale" were used. The data were analyzed using the SPSS program. After determining whether the data showed a normal distribution, the analyses were performed with the necessary tests. Descriptive statistics methods were applied to determine the distribution of the demographic data of the participants. The mental well-being levels of the participants were evaluated within the framework of many variables, and it can be said that gender, smoking, weekly sports hours, type of sports, and the time difference

between those who do and do not do sports have an effect on individuals mentally. As seen in the study results, when evaluated from a gender factor perspective, it is seen that the mental well-being levels of male participants are better than those of women. However, it was concluded that many variables such as being married or single, doing individual or team sports, age, education level, years of work in the institution do not have an effect on the mental well-being process of individuals.
Keywords: Physical activity, mental well-being, sports, exercise.

GİRİŞ

"Fiziksel aktivite (FA)", her hareket durumumuzda kas ve eklemlerimizin yardımıyla kalori yakmamızı sağlayan, kalp atım hızını ve nefes alış veriş hızını yükselten, alçak ya da yüksek şiddette düzenli olarak yapılan ve sonucunda yorgunluk duyulan aktivitelerdir (Baltacı, 2008). Düzenli şekilde yapılan fiziksel aktivite bireylerin yaşamı boyunca kaliteli yaşamın sürdürülmesinde onlara önemli faydalar sağlamaktadır (Bek, 2008). Amerikan Spor Hekimliği Birliği ve Amerikan Diyetisyenler Birliği'ne göre, yetişkinlerin her gün için en az 30 dakika süreli orta düzeyde fiziksel faaliyet yapması gerekmektedir (Driskell ve ark., 2005).

Fiziksel aktiviteler kişilerin mutluluk ve psikolojik düzeylerinde iyi hissetme, iyi olma hallerini de etkiler ve düzenli hale getirir. Bu açıdan değerlendirildiğinde düzenli ve doğru yapılan fiziksel aktivitelere katılım, bireyler de çeşitli unsurlardan dolayı görülen depresyonu aza indirgediği görülmektedir (Başar ve Sarı, 2018; Demirer ve Erol, 2020).

Mental iyi oluş kavramının kişiler ve toplumlar üzerinde ki pozitif yönünü Dünya Sağlık Örgütü şu şekilde açıklamıştır: Her bir bireyin yetenek ve erdemlerinin farkına varılması veya ortaya çıkarılması için çalışmalarda bulunmak, bireylerin yaşamlarını amaçlı ve anlamlı bir hale getirmek, bireylerin yaşadıkları topluma her alanda pozitif destek de bulunması, kişilerarası pozitif ilişkilerin doğru şekilde yapılması, kişilerin her alanda yaptığı çalışma ve konuşmaların da desteklendiklerinin hissedilmesi, kişilerin içsel huzurlarına önem verilmesi, memnuniyet duygusunun artırılması, yaşamı mutlu ve neşeli hale getirme, yaşamın her türlü zorluğu ile başa çıkma, kişilerin kendi özgüvenlerinin iyileştirilmesi ve güçlü bireyler olmalarının hedeflenmesi, kişilerin, kendi ve çevresindekilere en uygun biçimde görev ve sorumlulukları alma kapasitesinde bulunan kişilerin mental durumları olarak değerlendirilmiştir (Demirtaş ve Baydemir, 2019). Bu bağlamda araştırmanın amacı; Gençlik ve Spor İl Müdürlüğünde görev yapan personelin fiziksel aktivite yapma durumlarına göre mental iyi oluşlarını incelemektir.

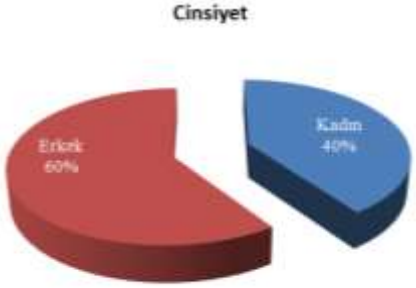
YÖNTEM

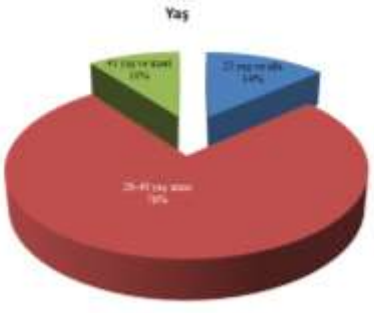
Araştırma Modeli

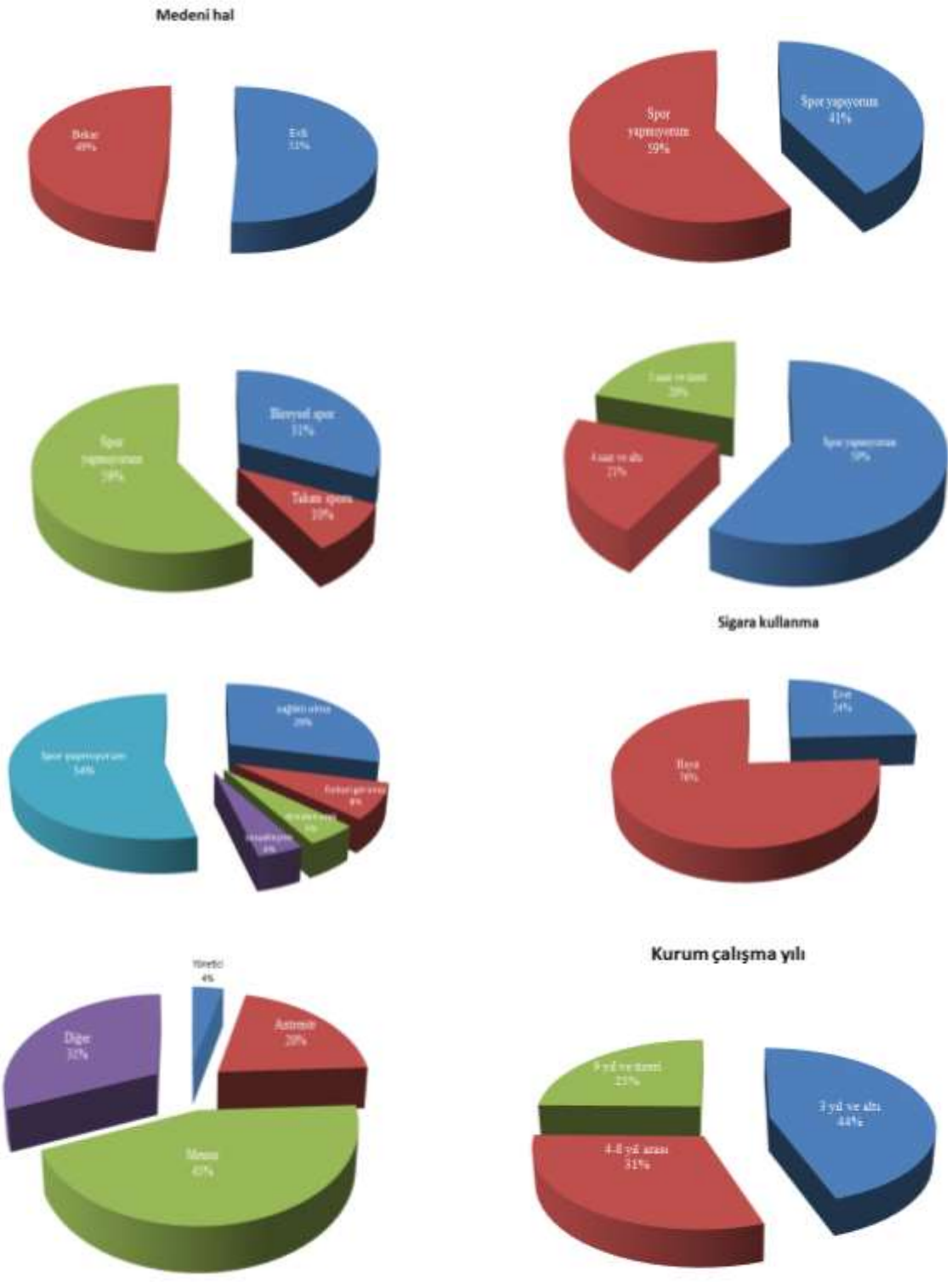
Araştırmada nicel araştırma deseni kullanılmıştır. Araştırma betimsel tarama modelinde gerçekleştirilmiştir.

Araştırma Grubu

Şırnak Gençlik ve Spor İl Müdürlüğü bünyesinde görev yapan personel araştırma grubunu oluşturmaktadır. Araştırma toplam 186 kişiyi (75 kadın ve 111 erkek) kapsamaktadır.







Grafik. Katılımcıların Demografik Özellikleri

Veri Toplama Araçları

Bireylerin demografik özelliklerine ilişkin verileri belirlemek amacıyla "Kişisel Bilgi Formu" kullanılırken, mental iyi oluş durumlarını ölçmek amacıyla "Warwinck- Edinburg Mental İyi Oluş Ölçeği" kullanılmıştır.

"Warwinck- Edinburg Mental İyi Oluş Ölçeği"
Tennant ve arkadaşları (2007) tarafından bu ölçek geliştirilmiş olup, Türkçeye uyarlanması Keldal (2015) tarafından yapılmıştır. 14 maddeyi kapsayan bu ölçekten alınacak puan 14-70 arasındadır. Puanın arttıkça psikolojik iyi oluş da arrtmaktadır. Ölçeğin güvenirlik katsayısı 0.89 olarak hesaplanmıştır.

Verilerin Analizi
Mental iyi oluş durumunun çeşitli değişkenlere göre karşılaştırılması amacıyla t testi ile ANOVA (Çok Yönlü Varyans Analizi) yapılmıştır. Farklılığın kaynaklandığı grubu belirlemek amacıyla Tukey post-hoc testi yapılmıştır. İlaveten yüzde (%) ve frekans (f) analizleri uygulanmıştır.

BULGULAR

Tablo 1. Katılımcıların cinsiyetlerine göre mental iyi oluş düzeyleri

	Cinsiyet	N	X	Ss	T	P
Mental İyi Oluş	Kadın	75	51,2000	10,93840	,134	**,019***
	Erkek	111	54,9279	10,23782		

(p<0.05)

Tablo 2. Katılımcıların medeni durumlarına göre mental iyi oluş düzeyleri

	Medeni durum	N	X	Ss	T	P
Mental İyi Oluş	Evli	95	53,0947	10,31429	,053	,818
	Bekar	91	53,7692	11,04745		

(p>0.05)

Tablo 3. Katılımcıların yaptıkları spor türüne göre mental iyi oluş düzeyleri

	Spor türü	N	X	Ss	T	P
Mental İyi Oluş	Bireysel sporlar	59	57,1695	7,93324	,006	,135
	Takım sporları	18	53,5556	11,51072		

(p>0.05)

Tablo 4. Katılımcıların sigara kullanma durumlarına göre mental iyi oluş düzeyleri

	Sigara kullanma	N	X	Ss	T	P
Mental İyi Oluş	Evet	45	55,0444	6,66386	11,96	**,001***
	Hayır	141	52,9078	11,61766		

(p<0.05)

Tablo 5. Katılımcıların haftalık spor yapma saatlerine göre mental iyi oluş düzeyleri

	Haftalık spor	N	X	Ss	T	P
Mental İyi Oluş	4 saat ve altı	39	52,7692	9,23512	,625	**,000***
	5 saat ve üzeri	38	59,9737	7,05763		

(p<0.05)

Tablo 6. Katılımcıların yaşlarına göre mental iyi oluş düzeyleri

	Yaş	N	X	Ss	F	P
Mental İyi Oluş	25 yaş ve altı	25	53,2800	11,54166	,964	,383
	26-40 yaş arası	142	53,8732	10,07832		
	41 yaş ve üzeri	19	50,2632	13,47360		
	Toplam	186	53,4247	10,65565		

(p>0.05)

Tablo 7. Katılımcıların eğitim durumlarına göre mental iyi oluş düzeyleri

	Eğitim durumu	N	X	Ss	F	P
Mental İyi Oluş	İlköğretim	4	53,7500	13,32604	,450	,717
	Ortaöğretim	37	51,5946	12,05188		
	Üniversite	135	53,8815	10,47388		
	Lisansüstü	10	53,9000	6,57352		
	Toplam	186	53,4247	10,65565		

(p>0.05)

Tablo 8. Katılımcıların yaptıkları spor türüne göre mental iyi oluş düzeyleri

	Spor türü	N	X	Ss	F	P
Mental İyi Oluş	Bireysel sporlar (a)	59	57,1695	7,93324	5,963	**,003* a>c**
	Takım sporları (b)	18	53,5556	11,51072		
	Spor yapmıyorum (c)	109	51,3761	11,31108		
	Toplam	186	53,4247	10,65565		

(p<0.05)

Tablo 9. Katılımcıların haftalık yaptıkları spor saatine göre mental iyi oluş düzeyleri

	Haftalık spor saati	N	X	Ss	F	P
Mental İyi Oluş	Spor yapmıyorum (a)	109	51,3761	11,31108	10,185	**,000* c>a,b**
	4 saat ve altı (b)	39	52,7692	9,23512		
	5 saat ve üzeri (c)	38	59,9737	7,05763		
	Toplam	186	53,4247	10,65565		

(p<0.05)

Tablo 10. Katılımcıların kurumdaki çalışma yılına göre mental iyi oluş düzeyleri

	Kurum yılı	N	X	Ss	F	P
Mental İyi Oluş	3 yıl ve altı	83	52,5904	10,54842	,784	,458
	4-8 yıl arasında	57	54,8596	10,89960		
	9 yıl ve üzerinde	46	53,1522	10,59343		
	Toplam	186	53,4247	10,65565		

(p>0.05)

TARTIŞMA VE SONUÇ

Katılımcıların spor yapma durumlarına göre mental iyi oluş durumlarının incelenmesinin amaçlandığı bu araştırmada elde edilen bulgular ışığında aşağıdaki yorumlamalara yer verilmiştir.

Cinsiyet değişkeni bağlamında katılımcıların mental iyi oluş durumları incelenmiş olup, farkın istatistiksel olarak anlamlılık seyrettiği tespit edilmiştir. Farkın hangi değişkenden kaynaklandığına bakıldığında erkek bireyler lehine olduğu belirlenmiştir (Tablo 1). Haring ve arkadaşları (1984) tarafından yapılan araştırmada erkeklerin kadınlara oranla daha yüksek psikolojik iyi olma düzeyine sahip olduğu belirtilmiştir. Tekkurşun ve arkadaşları (2018)'nın çalışmasına göre spor yapan kadınların erkeklere oranla daha düşük mental iyi oluş düzeyine sahip olduklarını belirtmişlerdir. Yine Gürgan ve Gür (2019) kadınların erkeklerden daha düşük mental iyi oluş düzeyine sahip oldukları sonucuna varmıştır. Bu bağlamda çalışmamızın sonuçları ile belirtilen çalışmaların sonuçları paralellik göstermektedir. Aksine Kuyumcu (2012) tarafından yapılmış olan araştırmada kadınların erkeklere göre psikolojik iyi-oluşlarının daha yüksek olduğu tespit edilmiştir. Yine Özen ve Gülaçtı (2012) tarafından yapılan araştırmada da kadınların mental

iyi oluş açısından erkeklere oranla daha iyi durumda olduğu gözlenmiştir. Çalışmamızın sonuçları ile örtüşmemektedir.

Evli ve bekar olan bireylerin mental iyi oluş sonuçlarına göre alınan puan ortalamaları arasında medeni durum açısından istatistiksel olarak anlamlı bir farka rastlanmamıştır (Tablo 2). Spor yapan bireylerin yaptıkları spor türüne göre analiz sonuçları incelendiğinde ölçekten alınan puan ortalamaları arasında istatistiksel olarak bir farka rastlanmamıştır (Tablo 3). Tablo 4'e göre, katılımcıların sigara kullanım durumlarına göre t-testi sonuçları verilmiştir. Sonuçlar incelendiğinde sigara kullanan bireylerin ölçekten alınan puan ortalamalarının kullanmayanlara göre yüksek olduğu gözlemlenmiştir. Bu bağlamda sigara kullanan bireylerin mental iyi oluş durumlarının, kullanmayan bireylere göre daha yüksek olduğu söylenebilir. Tablo 5'e bakıldığında, katılımcıların haftalık spor yapma durumlarına göre sonuçları incelendiğinde haftalık 5 saat ve üzerinde spor yapan bireylerin ölçekten alınan puan ortalamalarının haftalık 4 saat ve altında spor yapan bireylere göre yüksek olduğu gözlemlenmiştir. Bu bağlamda düzenli olarak haftalık spor yapma süresi fazla olan bireylerin mental iyi oluş durumlarının, daha az sürede spor yapan bireylere göre daha iyi olduğu sonucuna varılabilir. Yaş değişkeni bağlamında değerlendirildiğinde mental iyi oluş düzeyleri arasında alınan puan ortalamasının istatistiksel olarak bir fark oluşturmadığı gözlenmektedir (Tablo 6). Eğitim düzeyi değişkenine göre incelendiğinde; ilköğretim, ortaöğretim, üniversite ve lisansüstü eğitim düzeylerinden alınan puan ortalamaları arasında farkın anlamlı düzeyde olmadığı belirlenmiştir (Tablo 7). Tablo 8'e göre, spor yapmayan katılımcıların ve farklı türlerde spor yapan katılımcıların durumlarına göre analiz sonuçları verilmiştir. Sonuçlar incelendiğinde bireysel sporlar ile uğraşan bireylerin ölçekten alınan puan ortalamalarının spor yapmayan bireylere göre yüksek olduğu gözlemlenmiştir. Bu bağlamda bireysel sporlar yapan bireylerin mental iyi oluş durumlarının, spor yapmayan bireylere göre daha yüksek olduğu sonucuna varılabilir. Tablo 9'da spor yapmayan katılımcılar ile 4 saat altında ve 5 saat üzerinde spor yapan katılımcıların durumlarına göre sonuçlar verilmiştir. Buna göre haftalık 5 saat ve üzerinde spor yapan bireylerin ölçekten alınan puan ortalamalarının spor yapmayan ve 4 saat altında spor yapan bireylere göre yüksek olduğu gözlemlenmiştir. Bu bağlamda düzenli ve 5 saat üzerinde spor yapan bireylerin mental iyi oluş durumlarının, diğer bireylere göre daha yüksek olduğu söylenebilir. Kurumda çalışma yılları belirtilen bireylerin mental iyi oluş düzeyleri açısından değerlendirme yapıldığında alınan puan ortalamalarının anlamlı bir farka sahip olmadığı belirlenmiştir (Tablo 10).

Katılımcıların mental iyi oluş düzeyleri birçok değişken çerçevesinde değerlendirilmiş olup, cinsiyet, sigara kullanımı, haftalık spor yapma saati, spor türü (bireysel-takım sporu yapanlar ile yapmayanlar), spor yapan ve yapmayanlar arasındaki saat farkının mental yönden bireyler üzerinde etkiye sahip olduğu söylenebilir. Çalışma sonuçlarında görüldüğü gibi cinsiyet faktörü perspektifinden değerlendirildiğinde erkek katılımcıların mental iyi oluş düzeylerinin kadınlara oranla daha iyi durumda olduğu görülmektedir. Fakat evli ya da bekar olma durumu, bireysel veya takım sporuyla uğraşma, yaş, eğitim durumu, kurumdaki çalışma yılı gibi pek çok değişkenin ise bireylerin mental iyi oluşları sürecinde bir etki oluşturmadığı sonucuna varılmıştır.

KAYNAKÇA

Baltacı, G. (2008). Obezite ve Egzersiz, T.C. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü. Klasmat Matbaacılık, Ankara.

Başar, S., & Sarı, İ. (2018). Düzenli egzersizin depresyon, mutluluk ve psikolojik iyi oluş üzerine etkisi. *İnönü Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 5*(3), 25-34.

Bek, N. (2008). Fiziksel Aktivite ve Sağlığımız. Sağlık Bakanlığı. Klasmat Matbaacılık. Ankara.

Demirer, İ., & Erol, S. (2020). Üniversite öğrencilerinin fiziksel aktivite düzeyleri ile uykusuzluk ve psikolojik iyilikleri arasındaki ilişki. *Psikiyatri Hemşireliği Dergisi, 11*(3), 201-211.
Demirtaş, A. S. ve Baydemir, K. (2019). Warwick-Edinburgh Mental İyi Oluş Ölçeği kısa formu'nun Türkçe'ye uyarlanması: Geçerlik ve güvenirlik çalışması. *Elektronik Sosyal Bilimler Dergisi, 18*(70), 654-666.
Driskell, J. A., Kim, Y. N., & Goebel, K. J. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American dietetic association, 105*(5), 798-801. https://doi.org/10.1006/pmed.1998.0375
Gürgan, U., & Gür, S. (2019). Genç yetişkinlerde mental iyi oluş düzeyinin depresyonla ilişkisinin bazı değişkenlere göre incelenmesi. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi, 6*(6), 516-536.
Haring, M.J., Stock, W.A. ve Okun, M.A. (1984). A research synthesis of gender and social class as correlates of subjective well-being. *Human Relations, 37*(8), 645-657.
Kuyumcu, B. (2012). Türk ve İngiliz üniversite öğrencilerinin psikolojik iyi oluş duygusal farkındalık ve duygularını ifade etmelerinin ülke ve cinsiyet değişkenlerine göre incelenmesi. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 14*(2), 1-24.
Özen, Y., & Gülaçtı, F. (2012). Öğretmen adaylarının sosyal beceri ve psikolojik iyi oluş düzeylerinin incelenmesi. *Uluslararası Hakemli Beşeri ve Akademik Bilimler Dergisi, 1*(1), 83-101.
Tekkurşun Demir, G., Namlı, S., Hazar, Z., Türkeli, A., & Cicioğlu, İ. (2018). Bireysel ve takım sporcularının karar verme stilleri ve mental iyi oluş düzeyleri. *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi, 13*(1), 176-191.

FİZİKSEL AKTİVİTEYE KATILIMI ENGELLEYEN FAKTÖRLERİN İNCELENMESİ: Z KUŞAĞI ÜZERİNE BİR ARAŞTIRMA

EXAMINING THE FACTORS THAT HINDER PARTICIPATION IN PHYSICAL ACTIVITY: A STUDY ON GENERATION Z

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Özet
Bu çalışmanın amacı, z kuşağını kapsayan bireylerde fiziksel aktiviteye katılımı engelleyen faktörlerin incelenmesidir. İlaveten çeşitli değişkenler perspektifinden durumun saptanmasıdır. Araştırmada bireylerin fiziksel aktivitelere katılımını engelleyen faktörler belirlenerek çeşitli değişkenleri açısından analiz edilmesi için nicel araştırma yöntemi kullanılmıştır. Araştırmada veri toplama aracı olarak; "Kişisel Bilgi Formu" ve "Lise Öğrencilerinin Fiziksel Aktivitelere Katılımını Engelleyen Faktörler Ölçeği" kullanılmıştır. Veriler SPSS programı kullanılarak analiz edilmiştir. Verilerin normal dağılım gösterip göstermediğinin tespit edilmesinden sonra analizler gerekli testler ile yapılmıştır. Katılımcıların demografik verilerinin dağılımının belirlenmesi için betimsel istatistik yöntemler, yüzde (%) ve frekans (f) analizleri uygulanmıştır. Araştırmada anlamlılık düzeyi $p<0,05$ olarak kabul edilmiştir. Katılımcıların haftalık spor günü değişkeni bağlamında fiziksel aktiviteye katılım engellerinde, aile alt boyutunda spor yapmayan katılımcıların 3 gün ve altı spor yapan katılımcılara göre puan ortalamalarının yüksek olduğu belirlenmiştir. Buna ek olarak, arkadaş ve çevre alt boyutu incelendiğinde 4 gün ve üzeri spor yapan katılımcıların puan ortalamalarının ise spor yapmayanlara göre yüksek olduğu sonucuna varılmıştır. Sonuç olarak çalışmada, katılımcıların fiziksel aktiviteye katılımlarını engelleyen faktörler bazı değişkenlerden etkilenmektedir. Bunlar; spor deneyimleri, haftada spor yapılan gün sayısı, beden kitle indeksi olarak görülmektedir. Gelir düzeyi ile spor yapma konusunda aile desteği durumlarının ise fiziksel aktiviteye katılımı engelleme durumu üzerinde bir etkiye sahip olmadığı belirlenmiştir. Ayrıca spor yılı arttıkça fiziksel aktiviteye katılımı engelleyen etmenlerin farkındalığı da paralel olarak artış sağlayabileceği sonucuna varılmaktadır.

Anahtar kelimeler: Fiziksel aktivite, Z Kuşağı, Engel.

Abstract
The aim of this study is to examine the factors that prevent participation in physical activity in individuals of Generation Z. In addition, it is to determine the situation from the perspective of various variables. In the study, quantitative research method was used to determine the factors that prevent individuals from participating in physical activities and to analyze them in terms of various variables. In the study, "Personal Information Form" and "Factors Inhibiting Participation in Physical Activities of High School Students Scale" were used as data collection tools. Data were analyzed using SPSS program. After determining whether the data showed normal distribution, the analyses were performed with the necessary tests. Descriptive statistical methods, percentage (%) and frequency (f) analyses were applied to determine the distribution of the demographic data of the participants. The significance level in the study was accepted as $p<0.05$.

In the context of the weekly sports day variable of the participants, it was determined that the participants who did not do sports in the family sub-dimension had higher score averages than the participants who did sports 3 days or less. In addition, when the friends and environment sub-dimension was examined, it was concluded that the average scores of the participants who did sports 4 days or more were higher than those who did not do sports. As a result, the factors that prevent the participants from participating in physical activity in the study are affected by some variables. These are seen as sports experiences, the number of days of sports done per week, and body mass index. It was determined that income level and family support for doing sports do not have an effect on the situation of preventing participation in physical activity. It is also concluded that as the years of sports increase, the awareness of the factors that prevent participation in physical activity may increase in parallel.

Keywords: Physical activity, Generation Z, Disability.

GİRİŞ

Dünya Sağlık Örgütüne göre; iskelet kaslarının kasılması ile birlikte meydana gelen bazal seviye üzerinde enerji gerektiren; oyun oynama, ev işi yapma, çalışma ve boş zamanlarda yapılan etkinlikler de dâhil olmak üzere herhangi bir bedensel hareket fiziksel aktivite olarak tanımlanmaktadır (Thompson ve ark., 2009). Fiziksel aktivitede temel hedef, sedanter yaşam tarzının neden olduğu fiziksel bozuklukları önlemektir. İlaveten, fizyolojik kapasiteyi yükselterek beden sağlığını en iyi şekilde muhafaza etmektir. Fertlerde bedensel hareket azlığının akabinde ciddi boyutta sağlık problemleri meydana gelmektedir (Albayrak ve ark., 2015).

Teknolojinin gelişmesiyle birlikte lise öğrencilerinin fiziksel aktivitelere katılım oranları gittikçe azalmaktadır. İlaveten, yaşam tarzının kolaylaşması, eğitim hayatı ve başka birçok nedenden ötürü de azalma meydana gelmektedir. Buna paralel olarak birçok olumsuzluk da beraberinde gelmektedir. Lise öğrencileri fiziksel etkinliklerden uzaklaştıkça sosyal ilişki bağlarında zayıflama olmaktadır. Ek olarak sağlıklarının ilerleyen yaşlarda fiziksel aktivite yapan bireylere göre daha fazla olumsuz yönde etkilenebileceği yadsınamaz bir gerçektir. Fiziksel aktivite yapmak ve öz yeterlik inancı, lise öğrencilerinin fiziksel, sosyal, duygusal ve psikolojik yönden gelişimlerini gerçekleştirebilmesi açısından oldukça önemli bir yere sahiptir (Adak ve Yüksel, 2021).

Bireylerin toplumda fiziksel aktiviteye katılmalarına sebep olan engeller yaş ve cinsiyet gibi unsurlara göre değişiklik gösterebilirken, en yaygın kısıtlamalar arasında motivasyonel yetersizlik, sağlık endişeleri veya sınırlamaları yer almaktadır (Caviness ve ve ark., 2013). Zaman açısından sıkıntı yaşama, çevresel etmenler, psikolojik problemler, fiziksel yetersizlikler ve biyolojik unsurlar gibi birden fazla sebep de sayılabilmektedir (Armutçu, 2018). Bu bilgiler ışığında araştırmanın amacı; z kuşağını kapsayan bireylerde fiziksel aktiviteye katılımı engelleyen faktörlerin incelenmesidir.

YÖNTEM

Araştırma Modeli

Araştırmada nicel araştırma deseni kullanılmıştır. Araştırma betimsel tarama modelinde gerçekleştirilmiştir. Bu model geçmişte ya da halen var olan bir durumu var olduğu şekliyle betimlemeyi amaçlamaktadır (Karasar, 2002).

Araştırma Grubu

Şırnak'ta ikamet eden lise çağındaki 228 birey çalışma grubunu oluşturmaktadır. Bireylerin demografik özelliklerine ilişkin bazı bilgiler aşağıdaki grafiklerde yer almaktadır.

Ailenizin aylık geliri



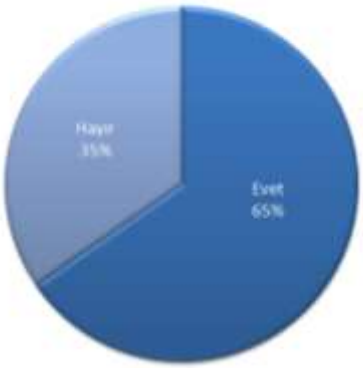
Spor yılı



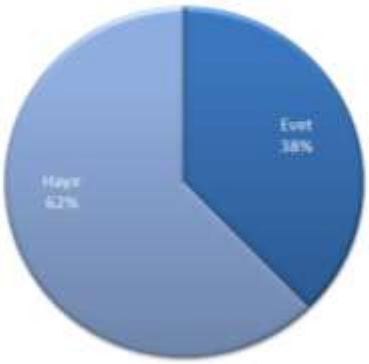
Haftalık spor günü



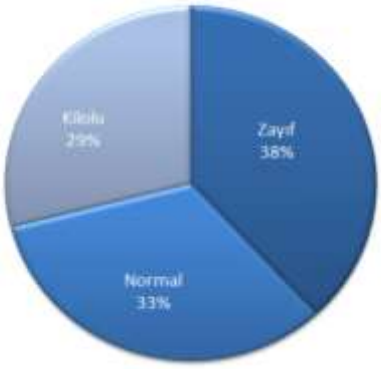
Ailenin spora desteği

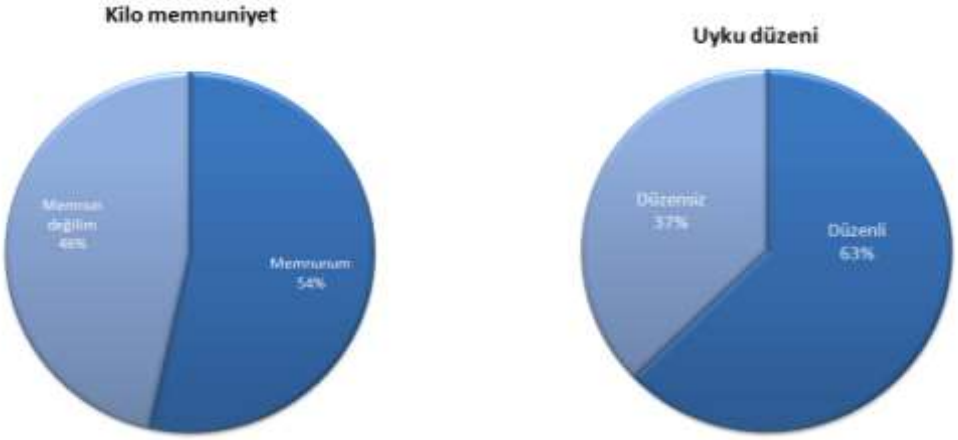


Ailede spor yapan birey



Vücut ağırlığı





Grafik. Katılımcıların Demografik Özellikleri

Veri Toplama Araçları

Bu araştırma kapsamında katılımcılardan veri toplamak amacıyla iki ölçme aracı kullanılmıştır. Katılımcıların fiziksel aktivitelere ilişkin katılımlarını engelleyen faktörleri ölçmek amacıyla "Lise Öğrencilerinin Fiziksel Aktivitelere Katılımını Engelleyen Faktörler Ölçeği" kullanılmıştır. Bireylerin sosyo-ekonomik özelliklerine ilişkin veriler araştırmacı tarafından geliştirilen Kişisel Bilgi Formu ile elde edilmiştir.

Lise Öğrencilerinin Fiziksel Aktivitelere Katılımını Engelleyen Faktörler Ölçeği: Özbek (2019) tarafından geliştirilen ölçek, 27 madde ve 5 alt boyuttan oluşmaktadır. Bunlar;

1. Alt boyut: 7 madde sayısına sahip olan "aile" faktörüdür.
2. Alt boyut: 7 madde sayısı olan "okul" faktörüdür.
3. Alt boyut: 6 madde sayısına sahip olan "tesis ve kulüp" faktörüdür.
4. Alt boyut: Madde sayısı 5 olan "eğitim sistemi" faktörüdür.
5. Alt boyut: Madde sayısı 2 olan "arkadaş çevre" faktörüdür. Ölçeğin Cronbach alpha değeri, α= 0.82 olarak belirtilmiştir.

Verilerin Analizi

Fiziksel aktivitiye ilişkin engellerin çeşitli değişkenlere göre karşılaştırılması amacıyla t testi ve Çok Yönlü Varyans Analizi (ANOVA) kullanılmıştır. Farklılığın hangi gruptan kaynaklandığını belirlemek amacıyla Tukey post-hoc testi yapılmıştır. Katılımcıların demografik verilerinin dağılımının belirlenmesi için betimsel istatistik yöntemler, yüzde (%) ve frekans (f) analizleri uygulanmıştır.

BULGULAR

Tablo 1. Katılımcıların aylık gelir düzeylerine göre t-testi sonuçları

FAKEF	Aylık gelir	N	X	Ss	T	P
Aile	İhtiyaçlarımızı karşılayabiliyoruz	182	22,22	4,155	,153	,696
	İhtiyaçlarımızı karşılayamıyoruz	46	22,19	4,553		
Okul	İhtiyaçlarımızı karşılayabiliyoruz	182	19,48	4,753	,046	,831
	İhtiyaçlarımızı karşılayamıyoruz	46	19,93	5,212		
Tesis, kulüp	İhtiyaçlarımızı karşılayabiliyoruz	182	18,36	3,143	,043	,836
	İhtiyaçlarımızı karşılayamıyoruz	46	17,93	3,151		

Eğitim sistemi	İhtiyaçlarımızı karşılayabiliyoruz	182	14,92	3,583	1,380	,241
	İhtiyaçlarımızı karşılayamıyoruz	46	15,34	3,121		
Arkadaş, çevre	İhtiyaçlarımızı karşılayabiliyoruz	182	6,44	1,794	,342	,559
	İhtiyaçlarımızı karşılayamıyoruz	46	6,41	1,640		
Toplam	İhtiyaçlarımızı karşılayabiliyoruz	182	81,44	9,041	2,211	,138
	İhtiyaçlarımızı karşılayamıyoruz	46	81,82	7,718		

p>0,05

Tablo 2. Spor yapan katılımcıların spor yapma yılı düzeylerine göre t-testi sonuçları

FAKEF	Spor yılı	N	X	Ss	T	P
Aile	4 yıl ve altı	69	21,84	4,431	,830	,364
	5 yıl ve üzeri	54	22,16	4,970		
Okul	4 yıl ve altı	69	18,39	4,908	,686	,409
	5 yıl ve üzeri	54	20,61	4,704		
Tesis, kulüp	4 yıl ve altı	69	18,72	3,433	,286	,594
	5 yıl ve üzeri	54	17,94	3,344		
Eğitim sistemi	4 yıl ve altı	69	14,81	3,300	,151	,698
	5 yıl ve üzeri	54	16,12	3,314		
Arkadaş, çevre	4 yıl ve altı	69	6,333	1,914	2,343	,128
	5 yıl ve üzeri	54	7,111	1,621		
Toplam	4 yıl ve altı	69	80,10	9,675	4,537	**,035**
	5 yıl ve üzeri	54	83,96	7,878		

****p<0,05***

Tablo 3. Spor yapan katılımcıların haftalık spor yapma durumlarına göre t-testi sonuçları

FAKEF	Haftalık Spor Günü	N	X	Ss	T	P
Aile	3 gün ve altı	72	21,44	3,924	,182	,671
	4 gün ve üzeri	51	21,52	4,527		
Okul	3 gün ve altı	72	18,91	4,604	,597	,441
	4 gün ve üzeri	51	20,27	4,935		
Tesis, kulüp	3 gün ve altı	72	18,23	3,392	,297	,587
	4 gün ve üzeri	51	18,00	3,181		
Eğitim sistemi	3 gün ve altı	72	15,08	3,422	,577	,449
	4 gün ve üzeri	51	15,47	3,489		
Arkadaş, çevre	3 gün ve altı	72	6,50	1,627	,940	,334
	4 gün ve üzeri	51	6,88	1,935		
Toplam	3 gün ve altı	72	80,18	8,999	,918	,340
	4 gün ve üzeri	51	82,15	9,992		

p>0,05

Tablo 4. Katılımcıların spor yapmada aile desteği durumuna göre t-testi sonuçları

FAKEF	Aile spora destek	N	X	Ss	T	P
Aile	Evet	149	22,16	4,469	2,593	,109
	Hayır	79	22,32	3,757		
Okul	Evet	149	19,52	4,849	,046	,831
	Hayır	79	19,67	4,853		
Tesis, kulüp	Evet	149	18,16	3,192	,168	,683
	Hayır	79	18,48	3,054		
Eğitim sistemi	Evet	149	15,10	3,360	1,393	,239
	Hayır	79	14,84	3,745		
Arkadaş, çevre	Evet	149	6,476	1,749	,001	,979
	Hayır	79	6,367	1,791		
Toplam	Evet	149	81,42	8,507	,340	,560
	Hayır	79	81,69	9,314		

p>0,05

Tablo 5. Katılımcıların ailelerinin spora katılım durumuna göre t-testi sonuçları

FAKEF	Aile spora katılım	N	X	Ss	T	P
Aile	Evet	86	22,75	4,606	1,870	,173
	Hayır	142	21,89	3,963		
Okul	Evet	86	19,20	5,122	,742	,390
	Hayır	142	19,79	4,666		
Tesis, kulüp	Evet	86	18,34	3,289	,146	,702
	Hayır	142	18,23	3,061		
Eğitim sistemi	Evet	86	14,89	3,261	,908	,342
	Hayır	142	15,08	3,634		
Arkadaş, çevre	Evet	86	6,488	1,858	1,135	,288
	Hayır	142	6,408	1,705		
Toplam	Evet	86	81,69	8,548	,008	,927
	Hayır	142	81,41	8,938		

p>0,05

Tablo 6. Katılımcıların vücut memnuniyet durumuna göre t-testi sonuçları

FAKEF	Vücut memnuniyet	N	X	Ss	T	P
Aile	Evet, memnunum	122	22,12	4,454	1,183	,278
	Hayır, memnun değilim	106	22,33	3,970		
Okul	Evet, memnunum	122	19,85	5,213	2,986	,085
	Hayır, memnun değilim	106	19,25	4,375		
Tesis, kulüp	Evet, memnunum	122	18,03	2,995	2,110	,148
	Hayır, memnun değilim	106	18,55	3,295		
Eğitim sistemi	Evet, memnunum	122	15,47	3,679	1,651	,200
	Hayır, memnun değilim	106	14,48	3,198		
Arkadaş, çevre	Evet, memnunum	122	6,573	1,753	,214	,644
	Hayır, memnun değilim	106	6,283	1,766		
Toplam	Evet, memnunum	122	82,05	9,470	2,628	,106

	Hayır, memnun değilim	106	80,90	7,901		

p>0,05

Tablo 7. Katılımcıların uyku durumuna göre t-testi sonuçları

FAKEF	Uydu düzeni	N	X	Ss	T	P
Aile	Düzenli	143	21,74	4,215	,016	,901
	Düzensiz	85	23,02	4,151		
Okul	Düzenli	143	19,99	5,060	1,824	,178
	Düzensiz	85	18,87	4,385		
Tesis, kulüp	Düzenli	143	18,16	3,206	,104	,747
	Düzensiz	85	18,45	3,041		
Eğitim sistemi	Düzenli	143	15,23	3,498	,007	,932
	Düzensiz	85	14,63	3,470		
Arkadaş, çevre	Düzenli	143	6,363	1,840	,835	,362
	Düzensiz	85	6,564	1,621		
Toplam	Düzenli	143	81,50	8,840	,003	,954
	Düzensiz	85	81,55	8,718		

p>0,05

Tablo 8. Katılımcıların spor yılına göre Anova sonuçları

FAKEF	Spor Yılı	N	X	Ss	F	P
Aile	Spor yapmıyorum (a)	105	22,49	3,664	,502	,606
	4 yıl ve altı (b)	69	21,84	4,431		
	5 yıl ve üzeri (c)	54	22,16	4,970		
	Toplam	228	22,21	4,228		
Okul	Spor yapmıyorum (a)	105	19,81	4,751	3,509	**,030* c>b**
	4 yıl ve altı (b)	69	18,39	4,908		
	5 yıl ve üzeri (c)	54	20,61	4,704		
	Toplam	228	19,57	4,840		
Tesis, kulüp	Spor yapmıyorum (a)	105	18,15	2,817	1,086	,339
	4 yıl ve altı (b)	69	18,72	3,433		
	5 yıl ve üzeri (c)	54	17,94	3,344		
	Toplam	228	18,27	3,142		
Eğitim sistemi	Spor yapmıyorum (a)	105	14,57	3,610	3,806	**,020* c>a**
	4 yıl ve altı (b)	69	14,81	3,300		
	5 yıl ve üzeri (c)	54	16,12	3,314		
	Toplam	228	15,01	3,492		
Arkadaş, çevre	Spor yapmıyorum (a)	105	6,161	1,647	5,571	**,003* c>a,b**
	4 yıl ve altı (b)	69	6,333	1,914		
	5 yıl ve üzeri (c)	54	7,111	1,621		
	Toplam	228	6,438	1,761		

Toplam	Spor yapmıyorum (a)	105	81,20	8,409	3,121	**,040* c>b**
	4 yıl ve altı (b)	69	80,10	9,675		
	5 yıl ve üzeri (c)	54	83,96	7,878		
	Toplam	228	81,52	8,775		

p<0,05

Tablo 9. Katılımcıların haftalık spor gününe göre Anova sonuçları

FAKEF	Haftalık spor günü	N	X	Ss	F	P
Aile	Spor yapmıyorum (a)	105	23,08	4,153	4,207	**,016* a>b**
	3 gün ve altı (b)	72	21,44	3,924		
	4 gün ve üzeri (c)	51	21,52	4,527		
	Toplam	228	22,21	4,228		
Okul	Spor yapmıyorum (a)	105	19,68	4,940	1,228	,295
	3 gün ve altı (b)	72	18,91	4,604		
	4 gün ve üzeri (c)	51	20,27	4,935		
	Toplam	228	19,57	4,840		
Tesis, kulüp	Spor yapmıyorum (a)	105	18,43	2,961	,340	,712
	3 gün ve altı (b)	72	18,23	3,392		
	4 gün ve üzeri (c)	51	18,00	3,181		
	Toplam	228	18,27	3,142		
Eğitim sistemi	Spor yapmıyorum (a)	105	14,74	3,549	,765	,467
	3 gün ve altı (b)	72	15,08	3,422		
	4 gün ve üzeri (c)	51	15,47	3,489		
	Toplam	228	15,01	3,492		
Arkadaş, çevre	Spor yapmıyorum (a)	105	6,181	1,730	2,831	**,020* c>a**
	3 gün ve altı (b)	72	6,500	1,627		
	4 gün ve üzeri (c)	51	6,882	1,935		
	Toplam	228	6,438	1,761		
Toplam	Spor yapmıyorum (a)	105	82,13	7,936	1,232	,294
	3 gün ve altı (b)	72	80,18	8,999		
	4 gün ve üzeri (c)	51	82,15	9,992		
	Toplam	228	81,52	8,775		

p<0,05

Tablo 10. Katılımcıların vücut ağırlığı düzeyine göre Anova sonuçları

FAKEF	Vücut ağırlığı	N	X	Ss	F	P
Aile	Zayıf (a)	87	22,22	4,586	,258	,773
	Normal (b)	75	22,45	3,402		
	Kilolu (c)	66	21,93	4,613		
Okul	Zayıf (a)	87	19,04	5,098	,845	,431
	Normal (b)	75	19,94	4,543		
	Kilolu (c)	66	19,84	4,830		
Tesis, kulüp	Zayıf (a)	87	18,02	3,191	,472	,624
	Normal (b)	75	18,38	2,990		
	Kilolu (c)	66	18,48	3,268		
Eğitim sistemi	Zayıf (a)	87	14,25	3,757	3,639	**,027* b>a**
	Normal (b)	75	15,66	3,256		
	Kilolu (c)	66	15,27	3,241		
Arkadaş, çevre	Zayıf (a)	87	6,590	1,800	,573	,565
	Normal (b)	75	6,333	1,671		
	Kilolu (c)	66	6,348	1,818		
Toplam	Zayıf (a)	87	80,14	9,331	1,917	,149
	Normal (b)	75	82,78	7,915		
	Kilolu (c)	66	81,89	8,826		

p<0,05

TARTIŞMA VE SONUÇ

Katılımcıların fiziksel aktivitelere katılımlarını engelleyen faktörlerin incelenmesinin hedeflendiği bu araştırmada elde edilen bulguların tartışılması bu bölümde yer almaktadır.

Araştırma sonucuna göre katılımcıların aylık gelir düzeylerinin fiziksel aktivite engel durumlarında anlamlı farklılık oluşturmadığı gözlenmektedir (Tablo 1). Aylık gelir durumunun bireylerin fiziksel aktiviteye katılım sağlaması hususunda herhangi bir engel teşkil etmediği söylenebilir.

Tablo 2'de spor yapan katılımcıların spor yapma yılı düzeylerine göre analizlerine yer verilmiş olup istatistiksel olarak toplam puanda farka rastlanmıştır. Bu farkın 5 yıl ve üzeri spor yapanlar lehine olduğu görülmektedir. Bu bağlamda uzun süreli spor yapan bireylerin spor engel faktörleri ile bilinçli farkındalık düzeylerini arttırmış olabilir. Yani spor yılı arttıkça fiziksel aktiviteye katılımı engelleyen etmenlerin farkındalığı da paralel olarak artış sağlayabilir.

Spor yapan katılımcıların haftalık spor yapma durumlarına göre t-testi sonuçları incelenmiş olup farkın anlamlı olmadığı tespit edilmiştir (Tablo 3). Katılımcıların spor yapmada aile desteği durumuna göre durumları incelendiğinde anlamlı fark oluşmadığı görülmektedir (Tablo 4). Katılımcıların ailelerinin spora katılma durumları bağlamında sonuçları incelendiğinde farkın istatiksel olarak anlamlı olmadığı saptanmıştır (Tablo 5). Bireylerin vücut memnuniyet durumları yönünde sonuçları incelenmiş olup farkın anlamlılık seyretmediği belirlenmiştir (Tablo 6). Uyku durumu değişkeni bağlamında analiz incelenmiş olup farkın anlamlılık göstermediği tespit edilmiştir (Tablo 7).

Katılımcıların spor yılı değişkenine göre fiziksel aktiviteye katılım engelleri incelendiğinde, toplam ölçek puanları ve okul alt boyutu bağlamında 5 yıl ve üzeri spor yapan katılımcıların almış aldıkları puan ortalamalarının 4 yıl ve altı spor yapan katılımcılara göre daha yüksek olduğu tespit edilmiştir (Tablo 8). Ayrıca bir diğer alt boyut olan eğitim sisteminde de 4 yıl ve altı spor yapan katılımcıların almış oldukları ortalama puanları spor yapmayan bireylere göre yüksek olduğu belirlenmiştir. İlaveten, arkadaş-çevre alt boyutuna bakıldığında 5 yıl ve üzeri spor yapan

katılımcıların diğer bireylere göre almış oldukları puan ortalamalarının daha yüksek olduğu saptanmıştır.

Katılımcıların haftalık spor günü değişkenine göre fiziksel aktiviteye katılım engellerine bakıldığında, aile alt boyutunda spor yapmayan katılımcıların 3 gün ve altı spor yapan katılımcılara göre puan ortalamalarının yüksek olduğu belirlenmiştir. Buna ek olarak, arkadaş ve çevre alt boyutu incelendiğinde 4 gün ve üzeri spor yapan katılımcıların puan ortalamalarının ise spor yapmayanlara göre yüksek olduğu sonucuna varılmıştır (Tablo 9).

Vücut ağırlığı değişkenine ilişkin fiziksel aktiviteye katılımı engelleyen faktörler incelendiğinde, eğitim sistemi alt boyutu yönünde vücut ağırlığını normal olarak nitelendiren katılımcıların almış oldukları puan ortalamaları kilosunu zayıf olarak kategorize eden bireylerden daha yüksek olduğu tablo 10'da görülmektedir.

Sonuç olarak çalışmada, katılımcıların fiziksel aktiviteye katılımlarını engelleyen faktörler katılımcıların spor deneyimleri, haftada kaç gün spor yaptıkları, vücut kitle indeksleri bağlamında farklılaşmaktadır. Gelir düzeyi ve ailenin spor yapma üzerindeki desteği perspektifinden ise fiziksel aktiviteye katılımı engelleme durumu üzerinde bir etkiye sahip olmamakta ve farklılık meydana getirmemektedir.

KAYNAKLAR

Adak, S., & Yüksel, M.F. (2021). Lise Öğrencilerinin Akademik Öz Yeterlik ve Fiziksel Aktivitelere Katılımını Engelleyen Faktörlerin İncelenmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi, 15*(3), 507-519.

Albayrak, E., Ziyagil, M.A., & Çekin, R. (2015). Okul, Spor ve Serbest Zamanlardaki Fiziksel Aktivite Alışkanlığının Üniversite Sınıf Düzeylerine Göre İncelenmesi. *Cbü Beden Eğitimi ve Spor Bilimleri Dergisi, 9*(2),8-17.

Armutcu, F. (2018). *Fiziksel aktivite amaçlı park ve rekreasyon alanlarının kullanımını etkileyen faktörlerin belirlenmesi* (Master's thesis, Batman Üniversitesi).

Caviness, C. M., Bird, J. L., Anderson, B. J., Abrantes, A. M., & Stein, M. D. (2013). Minimum recommended physical activity, and perceived barriers and benefits of exercise in methadone maintained persons. *Journal of Substance Abuse Treatment, 44*(4), 457-462.

Karasar, N. (2002). Bilimsel araştırma yöntemi. Ankara: Nobel Yayın Dağıtım.

Özbek S. (2019). Lise öğrencilerinin fiziksel aktivitelere katılımını engelleyen faktörler ölçeğinin geliştirilmesi. Doktora Tezi, Kırıkkale Üniversitesi. Sağlık Bilimleri Enstitüsü, Kırıkkale.

Thompson, D., Batterham, A.M., Markovitch, D., Dixon, N.C., Lund, A.J., & Walhin, J.P. (2009). Confusion and conflict in assessing the physical activity status of middle-aged men. *PLoSOne, 4*(2), 4337.

FİTNESS SALONLARINA DEVAM EDEN BİREYLERİN ÖZ GÜVEN DÜZEYLERİNİN İNCELENMESİ

EXAMINATION OF SELF-CONFIDENCE LEVELS OF INDIVIDUALS ATTENDING FITNESS CENTERS

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ÖZET

Bu araştırmanın amacı fitness salonlarına devam eden bireylerin öz güven düzeylerinin çeşitli değişkenlere göre incelenmesidir. Bu amaç doğrultusunda veri toplamak için ulaşılabilir olması nedeniyle kolayda örnekleme yöntemi kullanılmıştır. Bu araştırma Kocaeli ilinde faaliyet gösteren fitness salonlarından hizmet almış gönüllü katılımcılar ile gerçekleştirilmiştir. Araştırmanın çalışma grubunu, 48 kadın ve 31 erkek olmak üzere toplam 79 gönüllü katılımcı oluşturmaktadır. Verilerin toplanması aşamasında literatür bilgiler ışığında ve araştırmacılar tarafından hazırlanan 10 soruluk kişisel bilgi formu ile Akın (2007) tarafından geliştirilen 33 soruluk Özgüven Ölçeği uygulanmıştır. Ölçekler Google Form üzerinden hazırlanarak linkleri fitness salonlarına devam eden bireylere araştırmanın amacı açıklandıktan sonra dağıtılmıştır. Google form üzerinden gönüllülük esasına dayalı uygulanan anket doldurma işlemine toplam 79 kişi katılmıştır. Anket uygulamasına katılan toplam 79 kişiden elde edilen verilerin değerlendirilmesi ve istatistiksel analizler SPSS 27 yazılımı kullanılarak yapılmıştır. Değişkenlerin normal dağılıma uygunluğu basıklık ve çarpıklık değerleri kontrol edilerek incelenmiş, tanımlayıcı analizler ortalama ve standart sapma kullanılarak verilmiştir. Verilerin normal dağılım gösterdiği tespit edilerek analizlerde ikili grup karşılaştırmalarda bağımsız gruplar t Testi ile ikiden fazla grup karşılaştırmalarda tek yönlü varyas analizi ANOVA kullanılmış ve gruplar arası oluşan farklılıkları tespit etmek amacıyla PostHoc testleri yapılmıştır. Veri analizleri incelendiğinde; cinsiyet, anne eğitim durumu, baba eğitim durumu, kardeş sayısı, gelir düzeyi, ne zamandır fitness yapıyorsunuz ve spor dışı etkinlik yapıyor musunuz değişkenleri açısından anlamlı bir farklılık bulunmazken; yaş değişkeni açısından iç öz güven alt boyutunda, meslek ve fitness dışı spor yapma durumu değişkenleri açısından ise iç öz güven ve dış öz güven alt boyutlarında anlamlı farklılık bulunmuştur. Sonuç olarak araştırmanın daha büyük örneklemde çalışılması önerilmektedir.

Anahtar Kelimeler: Fitness Salonu, Öz Güven**,** Birey, Spor, Egzersiz

ABSTRACT
The aim of this study is to examine the self-confidence levels of individuals attending fitness centers according to various variables. In order to collect data for this purpose, convenience sampling method was used because it is accessible. This research was conducted with voluntary participants who received services from fitness centers operating in Kocaeli province. The study group of the research consists of a total of 79 volunteer participants, 48 women and 31 men. In the data collection phase, a 10-question personal information form prepared by the researchers in the light of the literature and the 33-question Self-Confidence Scale developed by Akın (2007) were applied. The scales were prepared via Google Form and the links were distributed to individuals attending fitness centers after explaining the purpose of the study. A total of 79 people participated in the voluntary questionnaire filling process via Google Form. The evaluation of the data obtained from a total of 79 people participating in the questionnaire application and statistical analyzes were performed using SPSS 27 software. The compatibility of the variables with normal distribution was examined by checking the kurtosis and skewness values, and descriptive analyzes were given using mean and standard deviation. It was determined that the data were normally distributed and independent groups t test was used for pairwise group comparisons, one-way variance analysis ANOVA was used for more than two group comparisons and PostHoc tests were performed to determine the differences between groups. When the data analyses were analyzed, no significant difference was found in terms of gender, mother's education level, father's education level, number of siblings, income level, how long have you been doing fitness and do you do non-sport activities; while a significant difference was found in the internal self-confidence sub-dimension in terms of age variable, and in the internal self-confidence and external self-confidence sub-dimensions in terms of occupation and non-fitness sports status variables. As a result, it is recommended that the study should be conducted with a larger sample.

Keywords: Fitness Center, Self-Confidence, Individual, Sport, Exercise

GİRİŞ

İnsanların zinde olmak ve sağlıklı yaşamak için serbest zaman dilimlerinde düzenli olarak aktivite yapmak için tercih ettikleri yerler genelde fitness merkezleridir. Bu merkezler aynı zamanda insanların hareket etme ihtiyacını karşılamayabilmek için hizmet etmekte ve bu ürettikleri hizmetlerini geliştirebilmek için faaliyet göstermektedir (Bektaş, 2015). Günümüz yaşam biçimi insanları hem fiziksel hem de mental açıdan yıpratmakta bu durum da yaşam kalitesinde düşme yaratabilmektedir. Fitness merkezleri ve spor işletmeleri son zamanlarda ortaya çıkan talepleri değerlendirerek bu durumu kendileri için kuruluş amacı olarak açıklamışlardır. Özellikle fitness salonları kişilerin fiziksel zihinsel olarak daha iyi bir düzeye gelmeler ve kişilerin sosyalleşmesi için de gerekli özelliklere sahip olan çok uygun merkezler olarak açıklanmışlardır (Taşdemir, 2015).

Fitness, hareketlerinin tam ve doğru bir şekilde yapılmasıyla kazanılan mevcut form ve kondisyon durumunu ortaya koyduğu. Bireylerin gerek rutin işlerini gerek ise serbest zaman faaliyetlerini en üst seviyede gerçekleştirmelerini sağlayan bir aktivite olduğu belirtilmiştir (Karatosun, 2006). Dünya Sağlık Örgütü (DSÖ) uzmanlar komitesi fitness, diğer adıyla fiziksel uygunluğu; "Kassal çalışmaların uygun yeterlilikte olması durumu" şeklinde tanımlamıştır (Özer, 2006). Pek çok insanın fitnessa başlama amacının genel olarak; beden ve ruh sağlığının iyi olmasını sağlamak, zinde ve dinç olmak, kas kaybı yerine kas kütlesinde artışa gitmek, eklem arası sıvı kayıplarının önüne geçmek, fazla kilolardan ya da zayıf bir vücuttan kurtulmak, atik olmak gibi bir yaşam tarzı haline getirmektir. Kısaca fitness egzersizleri; insanların sağlıklarını korumak, ruh halini geliştirmek, esneklik kazanmak, zinde olmak ve sıkılaşmak için yaptıkları günlük aktiviteler bütünü olarak ifade etmenin daha uygun olacağı belirtilmiştir (Uğur ve Baysaling, 2002

Günümüzde, sağlıklı yaşam ve fiziksel uygunluk giderek daha fazla insanın önem verdiği konular haline gelmektedir. Bu bağlamda, fitness aktivitelerinin sadece fiziksel sağlığa değil, aynı zamanda psikolojik ve duygusal iyilik haline de olumlu etkileri olduğu yönündeki düşüncenin giderek daha fazla kabul gördüğü bilinmektedir. Özellikle, düzenli egzersiz yapmanın bireylerin özgüvenlerini artırdığı ve genel yaşam kalitelerini yükselttiği birçok araştırma tarafından desteklenmektedir (Fox, 2000; Karagün, 2014; Sonstroem ve Morgan, 1989).

Öz güven, insanın kişiliğinin temeli açısından önemli bir etki yarattığı, ayrıca insan hayatını doğrudan etkileme özelliğine sahip olduğu ifade edilen bir kavram olarak görülmektedir. Öz güven bireyin hayatın getirdiği zorluklarla daha yoğun bir şekilde baş edebilmesine olanak sağlamak için bireyin daha güçlü olmasını gerektiren bir kavramdır. Bireyin öz güveninin zaman zaman iniş çıkışlarla olmakla birlikte zaman boyunca da değişiklik gösterebilmektedir. Bir diğer yandan öz güvenin bireyin zorluklarla mücadele etme gücünü ve motivasyonunu belirli seviyelerde arttırdığı (Demirer, 2010) bireylerin geleceğe daha iyimser bir biçimde bakmasını sağladığı görülmektedir. Öz güven bireylerin başarılı olabilmesi için gereken soyut olgulardan birisi olarak bireylerin daha cesur olmasında ve kendilerini daha iyi hissetmelerinde katkıda bulunduğu ileri sürülmüştür (Kaya, 2017).

Bireylerin düzenli olarak fiziksel aktivitede bulunması durumunda öz güven duygularının da daha fazla geliştiği belirtilmiştir (Kaya, 2017). Öz güven seviyesi yüksek olan olan bireylerin, başarılı olabilmek için var olan potansiyellerini ortaya çıkaracak psikolojik ve fiziksel beceriye sahip olduklarına inandıkları, bu durumun da öz güveni yüksek bireylerin yoğun baskı ve stres altındayken rahat ve sakin olmalarına bununla beraber daha olumlu düşüncelere odaklanabilmelerine imkan sağlayan önemli bir etken olduğu yönünde açıklamalar yapılmıştır (Yıldırım, 2013). Tüm bu açıklamalardan yola çıkıldığında farklı spor branşlarına katılan bireylerle çalışılmış olan öz güvenin serbest zamanda fitness salonlarına devam eden bireylerde ne durumda olduğu merak edilmiştir.

Bu açıdan spor merkezlerine devam eden bireylerin öz güven düzeylerinin incelenmesi amaçlanmıştır. Bu ana amaç dahilinde ayrıca; fitness salonlarına devam eden bireylerin; yaş, anne eğitim durumu, baba eğitim durumu, gibi sosyo-demografik değişkenler açısından öz güven düzeylerinin değişim gösterip göstermediğinin belirlenmesi alt amaç başlıkları olarak alınmıştır.

YÖNTEM

Araştırma Grubu

Bu araştırma betimsel bir çalışmadır. Araştırmanın evreni Kocaeli ve İstanbul illerinde ticari işletme olarak faaliyet gösteren fitness salonlarına devam eden üyelerden oluşmaktadır. Örneklemi ise bu üyelerden araştırmaya gönüllü katılım sağlayan 79 (kadın=48, erkek=31) kişiden oluşmaktadır.

Veri Toplama Araçları

Araştırmada katılımcıların, ekonomik, kişisel ve sosyal özelliklerine ilişkin bilgilerin sorgulandığı 10 soruluk kişisel bilgi formu ve Akın (2007)'ın geliştiirdiği 'Özgüven Ölçeği' kullanılmıştır.

Kişisel bilgi formu

Fitness salonlarına giden bireylerin demografik özelliklerini tanımak amacıyla, literatür bilgileri ışığında araştırmacılar tarafından hazırlanan bilgi formunda bireylerin; yaş, cinsiyet, anne- baba eğitim durumu, kardeş sayısı, çalışma durumu, gelir düzeyi, spor dışında bir etkinliğe katılıp katılmamaları, ne zamandır fitness yaptıkları, fitness dışında spor yapıp yapmadıklarına ilişkin değişkenleri sorgulayan 10 soru maddesi bulunmaktadır.

Öz Güven Ölçeği

Bireylerin öz güven seviyelerini belirlemek amacıyla Akın (2007)'ın geliştirdiği 33 madde ve 2 alt boyutlu, 5'li likert türünde, kendini değerlendirmeyi içeren "Öz Güven Ölçeği" kullanılmıştır.

Ölçekten alınan yüksek puanlar yüksek öz güveni düşük alınan puanlar ise düşük öz güveni ifade etmektedir (Akın, 2007).

Verilerin Analizi

Verilerin istatistiksel değerlendirmesi SPSS 27.00 yazılımı kullanılarak gerçekleştirilmiştir. Tanımlayıcı istatistiklere yönelik olarak, frekans ve yüzde analizleri gerçekleştirilmiş ve çarpıklık ile basıklık değerlerine bakılarak verilerin normal dağılım sergileyip sergilemediği test edilmiştir. Elde edilen verilerin +1 ve -1 aralığında olduğu gözlemlenmiş ve bu değerlere dayanarak verilerin normal dağılım sergilediği belirlenmiştir. İkili değişkenlerdeki farkların tespiti için T-Testi, çoklu değişkenlerde ise Tek Yönlü Varyans Analizi kullanılmıştır. Farklılığın kaynağının belirlenmesinde Tukey HSD tercih edilmiştir. İlişkisel analizde, korelasyon katsayısı hesaplaması yapılmıştır. Anlamlılık düzeyi 0,05 olarak belirlenmiştir

BULGULAR

Tablo 1: Katılımcıların frekans ve yüzde dağılımları

Değişkenler		**N**	**%**	**Değişkenler**		**N**	**%**
Cinsiyet	Kadın	48	60.8	**Spor Dışında Bir Etkinliğe Katılıyor Musunuz**	Evet	51	64,6
	Erkek	31	39.2		Hayır	28	35,4
Yaş	20 yaş ve altı	35	44.3	**Finess Dışında Spor Yapıyor Musunuz**	Evet	45	57,0
	21 yaş ve üzeri	44	55.7		Hayır	34	43,0
Anne Eğitim Durumu	Okul mezunu değil	2	2.5	**Aylık Gelir**	20.000 ve altı	47	59,5
	İlkokul	20	25.3		20.001 ve 30.000	11	13,9
	Ortaokul	5	6.3		30.001 ve 40.000	9	11,4
	Lise	25	31.6		40.001 ve 50.000	4	5,1
	Lisans	20	25.3		50.001+	8	10,1
	Lisansüstü	7	8.9	**Kardeş Sayısı**	Tek çocuk	3	3.8
Baba Eğitim Durumu	İlkokul	18	22.8		2	42	53.2
	Ortaokul	8	10.1		3	22	27.8
	Lise	23	29.1		4	5	6.3
	Lisans	25	31.6		5+	7	8.9
	Lisansüstü	5	6.3	**Kaç Yıldır Fitness Yapıyorsunuz**	1 yıl ve altı	49	62,0
Meslek	Öğrenci	69	87.3		1-2 yıl	20	25,3
	Kamu	4	5.1		3-4 yıl	4	5,1
	Özel	6	7.6		4+	6	7,6

Tablo 1'e bakıldığında; katılımcıların %55,7'si 21 yaş ve üzerinde, %39,2'si erkek, %60,8'i kadın, %59,5'u 20.000 TL ve altında gelire sahip, anne eğitim durumunda %31.6 lise mezunu iken baba eğitim durumunda %31,6 oranda üniversite mezunu olduğu, %35,4'ü spor dışında herhangi bir etkinliğe katılmadığını, %43'ü fitness dışında spor yapmadığını, 87,3 ünün öğrenci

olduğu, %53,2' sinin 2 kardeşi olduğu ve %62,0 sinin 1 yıl ve daha süredir fitness yaptığı belirlenmiştir.

Tablo 2. Katılımcıların sosyo-demografik özellikleri ve spor katılım durumlarına göre öz güven ölçeği ve alt ölçeklerinin analizlerinin karşılaştırılması

Değişkenler		**İç Öz Güven Ort/sd**	**Dış Öz Güven Ort/sd**
Cinsiyet	Kadın	3.66±.750	3.58±.794
	Erkek	3.94±.645	3.92±.750
	p	.083	.055
	t	-1.756	-1.975
Yaş	20 yaş ve altı	3.83±.667	3.88±.760
	21 yaş ve üstü	3.72±.765	3.58±.805
	p	**.002***	.080
	t	.658	1.701
Spor Dışında Etkinliğe Katılma Durumu	Evet	3.78±.760	3.76±.779
	Hayır	3.74±.655	3.63±.821
	p	.816	.517
	t	.234	.650
Fitness Dışında Spor Yapma Durumu	Evet	3.93±.655	3.90±.722
	Hayır	3.56±.758	3.47±.821
	p	**.023***	**.015***
	t	2.327	2.481

Tablo 2' ye bakıldığında cinsiyet değişkeni açısından iç özgüven ve dış özgüven alt boyutlarında anlamlı fark bulunmamıştır ($p>0.05$). Yaş değişkeni açısından iç özgüven alt boyutunda 20 yaş ve altında olanlar lehine anlamlı fark görülürken ($p<0.05$) dış özgüven alt boyutunda anlamlı farklılık görülmemiştir ($p>0.05$). Spor dışında etkinliğe katılma durumuna göre her iki alt boyutta da anlamlı farklılık bulunmazken ($p>0.05$), fitness dışında spor yapma durumuna göre hem iç hem de dış öz güven her iki alt boyutta da spor yapanlar lehine anlamlı farklılık görülmüştür ($p<0.05$).

Tablo 3. Katılımcıların anne ve baba eğitim durumu, aylık gelir durumlarına göre öz güven ölçeği ve alt ölçeklerinin analizleri

Değişkenler		**İç Öz Güven Ort/sd**	**Dış Öz Güven Ort/sd**
Anne Eğitim Durumu	Okul Mezunu Değil	3.59±.919	3.97±1.37
	İlkokul	3.69±.664	3.45±.718
	Ortaokul	3.44±.538	3.00±.798
	Lise	3.79±.582	3.74±.684
	Lisans	4.00±.780	3.95±.772
	Lisanüstü	3.59±1.185	4.14±.963
	p	.583	.061
	F	.758	2.219
Baba	İlkokul	3.66±.680	3.53±.852
	Ortaokul	3.77±.789	3.64±.944

Eğitim Durumu	Lise	3.78±.660	3.67±.741
	Lisans	3.92±.639	3.84±.684
	Lisanüstü	3.34±1.337	4.03±1.14
	p	.506	.640
	F	.837	.634
Aile Geliri	20.000 ve altı	3.74±.589	3.59±.692
	20.001 ve 30.000	3.92±.767	3.82±.808
	30.001 ve 40.000	3.60±.950	3.64±1.07
	40.001 ve 50.000	4.09±.480	4.05±.704
	50.001 TL ve üstü	3.74±1.18	4.21±.941
	p	.777	.260
	F	.302	.162

Tablo 3' de görüldüğü üzere anne eğitim durumu, baba eğitim durumu ve aile gelir düzeyi değişkenlerine göre iç öz güven ve dış özgüven alt boyut düzeylerinde istatistiksel açıdan anlamlı bir farklılık bulunmamıştır (p>0.05).

Tablo 4. Katılımcıların meslek, fitness yapma süresi ve kardeş sayısına göre öz güven ölçeği ve alt ölçeklerinin analizleri

Değişkenler		**İç Öz Güven Ort/sd**	**Dış Öz Güven Ort/sd**
Kardeş Sayısı	Tek Çocuk	3.65±.734	3.62±1.02
	2	3.71±.649	3.71±.752
	3	4.06±.642	3.89±.714
	4	3.46±.967	3.16±.998
	5 ve üzeri	3.48±1.05	3.60±1.04
	p	.121	.310
	F	2.006	1.215
Kaç Yıldır Fitness Yapıyorsunuz?	1 yıl ve altı	3.70±.703	3.65±.803
	1-2 Yıl	3.71±.639	3.75±.749
	3-4 Yıl	3.90±.249	3.81±.406
	4 yıl üzeri	3.91±1.27	4.00±1.08
	p	.698	.766
	F	1.647	1.926
Meslek	Öğrenci[a]	3.84±.650	3.79±.756
	Kamu Sektörü[b]	3.06±1.45	3.10±1.32
	Özel Sektör[c]	3.41±.6.82	3.25±.536
	p	**.046***	**.007***
	F	3.202	2.668
	Farkın Kaynağı	b,c<a	c<a

Tablo 4' te görüldüğü üzere kardeş sayısı ve spor salonuna gitme süresine bakıldığında iç öz güven ve dış öz güven durumunda anlamlı bir fark bulunmamıştır ($p>0.05$). Ancak mesleğe göre iç öz güven ve dış öz güven alt boyutlarında anlamlı farklılık bulunmuştur ($p<0.05$). İç öz güven alt boyutunda farkın hangi gruptan kaynaklandığını bulmak için yapılan Tukey testinde öğrenci olan katılımcıların özel sektör ve kamu sektöründe çalışan katılımcılara göre ortalama puanlarının daha yüksek olduğu sonucu bulunmuştur. Dış öz güven açısından bakıldığında ise öğrenci olan katılımcıların özel sektör katılımcılarına göre dış öz güven puan ortalaması daha yüksek olduğu bulunmuştur.

TARTIŞMA VE SONUÇ

Bu araştırma, serbest zamanlarında fitness salonlarına devam eden bireylerin öz güven düzeylerinin incelenmesi amacıyla yapılmıştır.

Tablolar incelendiğinde; katılımcıların öz güven düzeyleri arasında cinsiyet, anne eğitim durumu, baba eğitim durumu, kardeş sayısı, gelir düzeyi, ne zamandır fitness yapıyorsunuz ve spor dışı etkinlik yapıyor musunuz değişkenleri açısından anlamlı bir farklılık bulunmazken; yaş değişkeni açısından iç öz güven alt boyutunda, meslek ve fitness dışı spor yapma durumu değişkenleri açısından ise iç öz güven ve dış öz güven alt boyutlarında anlamlı farklılık bulunmuştur.

Araştırmaya katılan bireylerin öz güven puanları cinsiyete göre değerlendirildiğinde; cinsiyet değişkeni açısında anlamlı bir farklılık olmadığı görülmüştür. Literatüre bakıldığında bu çalışmanın sonuçlarına benzer olarak kadın ve erkekler arasında anlamlı bir fark olmadığını gösteren araştırmaların olduğu görülmüştür (Musa, 2020; Okyay, 2012; Yıldız vd., 2016). Bu benzer sonuçların aksine kadın ve erkekler arasında anlamlı farklılıklar bulunan çalışmaların olduğu da görülmüştür (Alaca, 2022; Esentaş vd., 2017; Yarımkaya vd., 2014; Yılmaz ve Ağgön, 2023). Kadın ve erkeklerin öz güven puan ortalamaları arasında anlamlı farkın çıkmamasının sebebi serbest zamanlarında spor yapan grupla araştırmanın yapılmış olmasından kaynaklanabileceği düşünülmüştür. Nitekim bu araştırmada sorgulanan değişkenlerden olan spor yapan kişiler ile yapmayan kişiler arasında spor yapan kişiler lehine hem iç hem de dış öz güven puanlarının anlamlı derecede öz güven düzeyinin yüksek çıkması ve bu çalışmaya katılan kişilerin de düzenli bir şekilde fitness yaptıkları da göz önüne alındığında bu düşünceyi destekleyen bir durum olarak değerlendirilmiştir. Ancak konuyla ilgili kesin sonuçlar alınması açısından daha farklı ve deneysel çalışmaların yapılarak değerlendirilmesinin uygun olacağı düşünülmüştür.

Fitness dışında spor yapma durumu değişkenine göre özgüven düzeyleri incelendiğinde; hem iç öz güven alt boyutunda hem de dış öz güven alt boyutunda spor yapanlar lehine anlamlı farklılık bulunmuştur. Literatür incelendiğinde bu sonuçlara benzer şekilde birden fazla spor branşı ile ilgilenen bireylerin tek bir sporla ilgilenen bireylere göre hem iç öz güven hem de dış öz güven puan ortalamaları arasında anlamlı farklılık olduğu belirlenmiştir. (Musa, 2020; Tel vd., 2018; Zeyrek ve Doğar, 2020).

Meslek değişkenine göre öz güven ölçeği ve alt ölçeklerine bakıldığında anlamlı sonuç ortaya konduğu görülmüştür. Bu anlamlılığın hangi gruplar kaynaklı olduğuna Tukey testi sonucuna bakıldığında; öğrenci olanların kamu sektörü ve özel sektörde çalışanlara göre anlamlı ölçüde daha yüksek puan ortalamasına sahip olduğu, dış öz güven alt boyutunda ise öğrenci olan katılımcıların özel sektörde çalışan katılımcılara göre anlamlı düzeyde yüksek öz güvene sahip oldukları tespit edilmiştir. Literatürde bu çalışma bulgularının aksine kamu sektöründe çalışanların diğer meslek gruplarına göre hem iç öz güven hem de dış öz güven alt boyutlarında daha yüksek öz güvene sahip olduğu tespit edilmiştir (Bozkurt, 2022; Teixeira ve Pereira, 2010). Bu araştırmada öğrencilerde öz güven düzeyinin anlamlı derecede yüksek çıkmasının nedenlerine ilişkin daha detaylı çalışmaların planlanmasının önerilmesi uygun görülmüştür.

Yaş açısından bakıldığında; 20 yaş ve altında olan katılımcıların iç öz güven puan ortalamasının 21 yaş ve üstünde olanlardan anlamlı derecede daha yüksek olduğu, dış öz güven alt boyutunda ise yaş açısından anlamlı bir ilişki bulunmadığı tespit edilmiştir. Literatür incelendiğinde çalışmanın aksine yaş açısından öz güven alt ölçeklerinde anlamlı fark bulmayan çalışmalar olmakla birlikte (Başoğlu, 2007; Bostancı vd., 2018; Gökkaya ve Biçer, 2017; Karagün, 2014; Yağan, 2019) bu çalışmaya benzer biçimde yaş değişkeni açısından yaşı daha genç olanların öz güven puan ortalamalarının yaşı daha büyük olanlara göre anlamlı derecede yüksek olduğunu gösteren çalışmalar da görülmüştür (Aksoy 2019; Dirik, 2016). Yaşı genç olanlar ve öğrencilerde öz güven puanlarının anlamlı derecede yüksek olması birbirini destekler nitelikteki sonuçlardır. Ancak konuyla ilgili detaylı çalışmaların planlanması ve nedenlere ilişkin detaylı sonuçlara ulaşılması önemli görülmüştür.

Gelir düzeyine göre öz güven ölçeği ve alt ölçek sonuçlarına bakıldığında; anlamlı bir fark olmadığı görülmüştür. Konuyla ilgili yapılan araştırmalarda gelir düzeyi ile öz güven arasında anlamlı bir ilişki bulmayan çalışmaların olduğu görülmüştür (Acuner; 2012; Ateş, 2020; Karabulut, 2019). Bir başka çalışmada ise gelir düzeyi açısından öz güven düzeyinde gelir düzeyi yüksek olanlar lehine anlamlı farklılık bulunmuştur (Bilgin, 2011). Sporcular üzerine yapılan bir diğer çalışmada gelir düzeyinin artmasıyla beraber öz güven düzeylerinde de artış yaşandığı tespit edilmiştir (Gökkaya ve Biçer, 2017). Literatürde bazı çalışmalarda ise gelir seviyesi azaldıkça öz güven düzeyinin de düştüğü sonucunu bulan çalışmaların da olduğu görülmüştür (Yaylacı, 2019; Yılmaz, 2021).

Katılımcılara uygulanan öz güven ölçeğinin her iki alt boyutunda spor dışı etkinliğe katılma özellikleri incelendiğinde anlamlı bir sonuç bulunmamıştır. Sonuçlar anlamlı olmasa da ortalamaları bakımından iç öz güven alt boyutu ile dış öz güven alt boyutunda spor dışı etkinliğe katılanların katılmayanlara göre puanları daha yüksek bulunmuştur.

Fitness sporunu ne kadar süredir yapıldığı değişkenine göre öz güven puan ortalamaları arasından anlamlı fark bulunmamıştır. Her ne kadar anlamlı fark bulunmasa da fitness yapma süresi arttıkça hem iç öz güven hem de dış öz güven puan ortalamasının da arttığı görülmüştür. Konuyla ilgili yapılan literatür incelemesinde spor yapma süresi arttıkça öz güvenin arttığını gösteren çalışmalar mevcuttur (Esentaş vd., 2017; Zorba vd., 1997). Bu sonuç spor yapma durumunda öz güven arttığına ilişkin sonuçla değerlendirildiğinde, spor yapma süresi arttıkça öz güven düzeyinin armasına yönelik beklentiyi karşılamadığı görülmektedir. Bu açıdan spor yapıp yapmama ve spor yapanlarda spor yapma süresinin öz güvene etkisini değerlendiren daha detaylı deneysel çalışmalara ihtiyaç olduğu düşünülmüştür.

Öz güven puanlarının annenin öğrenim durumu ile karşılaştırıldığında iç öz güven ve dış öz güven alt boyutlarında anlamlı bir fark olmadığı tespit edilmiştir. Literatürde çalışmamızın aksine anne eğitim düzeyi arttıkça öz güvenin de anlamlı derecede artacağını savunan araştırmalar (Özkan, 1994; Yiğit, 2010), olmakla birlikte bu çalışmaya benzer şekilde öz güven üzerinde anne eğitiminin bir etkisinin olmadığı sonucuna varan araştırmalar olduğu görülmüştür (Dilek ve Aksoy 2013; Öztürk, 2017; Sezer ve Vuslat, 2010).

Baba eğitim düzeyi ile öz güven ilişkisi incelendiğinde anlamlı fark olmadığı belirlenmiştir. Literatür verileri incelendiğinde babanın eğitim durumu düştükçe öz güven düzeyinin de düştüğünü belirten çalışmalar (Çelik ve Onay, 2014; Yiğit, 2010) olmakla birlikte bu çalışmaya benzer şekilde babanın eğitim düzeyi ile öz güven düzeyinin ilişkili olmadığı sonucuna varan çalışmaların olduğu da görülmüştür (Dilek ve Aksoy 2013; Sezer ve Vuslat, 2010).

Sonuç olarak araştırma verileri değerlendirildiğinde; cinsiyet, anne eğitim durumu, baba eğitim durumu, kardeş sayısı, gelir düzeyi, ne zamandır fitness yapıyorsunuz ve spor dışı etkinlik yapıyor musunuz değişkenleri açısından hem iç öz güven hem de dış öz güven açısından anlamlı fark görülmemiştir. Yaş değişkeni açısından dış öz güven alt boyutunda anlamlı fark görülmezken, iç

öz güven alt boyutunda, 21 yaş ve altında olan katılımcılar lehine anlamlı fark bulunmuştur. Meslek ve fitness dışı spor yapma durumu değişkenleri açısından ise iç öz güven ve dış öz güven alt boyutlarında öğrenciler lehine anlamlı farklılık bulunmuştur Konu ile ilgili daha kesin sonuçlara ulaşmak açısından daha büyük örneklemde farklı çalışmaların özellikle deneysel araştırmaların yapılması önerilmektedir.

KAYNAKLAR

Acuner, A. (2012). Farklı dansları yapan bireylerin çeşitli değişkenlere göre özgüven ve öz yeterliliklerinin karşılaştırılması, Yayınlanmamış Yüksek Lisans Tezi, Karadeniz Teknik Üniversitesi, Trabzon.

Akın, A. (2007). Öz-Güven ölçeğinin geliştirilmesi ve psikometrik özellikleri, *Abü Eğitim Fakültesi Dergisi,* 7(2), 165-175.

Aksoy, U. (2019). Farklı klasmanlarda görev yapan futbol hakemlerinin iletişim becerileri ve öz güven düzeylerinin çeşitli değişkenlere göre incelenmesi (Aydın İli Örneği). Yüksek Lisans Tezi, Aydın Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü, Aydın.

Alaca, E. (2022). Beden Eğitimi ve Spor Öğretmenliği Bölümü Öğrencileri ile Psikolojik Danışmanlık ve Rehberlik Bölümü Öğrencilerinin Liderlik Yönelimleri ve Özgüven Davranışlarının Karşılaştırılması Yüksek Lisans Tezi, Giresun Üniversitesi, Sağlık Bilimleri Enstitüsü, Beden Eğitimi ve Spor Anabilim Dalı.

Ateş, A. (2020). Bireylerin ve sorumluluğunun akademik başarının üzerindeki rolü, Yayınlanmamış Yüksek Lisans Tezi, İstanbul Sabahattin Zaim Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Başoğlu, S. T. (2007). Sınav Kaygı ile Öz güven Arasındaki İlişkinin Erinlik Döneminde İncelenmesi. Maltepe Üniversitesi Sosyal Bilimler Enstitüsü. Psikoloji, İnsan Bilimleri ve Felsefe Yüksek Lisans Programı. Yüksek Lisans Tezi. İstanbul.

Bektaş, M. (2015).İstanbul'da Zincir Fitness Merkezlerinde Sunulan Hizmetlerin Üye Memnuniyeti Açısından Değerlendirilmesi. Haliç Üniversitesi Sağlık Bilimleri Enstitüsü Beden Eğitimi ve Spor Anabilim Dalı. Yüksek Lisans Tezi

Bilgin, O., 2011, Ergenlerde özgüven düzeyinin bazı değişkenler açısından incelenmesi, Yayınlanmamış Yüksek Lisans Tezi, Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü, Sakarya.

Bozkurt, H. (2022). Spor Yapan ve Yapmayan Ampute Bireylerin Öz Güven Düzeylerinin Karşılaştırılması, Yüksek Lisans Tezi, Kahramanmaraş Sütçü İmam Üniversitesi Sağlık Bilimleri Enstitüsü, Kahramanmaraş.

Bostancı, Ö., Karaduman, E., ve Şebin, K. (2018). Dağcıların Özgüven Seviyelerinin Çeşitli Değişkenler Açısından İncelenmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 20(3), 145-154.

Çelik, Y., & Onay, I. (2014). 6. sınıf öğrencilerinin bilimsel tutumları ve öz güvenleri arasındaki ilişkinin çeşitli değişkenlere göre incelenmesi. *Asian Journal Of Instruction*, 2(2), 38-51.

Demirer, Y. (2010). Beden Algısı ve Ruh Sağlığı https://www.acilservis.pro/beden-algisive-ruh-sagligi. Erişim tarihi: 06 Nisan 2024.

Dilek, H., & Aksoy, A. (2013). Ergenlerin benlik saygısı ile anne-babalarının benlik saygısı arasındaki ilişkinin incelenmesi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 14(3), 95-109

Dirik, K. (2016). Ergenlerde akıllı telefon bağımlılığı ile öz-güven arasındaki ilişkilerin çeşitli değişkenler açısından incelenmesi (Yayınlanmış Yüksek Lisans Tezi). İstanbul Gelişim Üniversitesi, Sağlık Bilimleri Enstitüsü, İstanbul.

Esentaş, M., Işıkgöz, E. Doğan, P. K. ve Şahin, H. M. (2017). Gençlik Kampı Kadın Lider Adaylarının Öz güven Düzeyleri. *Kastamonu Eğitim Dergisi*. 25 (1): 315-328. 13.

Fox, K. R. (2000). The influence of physical activity on mental well-being. *Public Health Nutrition,* 2(3a), 411-418.

Gökkaya, D. ve Biçer, T. (2017). Psikolojik beceri kıstası olarak özgüvenin elit sporcuların performansına katkısı; boks milli takımı örneği. *Marmara Üniversitesi Spor Bilimleri Dergisi,* 2 (1), 25.
Karabulut, Ö., 2019, Sporcuların sportif sürekli kendine güven düzelerinin çeşitli değişkenlere göre incelenmesi, Yüksek Lisans Tezi, İnönü Üniversitesi Sağlık Bilimleri Enstitüsü, Malatya.
Karagün, E. (2014). Self-Confidence Level in Professional Athletes; an Examination of Exposure to Violence, Branch and Socio-Demographic Aspects. *Journal of Human Sciences*, 11(2), 744-753.
Karatosun, H. (2006). Egzersizin yararları, ısınma ve soğuma, yaşlılarda spor. Ankara: Nobel Yayın Dağıtım.
Kaya, C. (2017). Sosyal Latin Dansçılarında Öz güven ve Yaşam Yönelimi Arasındaki İlişkinin İncelenmesi. İstanbul Gelişim Üniversitesi Sağlık Bilimleri Enstitüsü. Antrenör Eğitimi Anabilim Dalı. Yayınlanmamış Yüksek Lisans Tezi.
Musa M. (2020). Fitness Merkezlerinde Spor Yapan Bireylerin Sosyal Görünüş Kaygısı ve Özgüven Düzeylerinin Bazı Değişkenlere Göre İncelenmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi.* 14(3), 503-518.
Okyay B. (2012). Yönetici ve çalışanların özgüven düzeyleri ve kişisel gelişimi inisiyatifi alma becerilerinin karşılaştırılması. Yüksek Lisans Tezi, Maltepe Üniversitesi Sosyal Bilimler Enstitüsü. İstanbul.
Özer, K. (2006). Fiziksel Uygunluk, Nobel Yayın ve Dağıtım Ankara.
Özkan, İ. (1994). Benlik saygısını etkileyen etkenler. Düşünen Adam, 7(3), 4-9.
Öztürk, N. (2017). Üniversite öğrencilerinin algıladıkları aile iklimi ve anne-babaya bağlanma biçimleri ile öz güven düzeyleri arasındaki ilişkinin incelenmesi. *The Journal of International Lingual, Social and Educational Sciences,* 3(1), 9-22.
Sezer, Ö., & Vuslat, O. (2010). Üniversite öğrencilerinde kendilerini değerlendirmelerinin ana baba tutumları ve bazı sosyo demogafik değişkenler açısından incelenmesi. *Kastamonu Eğitim Dergisi*, 18(3), 743-758.
Sonstroem, R. J., & Morgan, W. P. (1989). Exercise and self-esteem: Rationale and model. *Medicine and Science in Sports and Exercise*, 21(3), 329-337.
Tabachnick, B. G., & Fidell, L. S. (2007). Using Multivariate Statistics (5th ed.). New York: Allyn and Bacon
Taşdemir, B. (2015). Fıtness Merkezlerinde Üye Beklentileri Üzerine Bir Araştırma. Bahçeşehir Üniversitesi Sosyal Bilimler Enstitüsü Spor Yönetimi. Yüksek Lisans Tezi. İstanbul.
Tel, M., Gür, E., Ibrahem, Y., Karadağ, M. (2018) Düzenli olarak fitness salonlarına devam eden bireylerin özgüven düzeylerinin farklı spor branşlarındaki sporcularla karşılaştırılması. *Akademik Sosyal Araştırmalar Dergisi*, 6 (76), 207-217.
Teixeira, C.S., & Pereira, É. F. (2010). Physical fitness, age and nutritional status of military personnel. *Arquivos Brasileiros de Cardiologia*, 94 (4), 438-443.
Uğur, E., & Baysaling, Ö. (2002). Herkes İçin Spor, Vücut Geliştirme, Fitness ve Formda Kalma, İlpress Basım ve Yayın, İstanbul.
Yağan, K. (2019). Fitness Merkezine Giden Bireylerin Sosyal Görünüş Kaygısı ve Öz Güven düzeylerinin incelenmesi. Karamanoğlu Mehmet Bey Üniversitesi Sosyal Bilimler Enstitüsü. Yüksek Lisans Tezi. Karaman.
Yarımkaya, E., Akandere, M., ve Baştuğ, G. (2014). Effect of self-confidence levels of 12- 14 years old students on their serving agility in volleyball. *Niğde University Journal of Physical Education And Sport Sciences,* 8, 242-50.
Yaylacı, T.S. (2019) Sportif Faaliyetlerin 13-14 Yaşındaki Bireylerin Özgüven Düzeylerine Etkisi. Yüksek Lisans Tezi, Hitit Üniversitesi, Çorum.

Yıldırım, F. (2013). Sportif Sürekli Kendine Güven Alt Ölçeğinin Uyarlanması ve Ortaöğretim Kurumlarındaki Öğrencilerde Sportif Sürekli Kendine Güvenin Çeşitli Değişkenler Açısından İncelenmesi. Mersin Üniversitesi Eğitim Bilimleri Enstitüsü Beden Eğitimi ve Spor Anabilim Dalı. Yüksek Lisans Tezi. Mersin.

Yıldız, N., Özen, G., ve Bostancı, T. G. (2016). The effects of one-day outdoor education on self-efficacy. *Journal of Human Sciences*,13 (3), 6098-6103.

Yılmaz, E. M. (2021), Taekwondo Sporcularının Özgüven Seviyelerinin Algılanan Stres ve Saldırganlık Düzeyleri ile İlişkinin İncelenmesi. Yüksek Lisans Tezi, Selçuk Üniversitesi, Konya.

Yılmaz, A., Ağgön, E. (2023). Aktif Spor Yapan Üniversite Öğrencilerinin Beden Memnuniyeti, Mental İyi Oluş ve Özgüven Düzeylerinin İncelenmesi" *Ondokuz Mayıs Üniversitesi Spor ve Performans Araştırmaları Dergisi,* 14(1), 31-42.

Yiğit, H. (2010). Ergenlerin benlik saygılarının yaşam doyumu ve bazı özlük nitelikleri açısından incelenmesi. Yüksek Lisans Tezi, Selçuk Üniversitesi Eğitim Bilimleri Enstitüsü, Konya.

Zeyrek, A. ve Doğar, V. (2020). Ortaöğretim öğrencilerindeki özgüven gelişimlerinin spor ve farklı değişkenlere göre incelenmesi. *International Social Sciences Studies Journal*, 6(72), 4807-4812.

Zorba, E., Tekin, A., Özdağ, S. ve Akçakoyun, F. (1997). Egzersiz Programlı Kamp Yaşantısı ve Özsaygı İlişkisi. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, 2(4), 29-34.

YAPAY ZEKAYI EĞİTTİK VE SORDUK. TRANSLASYONEL TIP VE BİLİMSEL ARAŞTIRMALAR NEREYE GİDİYOR?

WE ASKED ARTIFICIAL INTELLIGENCE. WHERE IS TRANSLATIONAL MEDICINE AND SCIENTIFIC RESEARCH HEADED?

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ÖZET
Sağlık alanında akademisyenler, öğrenciler ve çalışanlar hizmet otomasyonuna giderek daha fazla dikkat ediyor ve yapay zekanın (YZ) sunduğu muazzam fırsatlardan yararlanıyor. Etkili hizmetler sunma gereksinimi bu konuya olan ilgiyi büyük ölçüde artırdı. Mevcut çalışmada, YZ'nin sağlık hizmetlerinde nasıl kullanıldığını ve gelecekte neler yapabileceğini inceledik. Sağlık hizmetlerinde YZ ile ilgili güncel araştırmaları kapsamlı bir şekilde anlamak için veritabanından makaleler aradık ve yapay zekayı eğitip sorular yönelttik. Translasyonel tıp (TM), hastaların ve toplumun sağlığını iyileştirmek için biyomedikal araştırmanın disiplinler arası uygulaması olarak tanımlanır. En basit tanımıyla translasyonel araştırma (veya translasyonel tıp), in vitro ve deneysel hayvan araştırmalarının insan uygulamalarına geçirilmesidir. Bu, temel deneysel sonuçların klinik öncesi deneylere, klinik çalışmalara ve son olarak klinik uygulamaya aktarılmasını içerir. Sağlık hizmetlerinde Translasyonel tıp, bilimsel araştırmalar ve YZ alanında araştırmaların gittiği yönü belirlemeye çalıştık ve gelecekteki araştırmalar için önemli yönleri vurguladık.

Anahtar Kelimeler: YZ, araştırma, sağlık, deney, translasyonel tıp

ABSTRACT
Healthcare academics, students, and employees are increasingly paying attention to service automation and are taking advantage of the tremendous opportunities offered by artificial intelligence (AI). The need to provide effective services has greatly increased the interest in this topic. In the current study, we examined how AI is used in healthcare and what it can do in the future. To comprehensively understand current research on AI in healthcare, we searched articles from the database and trained and posed questions to AI. Translational medicine (TM) is defined as the interdisciplinary application of biomedical research to improve the health of patients and society. In its simplest definition, translational research (or translational medicine) is the translation of in vitro and experimental animal research into human applications. This involves transferring basic experimental results to preclinical experiments, clinical studies, and finally clinical application. We tried to determine the direction of research in the field of translational medicine, scientific research, and AI in healthcare and highlighted important directions for future research.

Keywords: AI, research, health, experimentation, translational medicine

GİRİŞ

Yapay zeka, algılama, derin öğrenme, makine öğrenimi, etkileşim ve adaptasyon dahil olmak üzere insan zekasının çeşitli yönlerini taklit eden bilgisayar teknolojilerini kapsar. Yapılan çalışmalarla kanıtlandığı üzere, yapay zeka genellikle insan zekasını gerektiren faaliyetlerin yürütülmesini kolaylaştırır (Shah vd., 2024). Yapay zekanın kullanımı, tıbbi karar almayı kolaylaştırmadaki potansiyelini göstermiştir. Buna ilaç keşfi sürecini hızlandırmak ve ilişkili masrafları azaltmak, tahmini modeller oluşturmak, gerçek zamanlı sağlık hizmeti ortamlarında tanı testlerini optimize ve randevu hatırlatıcıları gibi idari görevleri otomatikleştirmek dahildir. Yukarıda belirtilen teknoloji, tıp uygulayıcılarının tanı koymalarına yardımcı olan bilgilerin edinilmesini kolaylaştırır (Väänänen vd., 2021).

Sağlık hizmetlerinde yapay zekanın kullanımı, hastaları nasıl tanımladığımızı, tedavi ettiğimizi ve takip ettiğimizi tamamen değiştirdi. Daha kesin tanı ve özelleştirilmiş tedaviler sağlayarak, bu teknoloji sağlık hizmetleri araştırmalarını ve sonuçlarını büyük ölçüde iyileştiriyor. Sağlık hizmetlerinde yapay zeka, doktorların aksi takdirde tespit edilemeyecek hastalık modellerini ve belirtilerini tanımlamasını sağlayabilir. Yapay zeka, erken teşhisten radyolojik görüntülerin taranmasına ve elektronik sağlık bilgilerini kullanarak sonuç tahminine kadar sağlık hizmetlerinde çeşitli şekillerde kullanılır. Yapay zekanın entegrasyonu ile sağlık sistemleri daha akıllı, daha hızlı ve daha etkili hale gelebilir ve dünya çapında milyonlarca hastayı tedavi edebilir. Sağlık hizmetlerinin geleceği yapay zekadır. Hastaların nasıl bakıldığını değiştirecek, sağlayıcı maliyetlerini düşürecek ve sağlık sonuçlarını iyileştirecektir.

Yapay zekanın hastalığın erken tespiti, doğru tanı, hastalığın yayılmasının tahmin edilmesi, tedavilerin kişiye özel hale getirilmesi, kişiselleştirilmiş bakım ve hastalığın zamanında tedavisi için doğru kararlar almada oynayabileceği rol hayal edilemez. Yapay zeka ayrıca hastaların sağlık parametrelerini takip etmelerine ve refahlarını sağlamalarına yardımcı olabilir ve destekleyebilir. Genel sağlık hizmetleri maliyetlerini azaltmak için sağlık hizmetleri sektörü, yapay zeka dahil olmak üzere gelişmiş teknolojileri sağlık hizmetleri süreçlerine entegre etmelidir (Attaran, 2022)

Translasyonel Tıp ve Yapay Zeka

Yapay zekadan önce yapılan translasyonel tıp çalışmalarında amaç hastaların yaşam süresini uzatmaktı. İlk olarak deneysel araştırmalara yardımcı olmak için geliştirilen istatistiksel yöntemler, klinik çalışmalara ve meta-analize genişletildi ve bu karmaşık tıbbi ampirizm biçimleri uygulamayı yönlendirmede etkili oldu. Sonuç, en azından sanayileşmiş ülkelerde, toplum genelinde eşit olmasa da, özellikle 70 yaş üstü kişilerde ölüm oranında bir düşüş oldu (Worboys vd., 2021).

ıptaki genel tablo olumlu olsa da sorunlar vardı. Talidomid, yeni ilaçların yetersiz test edilmesinin ve aşırı kullanımının en yıkıcı örneğini sağladı. Birçok hastalıkta, en büyük ölüm nedeni olan akciğer kanserinde olduğu gibi, nispeten mütevazı kazanımlar vardı (Timmermann 2013). Birçok vakada artan yaşam süresi, daha fazla insanın kronik, tıbbi olarak yönetilen rahatsızlıklarla yaşadığı anlamına geliyordu. Tıpta yeni bir şafağı sembolize eden ve hatta birçok bulaşıcı hastalığın ortadan kaldırılmasını vaat eden yeni antibiyotiklerin piyasaya sürülme oranındaki yavaşlama, bazı gözlemciler arasında tıbbi Ar-Ge'de azalan getiriler olduğuna dair bir inanca yol açtı (Begley & Carmichael, t.y.).

Örneğin, çok az etkili antiviral ilaç vardı. Mevcut antibiyotiklere karşı bakteriyel direnç arttıkça, yeni antibiyotiklerin göreceli kıtlığı bir sorun haline geldi. Neden daha az yeni antibiyotik vardı? Birkaç neden verildi. Araştırmacılar, bakterilerin kimyasal inhibisyonu ve yok edilmesi için yerleşik yolları tüketmişti. Yeni yollara ihtiyaç vardı. Antibiyotikler satış değeri açısından hala en büyük ilaç sınıfıydı, ancak şirketler kronik, bulaşıcı olmayan durumlar için tedavilere giderek artan bir ilgi duyuyorlardı. İlaç endüstrisi, yatırım eksikliğinin bir nedeninin ilaç geliştirmenin aşırı düzenlemeler nedeniyle engellenmesi olduğunu ileri sürdü. Test ve etkinlik protokolleri Talidomid trajedisinden sonra daha katı hale getirilmiş ve yeni klinik deneme standartlarıyla daha

da genişletilmişti. Tıp ve ilaç endüstrisindeki birçok grup durum için metaforlar üretti: tezgahtan yatağa "boru hattı tıkanmıştı"; ve yeni ilaçlar "ölüm vadisini" geçmekle karşı karşıyaydı. Bu nedenle, TM'nin temel amacı, boru hattını açmak, onarmak veya kısaltmak ve ölüm vadisini geçmek için yeni yollar bulmaktı. İşte yapay zeka bu olasılığı daha da yukarı çekebilir.
Gelecekteki preklinikten-kliniğe geçiş çalışmaları için yapay zeka programları kullanarak bazı sorular yönelttik. İn vitro çalışmalar için kullanılan birçok hücre hattı bulunmaktadır. Araştırmacılar, yeni moleküllerin sitotoksik analizinden tutunda etkin sinyal yolaklarının ortaya konulması ve hastalıkların moleküler mekanizmasını açıklayabilmek için bu yola başvurmuşlardır.

ARAŞTIRMA VE BULGULAR

Araştırmamız kapsamında "ChatGPT" program kullanıldı. Preklinikten-kliniğe giden yolda ilk önce in vitro çalışmalar incelendi. Bu amaçla, yapay zeka programına Şekil 1'deki gibi tanımlamalar eklendi.

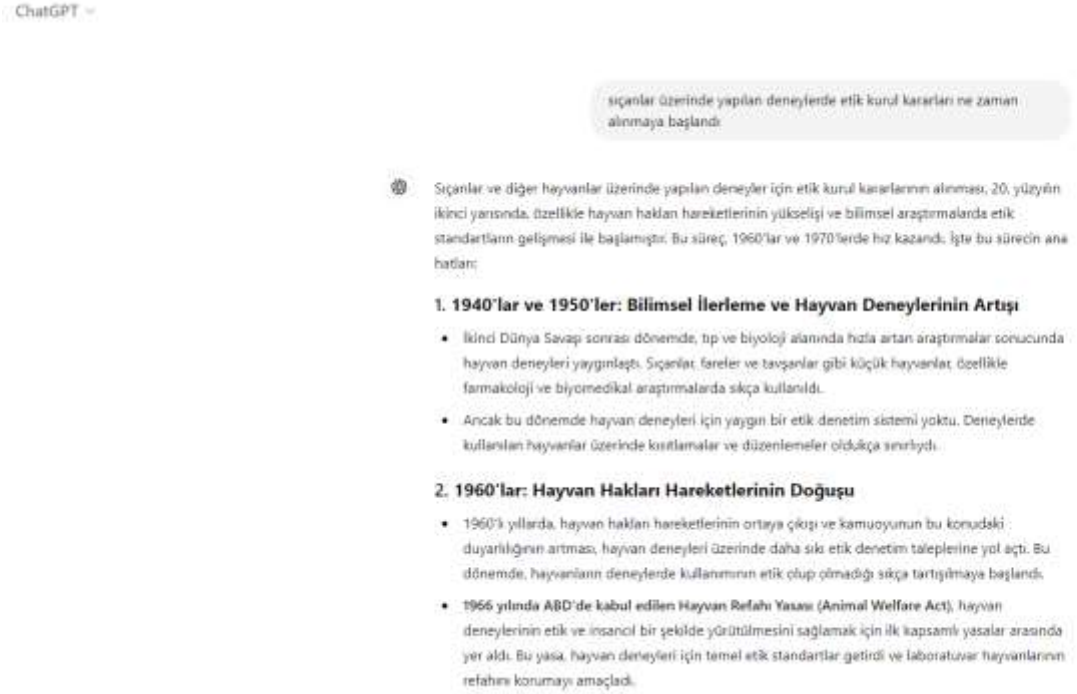


Şekil 1. İn vitro çalışmalar için yapay zeka programına bilgilerin yüklenmesi

Daha sonrasında, diğer hücre hatları, hastalık türleri ve kanser çalışmaları için çeşitli sorular yöneltilmiştir. "İn vitro çalışmalarda başka hangi hücre hatları ve türleri kullanılmıştır?" sorusuna farklı dillerde cevaplar alınmıştır. Bu hücre hatları, biyomedikal araştırmaların ve translasyonel tıbbın çeşitli alanlarında kullanılmaktadır ve bilim insanlarına hücre biyolojisini, hastalık mekanizmalarını ve tedavi yöntemlerini anlamada büyük katkılar sağlamaktadır. 1962 yılında hücre DNA keşfi ile başlayan Nobel ödül yolculuğu, hücre döngüsünün kontrolü, telomerler, kök hücreler, apoptoz gibi fenomenlerin ortaya çıkmasına sebebiyet vermiştir. Bu ödüller, hücre biyolojisi ve genetik araştırmaların tıpta ne kadar büyük ilerlemelere yol açtığını göstermektedir. Bu çalışmalar, kanser, genetik hastalıklar ve yaşlanma gibi konularda bilim insanlarına derinlemesine bilgi sağlamış ve yeni tedavi stratejileri geliştirilmesine olanak tanımıştır.
"Gelecekte yapay zeka çalışmaları in vitro araştırmaların yerini alabilir mi?" sorusuna cevap ise Yapay zeka (AI) ve biyoteknoloji alanındaki ilerlemelerin, **in vitro** (laboratuvar ortamında yapılan) araştırmaların bazı yönlerini destekleyip ve hızlandırabileceği, ancak tamamen yerini alması muhtemelen zor olacağı sonucunu vermiştir. Bununla birlikte, AI'nin biyomedikal araştırmalarda giderek artan rolü, deneylerin verimliliğini artırabileceğive bazı aşamalarda **in vitro** araştırmaların yerini alabilecek alternatif yöntemler sunabileceğini göstermiştir. Yapay zeka, **in vitro** araştırmaları tamamen ortadan kaldırmasa da, bu süreçleri destekleyici, hızlandırıcı ve bazı aşamalarda yerini alabilecek önemli bir araç olarak karşımıza çıkıyor. AI, biyolojik süreçleri modellemede ve öngörmede büyük potansiyel taşıyor, ancak biyolojinin karmaşık yapısı göz önüne alındığında, laboratuvar deneyleri hala vazgeçilmez bir parça olarak kalacaktır. Gelecekte,

AI ile in vitro araştırmaların entegre bir şekilde çalışması, araştırmalarda daha hızlı ve doğru sonuçlar elde edilmesini sağlayacaktır.

Translasyonel Tıp'ta kullanılan in vivo hayvan deneyleri modellemesi ile ilgili geçmişten günümüze yapay zeka programı eğitilerek Şekil 2'deki gibi gelecek hakkında bir takım sorular yöneltildi.



Şekil 2. İn vivo çalışmalar için yapay zeka programına bilgilerin yüklenmesi

Translasyonel tıp, laboratuvar araştırmalarının klinik uygulamalara dönüştürülmesini amaçlayan disiplinler arası bir bilim dalıdır. Bu alanda hayvan çalışmaları, temel biyolojik bilgilerin klinik tedavilere ve yeni tıbbi teknolojilere dönüştürülmesinde önemli bir rol oynamaktadır. Hayvan modelleri, translasyonel tıbbın "bençten yatağa" (bench to bedside) felsefesi doğrultusunda hem temel bilim araştırmaları hem de klinik uygulamalara geçiş aşamalarında kullanılır. te translasyonel tıpta hayvan çalışmalarının güncel rolü ve katkıları:

1. Hastalığın Mekanizmalarının Anlaşılması

- **Hayvan modelleri**, insan hastalıklarının biyolojik mekanizmalarının anlaşılmasında kritik rol oynar. Özellikle genetik olarak modifiye edilmiş hayvanlar (örneğin, genetiği değiştirilmiş fareler), hastalıklara neden olan genlerin ve proteinlerin işlevlerini anlamak için kullanılır.
- **Örnek**: Alzheimer hastalığı, Parkinson hastalığı, diyabet ve kanser gibi karmaşık hastalıkların patofizyolojisini anlamak amacıyla hayvan modelleri sıklıkla kullanılmaktadır. Bu çalışmalar sayesinde, insanlardaki benzer patolojik süreçler hakkında önemli bilgiler elde edilir.

2. Yeni Tedavi Yöntemlerinin Geliştirilmesi

- Hayvanlar üzerinde yapılan deneyler, **yeni ilaçların, biyolojik ajanların ve tedavi yöntemlerinin** geliştirilmesinde ilk aşamayı oluşturur. Klinik denemelere geçmeden önce, bir tedavi yönteminin etkinliğini ve güvenliğini test etmek için hayvan modelleri kullanılır.
- **Örnek**: Kanser tedavilerinde yeni ilaç adaylarının etkinliği ve yan etkileri önce hayvan modelleri üzerinde test edilir. Bu sayede, tedaviye verilen yanıtlar ve potansiyel riskler daha iyi anlaşılır ve insanlar üzerindeki klinik denemelere geçmeden önce güvenlik profili oluşturulur.

3. Genetik Araştırmalar ve Biyoteknolojik Yenilikler

- Translasyonel tıp, **gen terapisi** ve **hücre tedavisi** gibi yenilikçi tedavi yaklaşımlarını geliştirmede hayvan çalışmalarına dayanır. Genetik mühendislik yoluyla hayvanlarda hastalık modelleri oluşturulabilir ve bu sayede yeni tedavi stratejilerinin etkisi test edilebilir.
- **Örnek**: Genetiği değiştirilmiş fareler, insan genetik hastalıklarının tedavisinde kullanılan gen terapilerinin etkinliğini test etmek için sıklıkla kullanılır. Bu modeller, insan hastalıklarının genetik temellerinin anlaşılmasına da yardımcı olur.

4. Rejeneratif Tıp ve Doku Mühendisliği

- Translasyonel tıpta **rejeneratif tıp** ve **doku mühendisliği** alanlarında, laboratuvarda üretilen yapay dokular ve organların hayvanlar üzerinde test edilmesi önemlidir. Bu çalışmalar, insanlarda kullanılmadan önce bu yapay yapıların biyolojik uyumluluğunu ve fonksiyonel başarılarını değerlendirir.
- **Örnek**: Yapay kalp dokuları veya kök hücre tedavileri, önce hayvan modellerinde denenerek, bu tedavilerin insan vücudunda nasıl çalışacağı hakkında bilgi sağlar. Bu sayede insanlarda uygulanabilirlik aşamasına geçmeden önce biyolojik ve güvenlik testleri yapılabilir.

5. İmmünoloji ve Enfeksiyon Hastalıkları

- **Bağışıklık sistemi** ve enfeksiyon hastalıkları üzerine yapılan translasyonel tıp çalışmaları, genellikle hayvan modelleri kullanılarak yürütülür. Hayvanlar, insan bağışıklık sisteminin işleyişini anlamak ve yeni aşılar veya immünoterapiler geliştirmek için ideal deneysel araçlar sunar.
- **Örnek**: COVID-19 pandemisinde, aşı adaylarının klinik öncesi testleri sıçanlar ve maymunlar üzerinde yapıldı. Bu çalışmalar, insan denemelerine geçmeden önce aşıların etkinliği ve güvenliği hakkında kritik bilgiler sağladı.

6. Nörolojik Hastalıklar ve Beyin Araştırmaları

- Beyin ve sinir sistemi hastalıklarının translasyonel tıpta tedavisi oldukça karmaşıktır. **Nörolojik hastalıklar** için kullanılan hayvan modelleri, hastalığın nasıl geliştiğini ve hangi tedavi yöntemlerinin etkili olabileceğini anlamada büyük öneme sahiptir.
- **Örnek**: Parkinson, epilepsi ve ALS (Amyotrofik Lateral Skleroz) gibi nörolojik hastalıklar üzerine yapılan translasyonel çalışmalarda, genetik olarak değiştirilmiş sıçan ve fare modelleri yaygın olarak kullanılır. Bu hayvan modelleri, beyin fonksiyonları ve hastalık mekanizmaları hakkında değerli bilgiler sağlar.

7. Etik ve Alternatif Yöntemler

- Hayvan deneylerinin etik boyutu, translasyonel tıpta önemli bir tartışma konusu olmaya devam etmektedir. Günümüzde, hayvan deneylerinin azaltılması ve daha insancıl yöntemlerin kullanılması için **3R Prensibi** (Reduction, Refinement, Replacement) benimsenmiştir.
- **Alternatif yöntemler**: Yapay zeka, hücre kültürleri, organoid modeller ve organ-on-a-chip gibi alternatif teknolojiler, hayvan deneylerine olan bağımlılığı azaltmak için geliştirilmektedir. Bu teknolojiler, hayvan çalışmaları yerine kullanılabilecek potansiyel alternatifler sunmaktadır, ancak henüz tüm araştırma alanlarında hayvanların yerini tam olarak alamamıştır.

Translasyonel tıp, hayvan çalışmaları sayesinde laboratuvar bulgularını klinik uygulamalara dönüştürme konusunda büyük ilerlemeler kaydetmektedir. Hayvan modelleri, insan hastalıklarının anlaşılmasında, yeni tedavi yöntemlerinin geliştirilmesinde ve klinik denemelere geçişte önemli bir basamak oluşturur. Ancak, hayvan deneylerinin etikliği konusunda süregelen tartışmalar ve alternatif yöntemlerin gelişimi, translasyonel tıpta hayvan çalışmalarının gelecekteki rolünü şekillendirecektir.

“Yapay zeka in vivo çalışmaların yerini alabilir mi?” sorusuna ise, Yapay zeka (YZ), biyomedikal araştırmalar ve translasyonel tıpta büyük ilerlemelere yol açsa da, **in vivo** çalışmaların yerini tamamen alması henüz mümkün görünmediği cevabını vermiştir. Gelecekle ile ilgili araştırma sorularına ise henüz hazır olmadığı anlaşılmaktadır.

SONUÇ

YZ, *in vivo* çalışmaların ön aşamalarında ve bazı durumlarda *in vitro* ortamda biyolojik süreçleri simüle etmekte başarılı olabilir. Ancak, biyolojik sistemlerin karmaşıklığı ve YZ'nin tahmin yeteneklerinin sınırlı olması nedeniyle, *in vivo* çalışmaların tamamen ortadan kalkması yakın vadede mümkün görünmemektedir.

Bununla birlikte, yapay zeka ve biyoteknolojideki ilerlemeler, in vivo deneylerin daha az kullanıldığı ve daha etkili şekilde optimize edildiği bir geleceğe işaret ediyor.

KAYNAKLAR

Attaran, M. (2022). Blockchain technology in healthcare: Challenges and opportunities. *International Journal of Healthcare Management*, *15*(1), 70-83. https://doi.org/10.1080/20479700.2020.1843887

Begley, S., & Carmichael, M. (t.y.). *Desperately Seeking Cures*.

Shah, W. S., Elkhwesky, Z., Jasim, K. M., Elkhwesky, E. F. Y., & Elkhwesky, F. F. Y. (2024). Artificial intelligence in healthcare services: Past, present and future research directions. *Review of Managerial Science*, *18*(3), 941-963. https://doi.org/10.1007/s11846-023-00699-w

Väänänen, A., Haataja, K., Vehviläinen-Julkunen, K., & Toivanen, P. (2021). *AI in healthcare: A narrative review* (10:6). F1000Research. https://doi.org/10.12688/f1000research.26997.2

Worboys, M., Timmermann, C., & Toon, E. (2021). Before translational medicine: Laboratory-clinic relations. *History and Philosophy of the Life Sciences*, *43*(2), 48. https://doi.org/10.1007/s40656-021-00379-6

THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE PUBLIC SECTOR IN TURKEY: ARTIFICIAL INTELLIGENCE-PUBLIC SECTOR INTERACTION

TÜRKİYE'DE KAMU SEKTÖRÜNDE YAPAY ZEKÂ TEKNOLOJİLERİNİN KULLANIMI: YAPAY ZEKÂ-KAMU ETKİLEŞİMİ

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ABSTRACT
Rapid change in technology and Industry 4.0, robots, automations, simulations, algorithms, cloud technologies, unmanned vehicles, cyber-physical systems and networks such as big data, cryptocurrencies and metadata, and the introduction of artificial intelligence into our lives have led to significant changes not only in the private sector but also in the public sector. Countries are now utilizing artificial intelligence as much as possible to improve service delivery in the public sector and to make more reliable and responsible decisions. The integration of AI technology, fed directly by data, into the public sector has potentially changed the way public institutions work and interact with citizens. Today, Turkey has taken its share of this technological transformation process and has increased its interest in artificial intelligence solutions, especially in the public sector. Artificial technologies play a key role in the modernization of bureaucracy in order to make public services more efficient, faster and user-oriented.
The use of artificial intelligence technologies in public administration in Turkey manifests itself in various fields. Especially in areas such as data analytics, forecasting models and decision support systems, artificial intelligence solutions contribute to more efficient public services. Used since 2008, the E-Government system accelerates citizens' interactions with the state in the digital environment, and artificial intelligence-based services integrated into this platform offer solutions that can respond to citizen demands instantly. In addition, Turkey's first National Artificial Intelligence Strategy has been determined by the Digital Transformation Office of the Presidency of the Republic of Turkey, and it is recommended that relevant public institutions follow the developments in this field and develop their own digital application tools for the benefit of society. This study examines the artificial intelligence projects and applications implemented by public institutions and organizations in Turkey. The study examines how artificial intelligence technologies are used in the public sector in Turkey and the public interaction of these technologies. The method of this research was carried out according to the case study, which is one of the qualitative research types. The data of this study were obtained from the written materials on the online site of public institutions.

Keywords: Public Administration, Artificial Intelligence, Technology, Turkey.

ÖZET
Teknolojideki hızlı değişim süreci ve sanayi 4.0 ile birlikte robotlar, otomasyonlar, simülasyonlar, algoritmalar, bulut teknolojileri, insansız araçlar, büyük veri, kripto paralar ve metevarse gibi siber fiziksel sistemler ve ağlar ile yapay zekânın hayatımıza girmesi sadece özel sektörde değil kamu sektöründe de önemli değişikliklere ve dönüşümlere yol açmıştır. Ülkeler kamuda hizmet

sunumunu iyileştirmek, daha güvenilir ve sorumlu kararlar almak için bugün olabildiğince yapay zekâdan yararlanmaktadır. Doğrudan verilerle beslenen yapay zeka teknolojisinin kamu sektörüne entegre edilmesi, potansiyel olarak kamu kurumlarının çalışma ve vatandaşlarla etkileşim kurma biçimini de değiştirmektedir. Türkiye'de bugün bu teknolojik dönüşüm sürecinden payını alarak, özellikle kamu sektöründe yapay zekâ çözümlerine olan ilgisini artırmıştır. Kamu hizmetlerinin daha verimli, hızlı ve kullanıcı odaklı hale getirilmesi amacıyla yapay teknolojileri, bürokrasinin modernizasyonunda kilit rol oynamaktadır.
Türkiye'de kamu yönetiminde yapay zekâ teknolojilerinin kullanımı, çeşitli alanlarda kendini göstermektedir. Özellikle veri analitiği, tahminleme modelleri ve karar destek sistemleri gibi alanlarda yapay zekâ çözümleri, kamu hizmetlerinin daha verimli bir şekilde yürütülmesine katkı sağlamaktadır (Bozdoğanoğlu, Kaya ve Yücel, 2024: 1). 2008 yılından bu yana kullanılan E-Devlet sistemi, vatandaşların devletle olan etkileşimlerini dijital ortamda hızlandırmakta ve bu platforma entegre edilen yapay zekâ tabanlı hizmetler, vatandaş taleplerine anında cevap verebilen çözümler sunmaktadır. Bunun yanında Cumhurbaşkanlığı Dijital Dönüşüm Ofisi tarafından da Türkiye'nin ilk Ulusal Yapay Zekâ Stratejisi belirlenmiş ve ilgili kamu kuruluşlarının bu alandaki gelişmeleri takip etmeleri ve kendi dijital uygulama araçlarını toplumun yararına olacak şekilde geliştirmeleri önerilmiştir.
Bu çalışma ile Türkiye'de kamu kurum ve kuruluşları tarafından hayata geçirilen yapay zekâ proje ve uygulamaları incelenmiştir. Çalışmada, Türkiye'de kamu sektöründe yapay zekâ teknolojilerinin nasıl kullanıldığı, bu teknolojilerin kamu etkileşimi ele alınmıştır. Bu araştırmanın yöntemi, nitel araştırma çeşitlerinden olan durum çalışmasına göre gerçekleştirilmiştir. Bu araştırmanın verileri, kamu kurumlarının çevrimiçi sitesinde yer alan yazılı materyallerden elde edilmiştir.

Anahtar Kelimeler: Kamu Yönetimi, Yapay Zekâ, Teknoloji, Türkiye.

INTRODUCTION

Artificial intelligence (AI), as a rapidly developing technology in recent years, has gained an important place in the public sector as well as in many other sectors. In other words, artificial intelligence (AI) has led to radical changes in many sectors in recent years and public administration has also been affected by this transformation. Public administration generally aims to increase efficiency in the management of bureaucratic processes, service delivery and relations with citizens. At this point, artificial intelligence brings revolutionary innovations in public administration with the solutions it offers in terms of efficiency, speed and transparency. Especially in areas such as data analysis, process automation and decision support systems, the opportunities provided by artificial intelligence increase the efficiency of public services and enable the development of citizen-oriented solutions. In addition, artificial intelligence applications developed to increase citizen satisfaction, ensure transparency and simplify bureaucratic procedures also enable public institutions to provide more effective and innovative services. However, the integration of artificial intelligence into public administration is not only about technical innovations. For this process to be successful, ethical, legal and social dimensions should also be taken into consideration. The role of AI in decision-making processes must be balanced with important principles such as transparency and accountability. Therefore, with the widespread use of artificial intelligence in public administration, it is of utmost importance that public trust is maintained and the public interest is safeguarded. In Turkey, the interaction of AI technologies with the public sector is an important part of digital transformation strategies. In this context, the relationship between artificial intelligence and public administration will deepen in the coming years and developments in this field will play a central role in the transformation of public services.

In this context, this study examines the areas of use of artificial intelligence technologies in the public sector in Turkey, opportunities, challenges and developments in artificial intelligence-public sector interaction.

MATERIAL AND METHODS

The research material consists of primary and secondary sources on artificial intelligence and its use in public administration. The use and application areas of artificial intelligence and artificial intelligence in public administration were evaluated retrospectively.

FINDINGS USES OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN PUBLIC ADMINISTRATION

The public sector in Turkey utilizes artificial intelligence technologies in different areas. AI technologies are increasingly being used in the public sector to improve business processes, accelerate decision-making and provide more efficient services to citizens. In this section, we will examine the main uses and advantages of AI in the public sector.

Artificial Intelligence in Data Analysis and Forecasting

The public sector has large data sets and it is of great importance to transform these data into meaningful results. Thanks to artificial intelligence technologies, these data can be analyzed faster and more accurately. For example, the effects of natural disasters such as floods and earthquakes can be predicted with artificial intelligence by forecasting population movements and resource planning and analyzing weather and environmental data.

Artificial Intelligence in Public Service Delivery

Artificial intelligence technologies enable the automation of public services. In this way, citizens' transactions with government offices are carried out more quickly and smoothly (Önder and Saygılı, 2018: 648). Manual processes that reduce the complexity and efficiency of bureaucratic processes can be greatly reduced with artificial intelligence technologies. Paperwork, data entry and routine operational processes in public institutions are automated. For example, in institutions with large data and transaction volumes such as the Social Security Institution in Turkey, AI-supported systems accelerate transactions and increase citizen satisfaction. On the other hand, the use of artificial intelligence technologies in services provided through the E-government portal facilitates citizens' access to public services. Artificial intelligence-based chatbots and virtual assistants respond instantly to citizens' information requests and ease the burden on public institutions that direct citizens (Vashisht, 2017).

Artificial Intelligence in Decision Making

Artificial intelligence helps managers in decision-making processes. Many decisions taken in the public sector are based on large data sets and complex analysis. Artificial intelligence enables managers to make better decisions by providing speed and accuracy in these processes (Önder & Saygılı, 2018: 646). For example, during the coronavirus pandemic, artificial intelligence analysis was used to make decisions on issues such as vaccine distribution. Artificial intelligence offers data-based solutions in areas such as transportation, infrastructure and environmental management.

Artificial Intelligence in Cyber Security

Public institutions face ever-increasing cyber threats. Artificial intelligence technologies have the capacity to react quickly to these threats and detect possible security vulnerabilities in advance. Artificial intelligence is also used to protect the personal information of citizens (Mıjwıl, Sadıkoğlu, Cengiz, & Candan, 2002: 100-105). In particular, facial recognition technology is used in many countries around the world to locate suspected criminals and to help in the fight against terrorism. Thailand, one of the countries benefiting from artificial intelligence technology in the field of cyber security, uses this technology to monitor network traffic and conduct big data analysis to detect suspicious user behavior (Bozdoğanoğlu, Kaya, & Yücel, 2024: 14).

Artificial Intelligence in the Health Sector

Artificial intelligence plays an important role in improving health services and implementing health policies more effectively. In particular, AI has led to significant improvements in the processing and analysis of health data, individualized health management, health habits and well-being, surgical planning, drug development, diagnosis and treatment processes. With AI, early diagnosis of diseases is realized based on image processing and data analysis (YeşilScience, 2024). In addition, artificial intelligence also enables the monitoring and prevention of the spread of infectious diseases. In China, the world's first artificial intelligence hospital was put into service (NTV News, 2024).

Smart City Applications and Artificial Intelligence

Artificial intelligence plays an important role in making cities smarter, sustainable and livable. Artificial intelligence is used to manage traffic flow in cities, use water and energy resources effectively, ensure environmental protection, monitor air quality, and many other smart city applications (Smart Cities, 2024). These technologies can help city managers increase efficiency and make better decisions. Real-time data analysis is used to reduce traffic congestion in cities. Artificial intelligence solutions are used to optimize energy consumption in smart cities (GTM Technology, 2024).

Artificial Intelligence in Improving Education and Learning Processes

In public education institutions, AI is being used to make educational processes more personalized and improve the learning experience. Curricula tailored to the learning pace and needs of students are implemented with AI. AI provides data analysis to track students' success and development (Arslan, 2022: 82-88).

Artificial Intelligence in the Justice and Security Sector

Artificial intelligence helps the justice system to function more effectively and is also used in the prevention of crimes and in the operations of security units. In Turkey, the use of artificial intelligence in the security and defense sector is increasing rapidly. In areas such as facial recognition systems, border security and crime analytics, artificial intelligence is used as an important tool to ensure public security (Özer, 2023. 349-355). For example, it is known that the General Directorate of Security utilizes artificial intelligence systems in crime analysis and prevention activities. Artificial intelligence is used to identify areas with high crime rates and to take preventive measures (Argun, 2023). Artificial intelligence enables security forces to detect suspicious persons faster. In China, "smart courts" and "artificial intelligence judges" have been integrated into the legal system to ensure justice.

OPPORTUNITIES THAT ARTIFICIAL INTELLIGENCE TECHNOLOGIES BRING TO THE PUBLIC SECTOR

Artificial intelligence offers many opportunities to the public sector. These opportunities include factors such as increasing efficiency, cost savings and increasing citizen satisfaction. The automation of processes in public institutions and the use of artificial intelligence-supported analyses enable business processes to become more efficient (Gül, 2018: 13). Thus, organizations can do more work with less manpower. The use of artificial intelligence systems also provides significant savings in the operational costs of public institutions, especially through the automation of manual processes (Eggersvd, 2017: 3-11). In addition, it is possible to use resources more effectively with accurate decision-making processes. Fast and accurate service delivery is an important factor that increases citizen satisfaction. Artificial intelligence-based solutions provide an overall improvement in public services by enabling citizens to receive faster and more accurate services (Tanrıverdi, 2021: 290-295).

CHALLENGES IN THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES

The use of artificial intelligence in the public sector brings along some challenges. These challenges include data security, ethical issues, legal regulations and lack of human resources

(Yeşilkaya, 2022: 949). Since artificial intelligence systems rely on large amounts of data, data security becomes an important issue. It is critical to protect the personal data held by public institutions and to use these data securely in artificial intelligence systems. Ethical issues also arise during the use of artificial intelligence in public services (265Agnecy, 2024). In particular, the impartiality and transparency of AI systems are of great importance to gain the trust of citizens. False or biased algorithms can undermine public trust. The use of artificial intelligence technologies requires new legal regulations (Çam, 2024). In particular, comprehensive legal regulations should be made on issues such as data use, responsibilities and the role of artificial intelligence systems in decision-making processes. The effective use of artificial intelligence technologies in the public sector requires qualified human resources. However, finding personnel with sufficient expertise in this field is still a problem (Kılıç, 2020). It is important for public institutions to employ personnel specialized in artificial intelligence in order to use these technologies more effectively.

ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION IN TURKEY: ARTIFICIAL INTELLIGENCE-PUBLIC SECTOR INTERACTION AND FUTURE PERSPECTIVES

Artificial intelligence affects daily life and governments more and more every day. Therefore, governments are rapidly integrating artificial intelligence technologies into public administration and policies (Uzun, Yıldız, & Önder, 2022: 423). In Turkey, various strategies are being developed to encourage the use of artificial intelligence technologies in the public sector. The e-government, where public services are provided online, has been operating in many areas since 2008. The work on digital transformation (e-Government), cyber security, national technologies, big data and artificial intelligence, which had been carried out under different institutions in Turkey, was gathered under a single roof and the Presidential Digital Transformation Office was established in 2018 with the Presidential Decree No. 1. The Department of Big Data and Artificial Intelligence Applications was established within the service units of the Office (Sundu, Sağbaş and Türk, 2022: 259). Today, the Digital Transformation Office focuses on cyber security, infrastructure of public institutions and health.

In 2021, the "National Artificial Intelligence Strategy 2021-2025" was published within the scope of the 11th Development Plan (Erbaş, 2023: 1943). The National Artificial Intelligence Strategy is a framework document that sets out the current situation, future perspectives and goals in artificial intelligence. In this strategy document, six strategic priorities such as training artificial intelligence experts and increasing experts in the field, supporting research, entrepreneurship and innovation, expanding access to quality data and technical infrastructure, making arrangements to accelerate socio-economic adaptation, strengthening international cooperation, and accelerating structural and workforce transformation were identified and 24 objectives and 119 measures were determined (National Artificial Intelligence Strategy 2021-2025: 7-8).

In Turkey today, many artificial intelligence projects and practices are being implemented in public administration. The Digital Transformation Office conducts many AI-supported projects such as "Open Data", "Digital Turkey", "E-Correspondence", "Idea Marathon", "HackIstanbul", "Kamu Net", "KAYSİS", "Tek Durak", "National Data Dictionary" and "81 Cyber Heroes" (Avaner and Çelik, 2021: 13). The Ministry of Interior, the Presidency of Defense Industry and the Ministries of National Defense are carrying out many artificial intelligence-supported projects such as "Bomb Information Decision Support Analysis Center Project, Global Positioning System, Development of Independent Autonomous Navigation, Classification and Identification of Surface Targets Detected by Radar, Collaborative Robots, WMD Project, Crime Investigation Reporting Project, Ballistika Integration, Security Barriers, ASENA, ASTARUS" in public security and crime prevention in Turkey (Seçer, 2023: 2050- 253).

The "Turkish Brain Project", an artificial intelligence project initiated by the Digital Transformation Office of the Presidency, Gazi University Hospital and Gazi University Faculty of Engineering, aims to facilitate the diagnosis of diseases at an early stage and support decision-making by healthcare professionals. The Ministry of Trade is conducting pilot studies for risk analysis of customs transactions by evaluating the data collected from various sources such as closed circuit cameras, vehicle imaging devices and customs traffic from customs enforcement units with advanced data analytics and machine learning methods. The Ministry of National Education is conducting R&D studies on the application of artificial intelligence in education with the project to establish the Educational Technologies Incubation and Innovation Center (Erbaş, 2023: 194). With the "MAIN Artificial Intelligence Platform" developed by HAVELSAN, content and texts can be summarized in seconds, information can be retrieved from open source data and code can be written. The "Artificial Intelligence Supported Accounting and Advanced Analytics Project" implemented by the Ministry of Treasury and Finance provides efficiency, quality, speed and savings in public expenditures (Ministry of Treasury and Finance, 2024). In addition, in the recently announced Medium Term Program (MTP) for the years 2025-2027, artificial intelligence has been identified as one of the issues to be focused on in Turkey. In the 12th Development Plan covering the years 2024-2028, there is a call for increased work on artificial intelligence in many areas such as health, security, education, justice and economy (12 Kalkınma Planı, 2024; Orta Vadeli Plan, 2024). On the other hand, collaborations between public institutions and universities in Turkey accelerate the process of developing and integrating artificial intelligence technologies into public services. In this context, more widespread and effective use of artificial intelligence technologies in public services plays an important role in Turkey's digitalization vision.

DISCUSSION AND CONCLUSION

Despite hundreds of AI-supported projects developed in public administration in Turkey, it is seen that there is still a lot to do when compared to other developed countries. According to the "e-Government Development Index" published by the UN in 2022, Turkey ranks 48th among 193 countries. In Oxford Insights "Government AI Readiness Index 2022" Report, Turkey ranks 49th among 181 countries. However, since artificial intelligence is a newly developing field, the gap between our trained human resources and technological infrastructure, our will and investments in this field can be closed in a short time (Aydilek, 2023). On the other hand, the use of artificial intelligence technologies in the public sector in Turkey has great potential for improving public services and increasing citizen satisfaction. AI-public sector interaction brings innovations to the public sector in many areas such as data analysis, automation, security and citizen services. However, it also brings challenges such as data security and ethical issues. Within the framework of Turkey's digitalization strategies, the wider use of AI in public services offers an important opportunity to transform the public sector.

REFERENCES

Akıllı Şehirler (2024). Akıllı Şehir ve Yapay Zeka Kullanımı, https://www.akillisehir.com/idet/77/995/akilli-sehir-ve-yapay-zeka-kullanimi (Erişim Tarihi: 20 Eylül 2024).

Argun, N., F. (2023). Yapay Zeka, Adalet ve Güvenlik Alanlarında da Kullanılacak, https://www.dijitalgundem.net/yapay-zeka-adalet-ve-guvenlik-alanlarinda-da-kullanilacak/ (Erişim Tarihi: 19 Eylül 2024).

Arslan, K. (2017). Eğitimde Yapay Zeka ve Uygulamaları. Batı Anadolu Eğitim Bilimleri Dergisi, 11(1), 71-88.

Avaner, T. ve Fedai, R. (2019). Türk Kamu Yönetiminde Ofis Sistemi: E-Devlet Uygulamalarından Dijital Dönüşüm Ofisine. Amme İdaresi Dergisi, 52(2), 149-172
Aydilek, E. (2023). Yapay Zeka Kamu Yönetimini Nasıl Dönüştürecek? https://daktilo1984.com/yazilar/yapay-zeka-kamu-yonetimini-nasil-donusturecek/?gad_source=1&gclid=CjwKCAjwooq3BhB3EiwAYqYoEltN4mugq1Cnj_dbCpVWBHh1kOGbg-lEx-bi4N27OZpGYVe82vgywRoC4F8QAvD_BwE (Erişim Tarihi: 14 Eylül 2024).
265Agency (2024). Etik ve Yapay Zeka: Gelecekte Karşılaşılacak Zorluklar ve Çözümler, https://tr.linkedin.com/pulse/etik-ve-yapay-zeka-gelecekte-kar%C5%9F%C4%B1la%C5%9F%C4%B1lacak-zorluklar-%C3%A7%C3%B6z%C3%BCmler-ma7mf (Erişim Tarihi: 19 Eylül 2024).
Bozdoğanoğlu, B., Kaya, H., I. ve Yücel, A. (2024). Kamu İdarelerinde Yapay Zekâ Kullanımının Ülke Uygulamaları ve Temel Kamusal İlkeler Çerçevesinde Değerlendirilmesi, Ankara Hacı Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 26(1), 1-32.
Cumhurbaşkanlığı (2021). Ulusal Yapay Zekâ Stratejisi (2021-2025) konulu 2021/18 sayılı Genelge, 20 Ağustos 2021 tarihli ve 31574 sayılı Resmi Gazete.
Cumhurbaşkanlığı Dijital Dönüşüm Ofisi (2021). Ulusal Yapay Zekâ Stratejisi Belgesi 2021-2025, http.s://www.cbddo.gov.tr/UYZS (Erişim Tarihi: 14 Eylül 2024).
Çam, F. (2024). Yapay Zekanın En Büyük Zorluğu: Veri Kalitesi ve Önyargılar, https://gazetebilim.com.tr/yapay-zekanin-en-buyuk-zorlugu-veri-kalitesi-ve-onyargilar/ (Erişim Tarihi: 20 Eylül 2024).
Erbaş, S. M. (2023). Türk Kamu Yönetiminde Stratejik Yönetim ve Dijital Dönüşüm Bağlamında Yapay Zekânın Kullanımı, Türk İdare Dergisi, 95(496), 185-215.
Eggers, W., Schatsky, D., Viechnicki, P. (2017). AI-AugmentedGovernment- Using cognitive Technologies to Redesign Public Sector Work, DeloitteUniversityPress. https://www2.deloitte.com/content/dam/insights/us/articles/3832_AI-augmented-government/DUP_AI-augmented-government.pdf (Erişim Tarihi: 21 Eylül 2024).
Gül, H. (2018). Dijitalleşmenin Kamu Yönetimi ve Politikaları ile Bu Alanlardaki Araştırmalara Etkileri, Yasama Dergisi, 36, 5-26.
GTM Teknoloji (2024). Yapay Zeka ile Daha akıllı Şehirler, https://gtmteknoloji.com/nvidia_yapay_zeka_ile_akilli_sehirler/ (Erişim Tarihi: 1 Ekim 2024).
Kılıç, B. (2020). Yapay Zekâ: Sosyal Etki Alanı ve Etik Problemler, https://www.newslabturkey.org/2020/04/29/yapay-zeka-sosyal-etki-alani-ve-etik-problemler/ (Erişim Tarihi: 14 Eylül 2024).
Mıjwıl, M. M., Sadıkoğlu, E. Cengiz, E. ve Candan, H. (2022).Siber Güvenlikte Yapay Zekanın Rolü ve Önemi: Bir Derleme, Veri Bilim Dergisi, 5(2), 97-105.
NTV Haber (2024). Dünyanın ilk Yapay Zeka Hastanesi Açıldı! Günde 3 Bin Hasta Tedavi Olacak, https://www.ntv.com.tr/galeri/teknoloji/dunyanin-ilk-yapay-zeka-hastanesi-acildi-gunde-3-bin-hasta-tedavi-olacak,oS8nuJo7sUmszngBwDOHOg (Erişim Tarihi: 19 Eylül 2024).
Önder, M. ve Saygılı, H. (2018). Yapay Zekâ ve Kamu Yönetimine Yansımaları, Türk İdare Dergisi, 90(487), 629-669.
Özer, A., M. (2023). Adalet Yönetiminde Etkinlik Arayışları: Robotik Bürokrasi ve Yapay Zekâ Yönetişimi, TAAD, 14(55), 337-374.
Tanrıverdi, A., A. (2021). Yapay Zekânın Kamu Hizmetinin Sunumuna Etkileri, Adalet Dergisi, 66, 293-314.
Seçer, C., A. (2023). Cumhuriyet'in 100. Yılında Yapay Zekanın Türkiye'de Kamu Güvenliğine Etkisi, Türk İdare Dergisi, Özel Sayı, 241-274.
Vashisht, M. (2017). How is Artificial Intelligence Changing the Public Sector, ISHIR, https://www.ishir.com/blog/4662/artificialintelligence-changing-public-sector.htm (Erişim Tarihi: 26 Eylül 2024).

Yeşilkaya, N. (2022). Yapay Zekaya Dair Etik Sorunlar, Şarkiyat İlmi Araştırmalar Dergisi, 14(3), 948-963.
Yeşil Scinece (2024). Sağlıkta Yapay Zeka Uygulamaları, https://yesilscience.com/tr/yapay-zeka-ve-saglik/ (Erişim Tarihi: 20 Eylül 2024).
Uzun, M., Yıldız, M. ve Önder, M. (2022). Big Questions of Artificacial (AI) in Public Administration and Policy, Siyasal: Journal of Poltical Sciences, 31(2), 423-442.

EVALUATION OF THE THERMAL PROPERTIES OF BASE OILS USING THERMOGRAVIMETRIC ANALYSES

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ABSTRACT
In the aluminum casting injection processes of the automotive industry and sub-industry companies and in the glass sector, lubricants create a high temperature resistant film layer between the mold and the material, allowing the material to be easily separated from the mold. In this regard, production efficiency can be increased and unit costs can be decreased One of the most important parameters of these oils is their thermal behavior against to high temperature. In addition, residue amount of the lubricants at high temperatures is another crucial parameter and it should be specific according to process conditions. Thermal properties of the lubricants depend on properties the base oils which are the main component of the lubricant formulation. They have significant effect on thermal characteristic and their lubricity behavior in the operations. Base oils can be classified as paraffinic, naphthenic, polyalphaolefin (PAO) and polyglycol (PG). Besides these base oils, vegetable oils and ester can be also essential component of the lubricants. They are promising alternatives to petroleum-based lubricants since they can provide green and sustainable process. In this regard, it was determined that comparing the thermal stability these different base oils, vegetable oils and esters can provide a valuable contribution to the literature. In this study, thermal stability of base oils, vegetable oils and esters were investigated by using TGA instrument. It was determined that when the same type of Paraffinic, Naphthenic, PAO and PG lubricants were compared, it was observed that decomposition temperature and the amount of residue increased with increasing of the viscosity and flash point values. On the other hand, comparison of different types of lubricants showed that although they have similar degradation temperature the amounts of residue are quite different. It was found that paraffinic and vegetable oils have higher amounts of residue.

Keywords: base oils, lubricants, thermal properties

INTRODUCTION
Aluminium alloys play an important role in the development of space, aviation, automotive, weapons, and defence industry. It is one of the essential materials in the in the engineering application as a result of its high strength, low weight and ease of machinability [1,2]. Aluminum casting and injection processes are commonly used techniques in machning of aluminum. The aluminium poured into the mold then it cools rapidly and solidifies by taking the shape of the mold. In this regard utilization of lubricants as mold release agents is quite important for the separation of aluminium from the mold during the casting process [3]. When the material does not separate easily from the mold, aluminum residue can remain on the mold surface and it creates

quality problems on the part surface. These problems have a negative effect on the production efficiency. Lubricants can create film layer between the mold and the material can be separated to be easily from the mold [4]. Besides aluminum, glass also plays an important role in the industry. The glass sector provides input to many sectors such as construction, automotive, white goods, food, medicine, cosmetics, tourism, furniture, pipes, electricity and electronics. Flat glass and glassware have an important share in the sector and design and production optimization are the main goals of the sector. In order to achieve these objectives, high quality and efficiency should be obtained in glass production. As in the aluminum sector, it is important for the glass sector to separate the glass from the mold properly and similarly, the use of lubricants is highly required for the separation of glass material to be separated from the mold easily and without breaking [5]. In the both process, there is formation of high temperature and their thermal behavior is an important parameter. Nevertheless, operation temperature is different in the processing of alumium and glass. Aluminum casting porecess is carried out at about 600^{o}C whereas glass processing is performed at about 1200^{o}C. Therefore, lubricants used in these industiral application should be special according to process condition for an effective production.

Lubricans mainly consist of base oils and the composition and properties of the base oil significantly affect the overall performance of the final lubricant. Base oils can be classified as paraffinic, naphthenic, polyalphaolefin (PAO) and polyglycol (PG). Paraffinic and naphthenic base oils are petroleum-based oils which is obtained by refining of crude oil. PAOs and PGs are synthetic fluids. PAOs have high volatility and excellent low temperatures. PGs are type of polymer which classified as API group five base stocks. They have high viscosity index and low pour point. Besides base oils, vegetable oils and esters are another alternatives in the lubricant formulations. They are promising feedstocks due to their biodegradability and they can provide green and sustainable process. Although vegetable oils are abundant and they have low cost, they have limited utilization since their low temperature behavior and thermo-oxidative stability are poor. On the other hand, esters have high thermal and oxidative stability [6]. In this context, all these fluids have different technical properties. Comparasion of the thermal properties of these fluids can provide valuable research in the literature and a valuable insight can be obtained appropriate lubricant formulation according to process condition.

There are various thermal analysis techniques and TGA (Thermo Gravimetric Analysis) is one of the mostly used method which can be obtained quantitative weight changes in the mass of a sample with increasing of temperature. The plot of mass or mass percent versus temperature is attained and it can be easily determined the decomposition temperatures and service performance of lubricating oils [7,8].

In this study, it is aimed that analysis of the thermal properties of the paraffinic, naphthenic, polyalphaolefin (PAO) and polyglycol (PG), vegetable oils and esters and determine the effect the structure on the thermal behaviour. Furthermore, base oils that have same structure and different viscosities are compared and effect of viscosity on thermal stability is also evaluated.

MATERIAL AND METHOD

MATERIAL

In this study, various base oils, vegetable oils and esters were used and their technical properties were given in Table 1. As shown Table 1, different viscosites of each lubricant type were analyzed.

Table 1. Technical Properties of the Base Oils, Vegetable oils and Ester

BASE OILS, Vegetable Oils and Esters			Viscosity 40°C	Viscosity 100°C	Viscosity Index	Flash Point (°C)	Pour Point (°C)
Paraffinic	Sample 1	Heavy Neutral Base Oil	104,15	11,38	96	246	-12
	Sample 2	Bright Stock Base Oil	550,48	32,78	92	314	-9
Naphthenic	Sample 3	Distillates (petroleum), hydrotreated heavy naphthenic	110	9,038	26	211	-24
	Sample 4	Distillates (petroleum), hydrotreated heavy naphthenic	21,7	3,681	4	165	-48
PAO	Sample 5	Polyalphaolefin (PAO-4)	18,872	4,1009	119	228	-75
	Sample 6	Polyalphaolefin (PAO-6)	30,36	5,802	137	242	-70
PG	Sample 7	polypropylene glycol monobutyl ether	32,105	6,921	184	216	<-45
	Sample 8	ethylene oxide - propylene oxide - monobutyl ether	100,82	20,036	224	250	<-50
Vegetable Oils	Sample 9	Soybean oil	32,77	7,78	221	300	-7
	Sample 10	Castor oil	150	14,4	93	172	≤-21
Ester	Sample 11	Fatty acids, C18-unsatd., diesters and triesters with trimethylolpropane-(TMP-TO)	46,43	9,308	189	300	≤-42
	Sample 12	Trimellitat Ester	325,13	20,5	69	270	-25

In order to determine thermal properties of the base oils and specify appropriate lubriacant type fot the aluminum casting and shaping of the glass thermogravimetric analysis were carried out with TGA instrument.

METHOD

Thermogravimetric analysis principle is based on the determination of the degree of change in the sample weight (rate of weight loss) under conditions of increasing temperatures. In order to perform the test, a sample is placed in a small pan or crucible, which is then positioned in a furnace with a precisely controlled temperature program. The sample is then subjected to a controlled temperature regime at a constant rate. During the heating process, changes in the mass

of the sample are continuously recorded by a highly sensitive balance. At the end of test, a graph is of weight change against temperature is obtained, which is called thermo-gravimetric curve [9]. Schematic reprasantion of TGA instrument was given in Figure 1.
In this study, Thermogravimetric analysis (TGA) was carried out with thermal analyzer (TGA 4000, PerkinElmer), operated under N_2 flow. The test was performed with the following parameters; temperature range, 50–900 °C; heating rate, 10 °C min^{-1}.

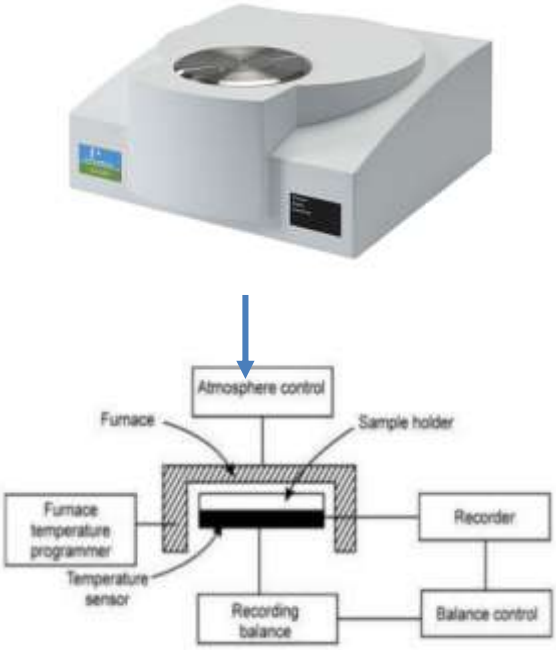


Figure 1. TGA test device

RESULTS

As a result of thermogravimetric analysis of various base oils, vegetable oils and esters, thermo-gravimetric curves were obtained. Figure 2 shows the weight loss of sample 1 with increasing of temperature. An inflection point was obtained by taking the first derivative of the TGA curve which indicates the degradation temperature. Thermal degradation occur as a result of deterioration of sample's physical and chemical composition. Comparasion of thermo-gravimetric curves of all samples were given in Figure 3. Degradation curves were also obtained for all samples. Degradation temperature of all samples were obtained and they were given in Table 2. Residue amount is another important paramter in the TGA analysis. Residue amount of all samples at 400ºC and 900ºC were given in Table 1.

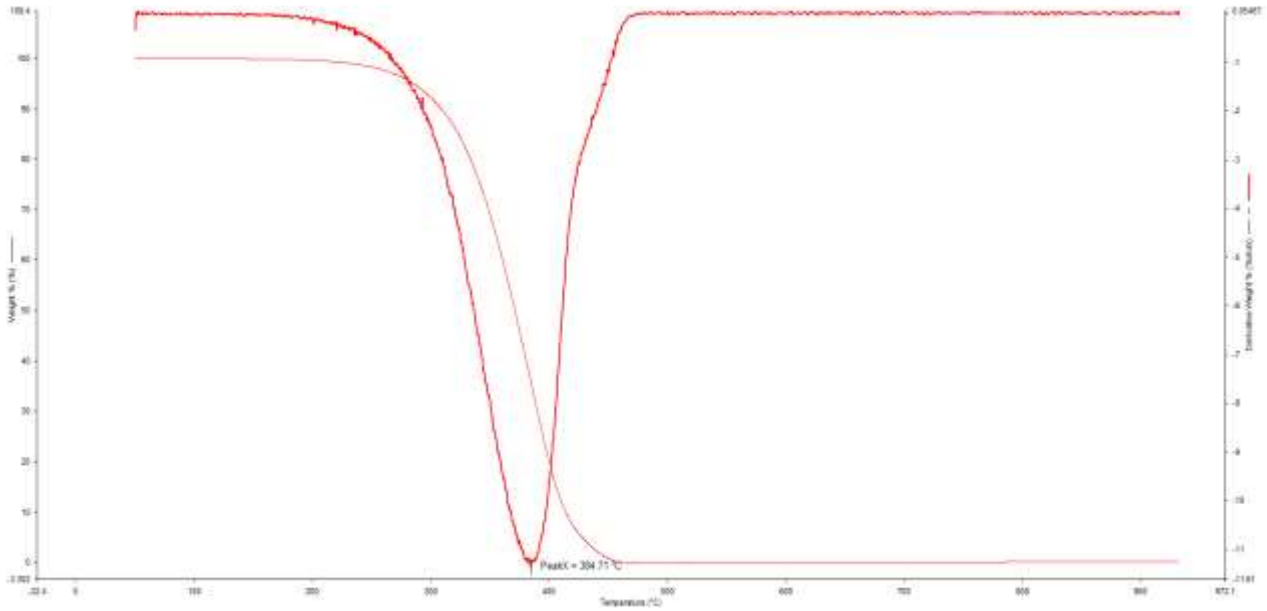


Figure 2. TGA curve of Sample 1

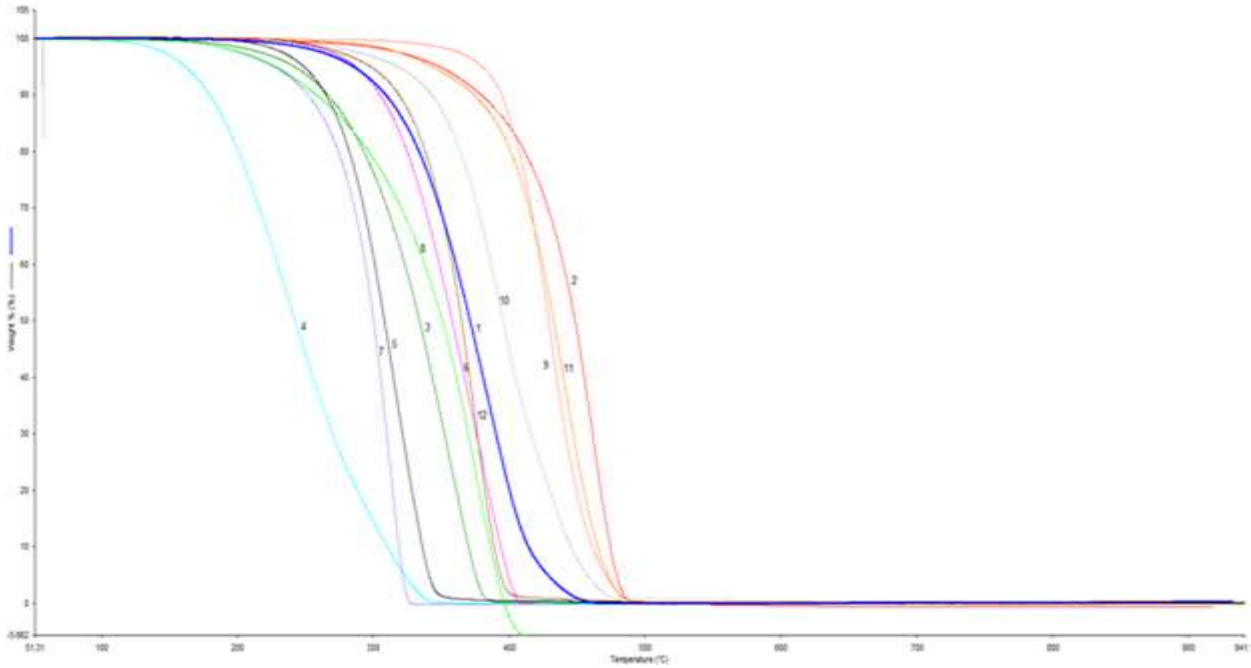


Figure 3. TGA curve of Samples

Table 2. Degradation Temperature and Residue Amount of Samples

	Sample No	Degradation Temperature	Residue Amoun at 400°C	Residue Amoun at 900°C
Paraffinic	**1**	384,71	20,5	0
	2	462,29	84,52	0
Naphthenic	**3**	357,62	0,24	0,11
	4	233,06	0,03	0
PAO	**5**	315,66	0,418	0,1
	6	375,6	1,83	0
PG	**7**	313,54	0 (380°C: 0)	0
	8	375,77	0 (380°C: 17,57)	0
Vegetable Oils	**9**	429,23	86,321	0,021
	10	400	47,413	0
Ester	**11**	441,47	80,785	0,396
	12	375,61	1,841	0

In Figure 4, it was clearly shown that, paraffinic, vegetanle oils and esters have higher thermal stability than naphthenic oils, PAOs and PGs. Furthermore, it was ascertained that increasing viscosity of the same type base oils increased the thermal degradation temperature.

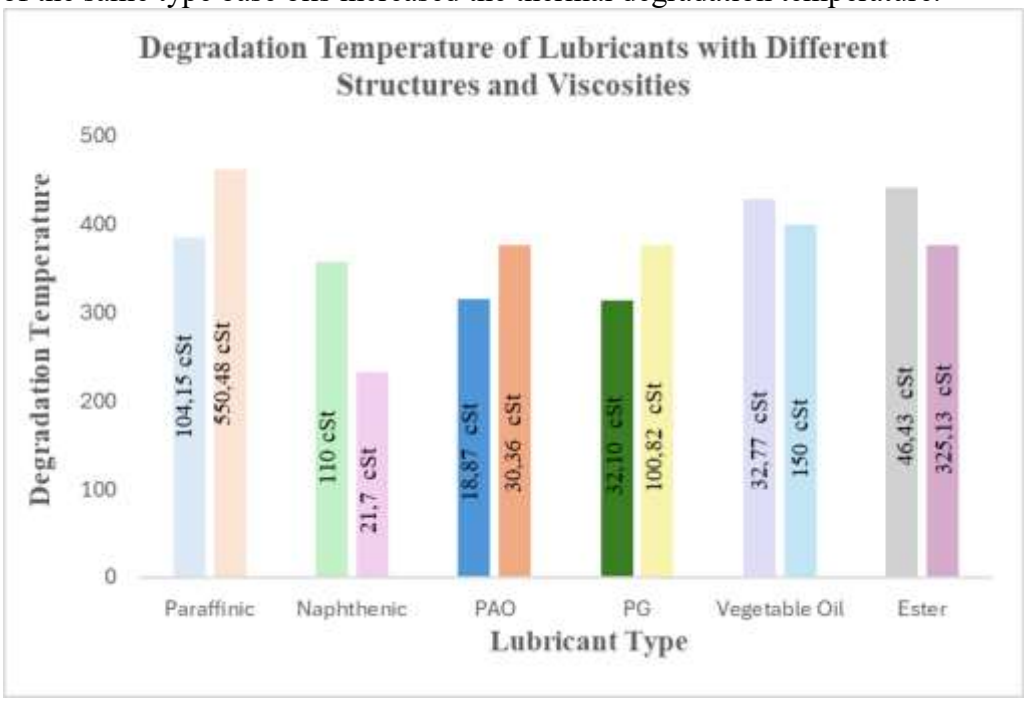


Figure 4. Comprasion thermal behaviour of the base oils, vegetable oils and esters

CONCLUSION

Aluminum and glass are quite important materials in automotive industry. Utilization of the lubricants in the aluminum casting injection processes and shaping of the glass is quite important to achive high production efficiency. In these processes, high temperature is occurred and thermal behaviour of lubricant is one of the important parameters. In this study, thermal behaviour of the various lubricant base-stocks was compared and the following inference was made;

- When the same type of Paraffinic, Naphthenic, PAO and PG lubricants were compared, it was observed that as the viscosity and flash point values increased, the degradation temperature and the amount of residue also increased.
- When comparing vegetable oils, it was determined that although the viscosity value of castor oil is higher than soybean oil, the decomposition temperature and residue amount of castor oil are lower. The reason for this situation may be the lower flash point and viscosity index of castor oil. In this context, it was determined that the flash point and viscosity index have also a significant effect on degradation temperatures and residue amounts. The reason for the different technical properties of castor oil can be attributed to its special structure. Unlike other vegetable oils, castor oil contains a fatty acid called ricinoleic acid and a hydroxyl group.
- Comparasion of esters showed that structure of ester is more important than the technical properties. Although Trimellitate Ester has higher viscosity, its degradation temperature and residue amount is lower than Trimethylolpropane trioleate. This result can be atribuated to lower viscosity index of the Trimellitate Ester.
- When different types of lubricant base stocks were compared, no significant difference is observed between the degradation temperatures of the lubricant base stocks, On the other hand, it was found that residue amounts were quite different. It was ascertained that paraffinic and vegetable oils have higher residue amounts. On the other hand, it was determined that naphthenic oils and PAOs have very low residues at 400ºC whereas PGs did not withstand temperatures up to 400ºC. It was determined that PGs withstand a maximum of 380ºC when they have high viscosity.

REFRENCES

1. Samuel, A.U. *et al.* (2021) 'Effect of machining of aluminium alloys with emphasis on aluminium 6061 alloy – a review', *IOP Conference Series: Materials Science and* Engineering, 1107(1), p. 012157.
2. Cagan, S.C., Venkatesh, B. and Buldum, B.B. (2020) 'Investigation of surface roughness and chip morphology of aluminum alloy in dry and minimum quantity lubrication machining', Materials Today: Proceedings, 27, pp. 1122–1126.
3. Otarawanna, S., & Dahle, A. K. (2011). Casting of aluminium alloys. In *Elsevier* eBooks (pp. 141–154).
4. Haragâş, S., Cristea, F., & Kicsi, V. (2022). The analysis efficiency of the demulation agent injected into aluminum molds. Tribology International, 177, 107950.
5. https://www.aso.org.tr/wp-content/uploads/2017/09/12.pdf
6. Gamlin, C., Dutta, N., Choudhury, N. R., Kehoe, D., & Matisons, J. (2002). Evaluation of kinetic parameters of thermal and oxidative decomposition of base oils by conventional, isothermal and modulated TGA, and pressure DSC. Thermochimica Acta, 392–393, 357–369.
7. Shara, S., Eissa, E., & Basta, J. (2017b). Polymers additive for improving the flow properties of lubricating oil. Egyptian Journal of Petroleum, 27(4), 795–799.
8. Abdelkhalik, A., Elsayed, H., Hassan, M., Nour, M., Shehata, A., & Helmy, M. (2017). Using thermal analysis techniques for identifying the flash point temperatures of some lubricant and base oils. Egyptian Journal of Petroleum, 27(1), 131–136.
9. https://resources.perkinelmer.com/lab-solutions/resources/docs/faq_beginners-guide-to-thermogravimetric-analysis_009380c_01.pdf

DİYABETİN CİNSEL İŞLEVLERE ETKİSİ

EFFECT OF DIABETES ON SEXUAL FUNCTIONS

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ÖZET
Diyabet, dünya çapında hızla artış gösteren en yaygın kronik hastalıklardan biridir. Diyabet, insülinin yetersizliği, yokluğu ya da eksikliği sonucu meydana gelen hiperglisemi, glikozüri ve bunlarla birlikte görülebilen birçok klinik bulgu ile seyreden karbonhidrat metabolizma bozukluğudur. Diyabetin görülme hızının artmasıyla komplikasyonları da artış göstermekte olup makrovasküler (kardiyo-vasküler sistem) ve mikrovasküler (retinopati, nefropati ve nöropati gibi) komplikasyonlarla pek çok organ ve sistemde işlev bozukluğuna sebep olmaktadır. Ayrıca hem erkekte hem de kadında cinsel işlev bozukluğuna da yol açabilmektedir. Diyabeti olan erkeklerde cinsel işlev bozukluğu riskinin üç kat arttığı, kadınlarda ise cinsel işlev bozukluğu görülme oranının yüksek olmasına karşın diyabet ve cinsel işlev bozukluğu arasında net bir ilişkinin olmadığı belirtilmektedir. Diyabet, hormonal ve vasküler bozukluklar, psikolojik ve nörolojik sorunlar gibi birçok riski de beraberinde getirerek cinsel işlev bozukluğuna sebep olmaktadır. Depresyonun ise diyabetle yakın ilişkisi olduğu ve özellikle kadınlarda cinsel işlev bozukluğunun en önemli nedeni olduğu belirtilmektedir. Diyabet cinselliğin her alanında değişik etkilere yol açabilmektedir. Diyabet ve cinsellik, sağlık profesyonelleri tarafından çok fazla konuşulamayan hatta çoğu zaman göz ardı edilen bir durumdur. İnsan hayatının önemli bir parçası olan cinselliğin diyabet hastaları için onların bütüncül bir yaklaşımla ele alınarak cinselliği rahat konuşabilecekleri, sorunlarını ve kendilerini ifade edebilecekleri ortam ve zamanın yaratılması, cinselliğin danışmanlık ve bakıma eklenmesinin desteklenmesi gerekmektedir. Cinsel sağlığa diyabetin etkileri konusunda hastalara sağlık profesyonellerince bilgi verilmesi ve onların cinsel işlevlerinin değerlendirilmesi önemlidir. Bu bilgilere dayanarak çalışmada diyabetin kadın ve erkek cinsel işlevlerine etkisini değerlendirmek ve bu etkilerin nasıl değerlendirilmesi gerektiğini ortaya koymak amaçlanmıştır.

Anahtar Kelimeler: Diyabet, diyabet komplikasyonları, cinsel sağlık, cinsel işlev bozuklukları.

ABSTRACT
Diabetes is one of the most widespread chronic diseases that is rapidly increasing worldwide. Diabetes is a carbohydrate metabolism disorder that occurs due to insufficiency, absence or deficiency of insulin and is accompanied by hyperglycemia, glycosuria and many clinical findings. As the rate of diabetes increases, its complications also increase and it causes dysfunction in many organs and systems with macrovascular (cardiovascular system) and microvascular (retinopathy, nephropathy and neuropathy) complications. It can also cause sexual dysfunction in both men and women. It is stated that the risk of sexual dysfunction is three times

higher in men with diabetes and that although the rate of sexual dysfunction is high in women, there is no clear relationship between diabetes and sexual dysfunction. Diabetes causes sexual dysfunction by bringing many risks such as hormonal and vascular disorders, psychological and neurological problems. It is stated that depression is closely related to diabetes and is the most important cause of sexual dysfunction, especially in women. Diabetes can cause different effects in every area of sexuality. Diabetes and sexuality are conditions that are not talked about much by health professionals and are often ignored. Sexuality, which is an important part of human life, should be addressed with a holistic approach for diabetic patients, creating an environment and time where they can talk about sexuality comfortably, express their problems and themselves, and supporting the inclusion of sexuality in counseling and care. It is important for health professionals to inform patients about the effects of diabetes on sexual health and to evaluate their sexual functions. Based on this information, the study aimed to evaluate the effects of diabetes on female and male sexual functions and to reveal how these effects should be evaluated.
Keywords: Diabetes, diabetes complications, sexual health, sexual dysfunctions.

GİRİŞ

Diyabet yaygın bir hastalıktır ve tıbbi, psikolojik ve cinsel işlevlerde bozukluk gibi birçok sağlık sorununa sebep olabilmektedir. Fiziksel kronik bir hastalık olmasının yanında hasta açısından ruhsal, sosyal, duygusal ve psikoseksüel birçok problemi ve çatışmayı da beraberinde getirebilen bir durumdur (Demir, 2020). Erkeklerde cinsel işlev bozukluğu diyabetin iyi bilinen bir komplikasyonudur. Diyabetli kadınlarda cinsel işlev bozuklukları karmaşık bir durumdur ve nörolojik, vasküler, hormonal ve psikososyal durumları içermektedir (Çiftçi ve Yeni, 2014). Cinsel işlev bozukluğu bireyin kişiler arası ilişkilerini, yaşam kalitesini, kendine olan güvenini, evlilik ilişkisini, psikolojisini ve etkileyen çok boyutlu bir sağlık sorunudur. Diyabetli bireylerde cinsel işlev bozuklukları sıklıkla fark edilmeyip yeterince ele alınmayabilir. Sağlık profesyonelleri cinsel sağlık hakkında rutin olarak bir sorgulama yapmayabilir ve hastalar da konuyu açmakta isteksiz davaranabilirler. Bu durumda hastaların uygun bakım almalarının engellenmesine neden olabilir (Rogoznica ve diğerleri, 2023). Diyabet tedavisi veya yönetimi, eğitim programları tasarlanarak ve diyabetli bir hastanın öz bakım davranışını etkileyen değişkenlerin incelenmesiyle geliştirilebilir. Diyabet gibi kronik bir hastalıkta ve buna bağlı gelişebilecek cinsel işlev bozukluğu gibi komplikasyonlarda adaptasyon süreci hakkında hastalara açıklama ve uygun bir yönlendirme yapılması önemlidir (Siddiqui, Ahmed ve Khan, 2012).

Bu çalışmasının amacı diyabetli erkek ve kadınlarda diyabetin cinsel işlevlere etkisini ve yönetimini gözden geçirmektir.

DİYABETES MELLİTUS (DM)

Diyabetes Mellitus (DM), insülinin yetersiz salgılanması ya da yetersiz kullanılması durumunda meydana gelen, hiperglisemi ile karakterize, karbonhidrat, lipid ve protein metabolizmasında bozukluklarla seyreden bir endokrin ve metabolizma bozukluğudur (Kızılkaya Beji, 2020). DM küresel sağlığı tehdit eden en yaygın kronik hastalıklardan biri olup özellikle yaşlı nüfusun artması, obezite ve fiziksel hareketsizlik gibi sebeplere bağlı olarak artmaya da devam etmektedir (Sirait, Setiawan ve Tarigan, 2019). Uluslararası Diyabet Federasyonu (IDF) 2021 verilerine göre; dünyada 537 milyon yetişkinin diyabet olduğu ve bu sayının 2045 yılında 783 milyona yükseleceği; Türkiye'de ise 2021 yılında 9 milyon diyabet hastası olduğu ve 2045 yılında ise 13.4 milyona erişeceği şeklinde belirtilmektedir (IDF, 2021).

Diyabetin Fizyopatolojisi ve Sınıflandırılması

İnsülinin yeterli olmadığı ya da glikozun hücrelere yeterli taşınamadığı durumlarda dolaşımda anormal miktarda glikoz birikir. Hücre açlığından dolayı, vücut enerji için proteinleri ve yağları kullanmaya başlar. Proteinlerin yakılması ile negatif nitrojen dengesi, yağların yakılması ile ketozis meydana gelir. Kanda glikoz yoğunluğundaki artış ozmotik güç oluşturarak suyun hücrelerden kana çekilmesine sebep olur. Bu durum sellüler dehidratasyonla sonlanır. Kanda

yüksek yoğunlukta bulunan glikoz idrara geçer ve glikozüri ortaya çıkar. İdrardaki glikozun ozmotik etkisi, suyun böbrek tübüllerin geri emilmesini önler ve ekstrasellüler dehidratasyon ortaya çıkar. Bu patolojik değişiklikler diyabetin daha çok görülen klasik belirtilerine yol açar. Tablo 1'de diyabetin tipik belirti ve bulguları görülmektedir (Kızılkaya Beji, 2020; Diabetes Mellitus ve Komplikasyonlarının Tanı, Tedavi ve İzlem Kılavuzu-2024).

Tablo 1. Diyabetin Belirtileri

Klasik belirtiler	**Daha az görülen belirtiler**
Poliüri	Bulanık görme
Polidipsi	Açıklanamayan ağırlık kaybı
Polifaji veya iştahsızlık	İnatçı enfeksiyonlar
Halsizlik, çabuk yorulma	Tekrarlayan mantar enfeksiyonları
Ağız kuruluğu	Kaşıntı
Noktüri	

Tablo 2'de özetlenen diyabet sınıflamasında dört klinik tip yer almaktadır (Diabetes Mellitus ve Komplikasyonlarının Tanı, Tedavi ve İzlem Kılavuzu-2024).

Tablo 2. Diyabetin Etiyolojik Sınıflandırılması

1. Tip 1 diyabet (Genellikle mutlak insülin noksanlığına sebep olan b-hücre yıkımı vardır)
2. Tip 2 diyabet (İnsülin direnci zemininde ilerleyici insülin sekresyon defekti ile karakterizedir)
3. Gestasyonel diabetes mellitus (Gebelik sırasında ortaya çıkan ve genellikle doğumla birlikte düzelen diyabet formudur)
4. Diğer spesifik diyabet tipleri

Diyabetin Komplikasyonları

Diyabetin akut ve kronik olmak üzere komplikasyonları bulunmaktadır. Diyabetin akut komplikasyonları; Diyabetik ketoasidoz, Hiperozmolar hiperglisemik durum, Laktik asidoz ve Hipoglisemi olarak dört ana başlıkta incelenebilir. Diyabet kronik olarak ise, mikrovasküler (retinopati, nefropati ve nöropati gibi), makrovasküler (kardiyovasküler sistem, periferik arter hastalığı) ve ürolojik (alt üriner sistem disfonksiyonu, cinsel disfonksiyon ve üriner sistem enfeksiyonları) komplikasyonlara yol açar (Diabetes Mellitus ve Komplikasyonlarının Tanı, Tedavi ve İzlem Kılavuzu-2024). Diyabet, cinsel disfonksiyonun önemli nedenlerinden biridir, bu normal popülasyona oranla Tip 1 diyabetli hastalarda daha yaygın ve önemli bir sorundur (Celik, Demirgöz Bal ve Kelleci, 2022). Diyabet hem erkek hem de kadınlarda cinsel işlev bozukluğuna sebep olabilmektedir. Diyabetli erkeklerde Erektil Disfonksiyon riskinin üç kat arttığı, kadınlarda ise cinsel işlev bozukluğu oranı yüksek bulunmasına karşın diyabet ve cinsel işlev bozukluğu arasındaki ilişkinin net olarak açıklanamadığı belirtilmektedir (Köse Tuncer, Atalıkoğlu Başkan, Karakurt ve Güneş, 2023).

DİYABETİN CİNSEL İŞLEVLERE ETKİSİ

Diyabete bağlı cinsel sorunlar ilk İbn-i Sina tarafından 'cinsel işlevin çöküşü' olarak MS 960-1037 yıllarında tanımlanmıştır. Bu gözlemi doğrulayan birkaç yazar da olmuştur. Son 70 yılda diyabet ve cinsel sağlık arasındaki ilişki hakkında eğitimin geliştirilmesinde giderek daha hızlı ilerlemeler görülmüştür. 1940'ların başlarında tıp ders kitapları cinsel sağlığı diyabetin bir komplikasyonu olarak kabul etmiştir. Ancak kadın cinsel işlev bozukluğuna çok az dikkat çekilmiştir. 1950'lerde araştırmacılar diyabetli erkeklerde kadın cinselliği ve cinsel işlev bozukluğu hakkındaki bilgiyi genişletmeye büyük ilgi göstermiştir. 1971'de diyabetin kadın cinsel sağlığı üzerindeki etkisine dair ilk makale yayınlanmıştır (Siddiqui, Ahmed ve Khan, 2012). Cinsel işlev bozukluğu; farklı sebeplere bağlı cinsel uyarıya karşı oluşan arzu, uyarılma, orgazm evrelerinden biri veya bir kaçının oluşmaması ve cinsel ilişki sırasında ağrı olması şeklinde tanımlanmaktadır. Bu durum

kişinin psikolojisini, kendine olan güvenini, kişiler arası ilişkilerini, yaşam kalitesini ve evlilik ilişkisini etkileyen çok boyutlu bir sağlık sorunu olmaktadır (Çiftçi ve Yeni, 2014).
Diyabetli kadınlarda cinsel işlev bozukluğunun nedeni tartışmalıdır ve hiperglisemi, enfeksiyon, vasküler, nöral ve psikososyal bozuklukların geneli bu durumdan sorumlu tutulmaktadır. Diyabetik nöropati vajinal duvar değişikliklerine, pelvik taban disfonksiyonuna ve zayıflamış kas tonüsüne yol açar. Otonom sinir sistemindeki nöropatik hasar orgazm sürecini bozar, gecikmiş uyarılma ve daha düşük isteğe neden olur. Yetersiz vajinal lubrikasyon ağrılı cinsel ilişkiye neden olur. Hiperglisemide, mukoza zarlarının dehidratasyonu ve sık ürogenital enfeksiyonlar vajinal kayganlığın azalmasına, disparoniye, yanmaya, kaşıntıya, gerginliğe ve vajinal kuruluğa veya akıntıya yol açabilir (Siddiqui, Ahmed ve Khan, 2012; Celik, Demirgöz Bal ve Kelleci, 2022; Derosa, Romano, D'Angelo ve Maffioli, 2023). Diyabetli kadınlarda cinsel işlev bozukluğunun görülme oranı üzerine yapılan çalışmalar farklı sonuçlar vermiştir. Bu oranlar farklı çalışmalarda sırasıyla %27, %35 ve %71 olarak bulunmuştur (Enzlin ve diğerleri, 2002; Maiorino, Bellastella ve Esposito, 2014; Doruk ve diğerleri, 2004). Diyabetli hastalarda kadın cinsel işlev bozukluğunun prevalansı ile ilgili bu oldukça farklı sonuçlar kültürel farklılıklara bağlanabilse de bu sorunun yeterince ele alınmadığı ve önemli bir sorun olmaya devam ettiği kabul edilmektedir (Celik, Demirgöz Bal ve Kelleci, 2022).
Kadınlarda cinsel işlevlerin değerlendirilmesi hem hastalar hem de sağlık profesyonelleri için zordur. Cinsel yaşamla ilgili kişisel tabular, gizlilik sorunları ve kadın cinsel işleviyle ilgili sınırlı deneyim, cinsel sorunları tanımlamayı zorlaştıran faktörler arasındadır. Bu konuda gelişmiş klinik yöntemler de sınırlıdır. Kadın cinsel işlev indeksi (Female Sexual Function Inventory/FSFI), kadın cinsel işlevlerinin değerlendirilmesini standartlaştırmak için geliştirilmiş bir değerlendirme aracıdır. Cinsel işlevlerin sınıflandırılmasını kolaylaştıran alt ölçekler içerdiği ve farklı ülkelerde geçerlilik ve güvenilirlik çalışmalarında değerlendirildiği için uluslararası alanda yaygın kabul görmüş bir ölçektir (Aygin ve Aslan, 2005). Elyasi ve diğerleri (2015) 150 Ttip 2 diyabet hastası kadınla yaptıkları çalışmada, kadınların %78,7'sinin cinsel işlev bozukluğu yaşadığı saptanmıştır.
Kadın cinsel işlev bozuklukları sınırlı tedavilerle çok daha karmaşık ve zor bir konudur. Lubrikasyon problemleri kolaylıkla çözümlenmesine rağmen uyarılma bozukluğu, orgazm zorlukları, cinsel istek konuları daha karmaşıktır ve bu konularda uzman danışmanlar gerekmektedir (Demir, 2020). Kan şekeri kontrolü için yapılan yaşam tarzı değişiklikleri; düzenli egzersiz, sağlıklı ve dengeli beslenme, kilo kontrolü gibi durumlar kan şekeri kontrolünün yanında diyabetin komplikasyonlarını ve psikolojik şikyatleri tedavi ederek bunun sonucunda cinsel işlevleri de düzeltebilmektedir. Cinsel istek, arzu, vajinismus bozukluklarında bilişsel davranışçı psikoterapi önerilebilir, uyarılma ve orgazm bozukluğu olan kadınlarda ise klitoral terapi cihazı kullanılabilir, depresyon tedavisi de önemlidir ve ilaçla tedavi hormonal tedavilere dayanmaktadır (Çiftçi ve Yeni, 2014).
Diyabet, 10 yıldır diyabet hastası olan erkeklerin yarısından fazlasının bir tür erektil disfonksiyon (ED) yaşadığı, erkeklerde cinsel sağlık sorunlarının önde gelen nedenlerinden biridir. ED'nin yaygınlığı, seçilen popülasyona, yaşa, tipe ve diyabet süresine bağlı olarak %32-90 arasında büyük ölçüde değişmektedir. Tip 1 diyabette ED yaygınlığı %32 ve tip 2 diyabette %46'dır. Ancak yaygınlık yaşla birlikte artmaktadır. 20-29 yaşlarındaki erkeklerin ED yaygınlığı %9, 30-34 yaşlarındakilerde %15 ve 60-70 yaşlarındakilerde ise %95 olarak belirtilmektedir. Diyabet kontrolü kötü olan erkeklerin cinsel sağlık sorunları yaşama olasılığı daha yüksektir. Diyabetli hastalarda ED'nin patofizyolojisi multifaktöriyel olup vasküler, hormonal ve nöral komplikasyonlar rol oynar (Bahar ve diğerleri, 2020).
Diyabetik nöropati, ereksiyon için önemli olan otonom ve somatik sinir bozukluklarına neden olabilmektedir. Ayrıca diyabet, endotelden üretilen nitrik asit sonucu kavernöz düz kasların gevşemesinde bozukluklara neden olur ve bu glikozlanmış ürünlerin bir yan etkisidir. Diyabetli erkeklerin penisi destekleyen atardamarlar ve sinirlerle ilgili sorunlara ek olarak testosteron

seviyelerinin düşmesi (hipogonadizm) tehlikesi de bulunmaktadır. Bu etkinin kesin bir mekanizması henüz tam olarak belirlenmemiş olsa da hipogonadizm, testislerde testosteron üretimini uyarmaktan sorumlu olan hipofiz hormonlarının seviyelerini dolaylı olarak azaltır. Düşük testosteron seviyeleri ayrıca cinsel dürtü kaybına veya doğrudan veya dolaylı olarak ED'ye neden olabilmektedir. Ancak, cinsel istek, orgazm bozuklukları ve boşalma sorunlarının yaygınlık oranları ise tam olarak belirlenmemiştir. Diyabetli erkeklerde ED görülme sıklığı genel nüfusa göre neredeyse üç kat daha fazladır (Maiorino, Bellastella ve Esposito, 2014; Kamenov, 2015; Sirait, Setiawan ve Tarigan, 2019; Bahar ve diğerleri, 2020). ED diyabetli hastalarda rutin bir şekilde sorgulanmalı ve düşünülmelidir, bireye uygun tedaviler yüksek etkinliğe sahip olacaktır (Demir, 2020). Fallahi ve diğerleri (2014) Tip 2 diyabeti olan erkek hastalarda cinsel işlev bozukluğu düzeylerini belirlemek amacıyla 69 erkek hasta üzerinde yaptıkları çalışmada katılımcıların çoğunun ereksiyon sorunu ve cinsel ilişkiye girme sayılarının düşüklüğü ile ilgili sorunlar yaşadığı belirlenmiştir. Bahar ve diğerleri (2020) yaptıkları çalışmada 350 Tip 2 Diyabetli erkek hastanın %62,2'sinin ED yaşadığı ve yaş arttıkça oranın arttığı tespit edilmiştir.

SONUÇ

Diyabet, erkek ve kadınların cinsel işlevlerini önemli ölçüde bozmaktadır. Cinsel işlev bozukluğuna katkıda bulunan faktörler arasında yaş ve diyabetin süresi önemlidir. Hem erkek hem de kadın diyabetli hastaların değerlendirilmesinde cinsel işlev bozukluğunun dikkate alınması gerekir. Sağlık çalışanlarının cinsellikle ilgili bilgi eksiklikleri, ön yargıları, yanlış inanışları ve başvuranın kültürel durumuna ilişkin geliştirdikleri tutum ve inançlar gibi etmenler nedeniyle cinsel yaşamı sorgulama ve değerlendirmede yetkin olamayabilecekleri belirtilmektedir. Oysaki insan hayatının önemli bir parçası olan cinselliğin diyabet hastaları için onların bütüncül bir yaklaşımla ele alınarak cinselliği rahat konuşabilecekleri, sorunlarını ve kendilerini ifade edebilecekleri zaman ve ortamın yaratılması, cinselliğin bakım ve danışmanlığa eklenmesinin desteklenmesi çok önemlidir.

Sağlık profesyonellerinin, hastalarla zamanında görüşmelere katılmaları, birlikte kişiye özel tedavi seçeneklerini seçip uygulamaları ve cinsel sağlığın hem fiziksel hem de psikolojik yönlerinde iyileştirmeleri en üst düzeye çıkarmak için hastaları sosyal destek sistemleriyle ilişkilendirmeleri gerekmektedir.

KAYNAKLAR

Aygin, D., & Aslan, F. (2005). Kadın Cinsel İşlev Ölçeği'nin Türkçeye Uyarlaması. Turkiye Klin J Med Sci., 25 (3), 393–9.

Bahar, A., Elyasi, F., Moosazadeh, M., Afradi, G., & Kashi, Z. (2020). Sexual dysfunction in men with type II diabetes. Caspian J Intern Med, 11(3), 295-303.

Celik, S., Demirgöz Bal, M., & Kelleci, M. (2023). Comparison of sexual functions in women with and without Type 1 diabetes, Rev Assoc Med Bras., 69(2), 216-221.

Çiftçi, H., & Yeni, E. (2014). Diyabetes mellitus'un kadın cinsel fonksiyonlarına etkisi. Androloji Bülteni,16(56), 83-87.

Demir, S. (2020). Diyabetik erkek ve kadınlarda seksüel disfonksiyon. Van Tıp Dergisi, 27(1), 109-116.

Derosa, G., Romano, D., D'Angelo, A., & Maffioli, P. (2023). Female Sexual Dysfunction in Subjects with Type 2 Diabetes Mellitus. Sexuality and Disability, 41(2), 221-233.

Doruk, H., Akbay, E., Cayan, S., Bozlu, M., & Acar, D. (2005). Effect of diabetes mellitus on female sexual function and risk factors. Arch Androl, 1(1), 1-6. https://doi.org/10.1080/014850190512798

Elyasi, F., Kashi, Z., Tasfieh, B., Bahar, A., & Khademloo, M. (2015). Sexual dysfunction in women with type 2 diabetes mellitus. Iran J Med Sci, 40, 206-13.

Enzlin, P., Mathieu ,C., Van den Bruel, A., Bosteels,, J., Vanderschueren, D., & Demyttenaere, K. (2002). Sexual dysfunction in women with type 1 diabetes: a controlled study. Diabetes Care, 25(4), 672-77. https://doi.org/10.2337/diacare.25.4.672.

Fallahi, M., Mozaffari-Khosravi, H., Afkhami-Ardekani, M., & Dehghani, A. (2014). Evaluation of sexual function in men with diabetes mellitus type 2-yazd diabetes research center. Iran J Diabetes Obesity, 6, 136-41.

International Diabetes Federation (IDF) (2021). Diabetes Around The World in 2021. https://diabetesatlas.org.

Kamenov, Z. A. (2015). comprehensive review of erectile dysfunction in men with diabetes. Exp Clin Endocrinol Diabetes, 123, 141-58.

Kızılkaya Beji N. Kadın Sağlığı ve Hastalıkları, Nobel Tıp Kitabevleri, 3. Baskı, 2020, ISBN: 978-605-335-463-5.

Köse Tuncer, S., Atalıkoğlu Başkan, S., Karakurt, P., & Güneş, D. (2023). Diyabetli kadınlarda evlilik uyumu ve cinsel yaşam kalitesi arasındaki ilişki. Kırşehir Ahi Evran Üniversitesi Sağlık Bilimleri Dergisi, 7(3), 196-204.

Maiorino, MI., Bellastella, G., & Esposito, K. (2014). Diabetes and sexual dysfunction: current perspectives. Diab Metab Syndr Obes, 6(7), 95-105. https://doi.org/10.2147/DMSO.S36455

Rogoznica, M., Perica, D., Borovac, B., Belanˇci´c, A., & Matovinovi´c, M. (2023). Sexual Dysfunction in Female Patients with Type 2 Diabetes Mellitus—Sneak Peek on an Important Quality of Life Determinant. Diabetology,4, 527–536. https://doi.org/10.3390/ diabetology4040046

Siddiqui, M.A., Ahmed, Z., & Ahmed Khan, A. (2012). Psychological Impact on Sexual Health among Diabetic Patients: A Review. International Journal of Diabetes Research , 1 (2), 28–31. DOI: 10.5923/j.diabetes.20120102.02

Sirait, I., Setiawan, & Tarigan, R. (2019). The experience of type 2 diabetes mellitus male patients who undergo sexual dysfunction. International Journal of Nursing and Health Services (IJNHS), 2(3), 116-123.

TEMD Diabetes Mellitus ve Komplikasyonlarının Tanı, Tedavi ve İzlem Kılavuzu - 2024,https://file.temd.org.tr/Uploads/publications/guides/documents/diabetesmellitus2024.pdf, erişim tarihi 09.10.2024.

EMPATİ VE DUYARSIZLAŞMA KAVRAMLARI ÇERÇEVESİNDE MEDYADA ŞİDDET VE NORMALLEŞME

VIOLENCE AND NORMALIZATION IN MEDIA IN THE FRAMEWORK OF EMPATHY AND DESENSITIZATION CONCEPTS

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ÖZET
İnternet kullanımının yaygınlaşmasıyla iletişimin yanı sıra bilgi paylaşımı, eğlence, ticaret gibi pek çok amaçla kullanılan sosyal medya, bireylerin ve toplumların dünyayı anlamlandırma biçimlerinde önemli bir yer edinmiştir. Klasik uzam içerisinde karşılaşılan olay ve durumlar kadar dijital uzamın zaman ve mekândan bağımsız olarak sunduğu içerikler de bireylerin ve dolayısıyla toplumların hayata bakış açılarını şekillendirmektedir. Kişilerarası iletişim açısından oldukça önemli bir yere sahip olan empati, klasik uzam içerisinde yalnızca mekânsal olarak bir arada bulunma durumunu zorunlu kılsa da gelişen teknoloji sayesinde bu durum değişmiştir. Dünyanın farklı noktalarından insanların deneyimlerinin sosyal medya ile aktarılmasıyla dijital uzam aracılı empati mümkün hale gelmiştir. İlk bakışta internetin pozitif etkilerinden biri olarak görülebilecek bu imkân, medya içeriklerinin negatif yapısı ve aynı negatif temadaki içeriklerin sürekli paylaşımı gibi durumlara neden olabilmekte ve etkiyi negatif bir yöne çekebilmektedir. Özellikle şiddet temalı içeriklerin geleneksel medya ve sosyal medyada sürekli paylaşımı, empati kavramının karşıtı olan duyarsızlaşmayı gündeme getirmektedir. Her ne kadar bilinçli bir seçimle içeriklerin kullanıcılar tarafından seçildiği savunulsa da yankı odası ve filtre balonu etkisiyle kullanıcıların şiddet içerikli paylaşımlardan uzaklaşabilmeleri zorlaşmaktadır. Aşırı maruz kalmanın sonraki aşaması olarak ortaya çıkan normalleşme süreci, kullanıcıların şiddet içeriğinin seviyesinden bağımsız olarak yaşanan duruma duyarsızlaşmasına neden olabilmektedir. İkincil duyarsızlaşma ve bunun sonucunda ortaya çıkan normalleşme, bireysel bir travmadan ziyade kolektif bir gerçeklik inşası sonucu kendini göstermektedir. Medyada şiddet içeriklerine aşırı maruz kalmanın kolektif bir şekilde duyarsızlaşmaya ve bunun sonucunda normalleşmeye neden olabileceğini tartışan çalışmada, gerçekliğin sosyal inşasında negatif maruz kalmanın kolektif etkileri sorgulanmaktadır.

Anahtar Kelimeler: Şiddet, Empati, Duyarsızlaşma, Normalleşme, Sosyal Medya, Medya Psikolojisi

ABSTRACT
With the widespread use of the Internet, social media, which is used for many purposes such as information sharing, entertainment and trade as well as communication, has gained an important place in the way individuals and societies make sense of the world. As much as the events and situations encountered in classical space, the contents offered by digital space independent of time and space shape the perspectives of individuals and therefore societies. Although empathy, which has a crucial place in terms of interpersonal communication, requires only spatial coexistence in classical space, this situation has changed thanks to the developing technology. Digital space-mediated empathy has become possible through the transfer of the experiences of people from

different parts of the world through social media. This opportunity, which can be seen as one of the positive effects of the internet at first glance, can lead to situations such as the negative structure of media content and the continuous sharing of content with the same negative theme and can pull the effect in a negative direction. Especially the constant sharing of violence-themed content in traditional media and social media brings up desensitization, which is the opposite of the concept of empathy. Although it is argued that users select the content with a conscious choice, the echo chamber and filter bubble effect makes it difficult for users to move away from violent posts. The normalization process that occurs as the next stage of overexposure can cause users to become desensitized to the situation, regardless of the level of violent content. Secondary desensitization and the resulting normalization are the result of a collective construction of reality rather than an individual trauma. Arguing that overexposure to violent content in the media can lead to collective desensitization and consequent normalization, the study questions the collective effects of negative exposure on the social construction of reality.
Keywords: Violence, Empathy, Desensitization, Normalization, Social Media, Media Psychology

GİRİŞ

Günümüz dünyasında sosyal medya, yalnızca bireyler arasında bilgi paylaşımı ve eğlence amaçlı bir platform olmaktan çıkmış, toplumsal gerçekliğin şekillenmesinde önemli bir rol oynamaya başlamıştır. İnternet ve sosyal medyanın yaygınlaşmasıyla birlikte, bireylerin yaşadıkları olaylar ve bu olaylara verdikleri tepkiler de değişime uğramıştır. Dijital uzam, fiziksel sınırlardan bağımsız olarak, bireylerin dünyayı anlamlandırma biçimlerini dönüştürmekte, bu dönüşüm ise toplumsal yapılar üzerinde önemli etkiler yaratmaktadır. Sosyal medyanın bu etkisi, bireyler arasındaki iletişimin temel taşlarından biri olan empatiyi de yeniden tanımlamıştır. Eskiden fiziksel yakınlık gerektiren empati, artık dijital araçlarla dünyanın dört bir yanındaki insanların yaşantılarını paylaşarak kurulabilmektedir. Ancak, bu pozitif etki beraberinde yeni sorunları da getirmiştir.

Sosyal medya platformlarında şiddet içeriklerine sıkça rastlanması, empati becerisini zayıflatabilen bir faktör olarak öne çıkmaktadır. Şiddet içeriğine maruz kalmanın artışı, bireylerde duyarsızlaşmaya yol açabilir. Duyarsızlaşma, bir olay veya duruma tekrar tekrar maruz kalmanın, bu olay veya duruma karşı verilen duygusal tepkilerin azalması sürecini ifade etmektedir. Özellikle şiddet içerikli medyanın sürekli tüketimi, bireylerin ve toplulukların bu tür içeriklere karşı duyarsız hale gelmelerine ve böylece şiddeti sıradan bir durum olarak kabul etmelerine neden olabilmektedir. Bu süreç, yalnızca bireyler düzeyinde değil, kolektif bir gerçeklik inşası olarak toplum genelinde de yaygınlaşmaktadır.

Gerçekliğin sosyal inşası teorisi, toplumsal olayların nasıl anlamlandırıldığı ve bu anlamlandırmanın zamanla nasıl değişebileceğini açıklamaktadır. Bu bağlamda sosyal medya, kolektif bilinç üzerinde önemli bir etki yaratarak belirli olayların normalleşmesine katkıda bulunmaktadır. Şiddet içeriklerinin sürekli olarak görülmesi, başlangıçta tepki çekebilecek olayların bile zamanla toplum tarafından normal karşılanmasına ve gündelik hayatın bir parçası olarak görülmesine neden olabilmektedir. Bu çalışmada, sosyal medyanın empati ve duyarsızlaşma süreçleri üzerindeki etkisi incelenerek, bu süreçlerin toplumsal gerçekliğin inşasına nasıl katkıda bulunduğu ele alınmaktadır. Ayrıca, sosyal medyanın bireysel ve toplumsal düzeyde şiddetin normalleşmesine nasıl zemin hazırladığı değerlendirilmektedir.

MEDYA VE ŞİDDET

Kitle iletişim araçlarının yaygınlaşması ile birlikte çeşitli sosyolojik ve psikolojik etkiler ortaya çıkmıştır. Özellikle medya içeriklerinin izleyici/kullanıcı üzerindeki psikolojik etkisi araştırmaların odak noktasını oluşturmaktadır. Yaygın olarak, şiddet içeren medya içeriklerinin insan tutum ve davranışı üzerindeki etkilerinin incelenmesi üzerine çalışmalar yürütülmektedir.

Brad J. Bushman (1995, s.953), yüksek sürekli agresif bireylerin (high trait aggressive individuals) şiddet içerikli medyadan düşük sürekli agresif bireylerden daha fazla etkilendikleri hipotezini 3

araştırma ile çalışmıştır. Birinci çalışmada katılımcılardan belirlenmiş film açıklamalarını okuyarak şiddet içeren ve içermeyen filmlerden izlemek istediklerini seçmeleri istenmiş; ikinci çalışmada katılımcılara şiddet içeren ve içermeyen 15 dakikalık videolar izletildikten sonra ruh halleri rapor edilmiş; üçüncü çalışmada ise katılımcılara önce ikinci çalışmadaki gibi bir video izletilmiş ve ardından kaybedenin gürültü patlaması ile karşılaştığı bir tepki süresi görevinde bir rakiple yarıştırılmışlardır. Her üç çalışma da yüksek sürekli agresif bireylerin şiddet içeren medya içeriklerini tüketmeye eğilimli oldukları ve ardından daha öfkeli hissettikleri bulgulanmıştır.

Medya şiddetinin saldırganlık üzerindeki etkilerini kültürel durum özelinde inceleyen Anderson ve meslektaşlarına göre (2017, s.10), medya şiddeti etkilerinin cinsiyet, mahalle şiddeti, akran mağduriyeti vb. gibi değişkenler kontrol edildikten sonra bile en büyük etki olarak bulunmaya devam etmektedir. Dolayısıyla medya şiddeti ile saldırganlık arasındaki ilişkinin kültürler arasında genellenebilir olduğu sonucuna ulaşılmıştır.

Şiddet içeren videoların izlenmesine ilgi ile akademik başarı arasındaki ilişkinin ölçülmesi amacıyla Aluja-Fabregat ve Rafael Torrubia-Beltri (1998) tarafından gerçekleştirilen araştırma sonucunda engellenmemiş kişilik özelliklerine sahip erkek ve kız çocuklarının saldırgan davranış kalıpları sergileme olasılığının daha yüksek olduğu, bu kişilerin medya şiddetini olumlu değerlendirdikleri ve daha düşük akademik başarı düzeyine sahip oldukları anlaşılmıştır.

Daha önce medyada veya gerçek hayatta şiddete maruz kalma durumuna göre medyadaki şiddet içeriklerine verilen tepkinin değişip değişmediğini incelemeyi amaçlayan Madan ve arkadaşlarının (2013) araştırmasına göre, daha önce yüksek düzeyde gerçek yaşam şiddetine maruz kalan öğrencilerin, şiddet içeren videoları izlerken şiddet içermeyen videolara kıyasla daha düşük kan basıncı artışları gösterdiği bulgulanmıştır. Dolayısıyla şiddet içeren videolara nispeten kısa süreli maruz kalmanın, geç ergenlerde kaygıyı arttırdığı sonucuna ulaşılmıştır. Şiddet içeren medyaya ve gerçek hayattaki şiddete önceden maruz kalma, yüksek aksiyonlu ve şiddet içeren filmlere karşı daha düşük fizyolojik reaktivite ile ilişkili bulunmuş ve bunun da duyarsızlaşmaya neden olduğu bulgulanmıştır.

EMPATİ

Günlük dilde yoğun biçimde kullanılan empati kavramı literatürde birkaç farklı şekilde tanımlanmaktadır. Rogers empati kavramını, "Bir kişinin kendisini karşısındaki kişinin yerine koyarak olaylara onun bakış açısıyla bakması, o kişinin duygularını ve düşüncelerini doğru olarak anlaması, hissetmesi ve bu durumu ona iletmesi" (akt. Dökmen, 2017, s.157) olarak tanımlamaktadır. Empatide başlıca iki öge olduğunu belirten Ertürk'e göre (2010, s.13) karşıdakini anlamak açısından bilişsel öge ve karşıdakini hissetmek açısından duygusal öge bulunmaktadır. Empatinin başarılı bir şekilde kurulabilmesinin yolu, hem bilişsel hem de duygusal olarak karşıdaki kişinin içinde bulunduğu durumu anlamlandırabilmektir.

Daniel Goleman üç tür empati tanımlamaktadır. Bunlardan ilki olan bilişsel empati temel olarak, "başka bir kişinin bakış açısını anlama yeteneğidir". Bilişsel empatinin ortaya çıkması için karşıdaki kişinin duygularını hissetmeye gerek bulunmamaktadır. Burada esas önemli olan yalnızca karşıdaki kişinin durumu üzerine düşünmektir. Empatinin ikinci türü olan duygusal empati ise Goleman tarafından "başka birinin hissettiklerini hissetme yeteneği" olarak anılmaktadır. Bilişsel empatinin aksine burada başkalarının duygu durumlarının kişi tarafından deneyimlenmesi merkezdedir. Goleman tarafından ifade edilen üçüncü tür olan empatik ilgi ise "başka bir kişinin sizden ne istediğini hissetme yeteneği" olarak tanımlanmaktadır (Goleman, 2017, s.4). Dolayısıyla empatik ilgi, diğer empati türlerinden kategorik olarak farklıdır. İlk iki empati türü gerek bilişsel gerekse duygusal olarak karşıdaki kişinin içinde bulunduğu durumu kavramayı sağlamaktadır. Örneğin bir STK görevlisi, görevi gereği bulunduğu bir afet alanında mesleğini profesyonel bir biçimde yerine getirirken karşısındakilere bilişsel empati ile yaklaşabilmektedir. Benzer biçimde günlük hayatın akışı içerisinde kişisel ilişkilerimiz duygusal empati ile his odaklı bir yaklaşımla davranmamızı mümkün kılabilmektedir. Ancak üçüncü

kategori olan empatik ilgi empatiyi gereksinen konumda bulunan kişinin ihtiyaçlarını da anlamamızı sağlamaktadır. Empatik ilginin duygusal empati ile doğrudan ilgili olduğunu ifade eden Goleman, bu empatinin özel bir niteliğine dikkat çekmektedir; "…insanların sadece nasıl hissettiklerini değil, sizden ne istediklerini de anlamanızı sağlar" (Goleman, 2017, s.8). Kökleri ebeveyn-çocuk ilişkisindeki biyolojik mekanizmalara dayanan empatik ilgi kişiyi sorumluluk almaya ve harekete geçmeye yönlendirmektedir. Anlaşıldığı üzere bilişsel ve duygusal empati günlük toplumsal ilişkilerin kuruluşu için oldukça gerekliyse de sistematik davranış geliştirme açısından yeterli değildir. Nitekim insanlar karşılaştıkları olaylar karşısında duygusal veya en azından bilişsel empati geliştiriyorlarsa da empatik ilgi geliştirme konusunda başarılı olamamaktadırlar.

Empatik ilgi kavramına değinen bir başka düşünür olan Davis (1996), empatik ilgi, hayal gücü, kişisel sıkıntı ve perspektif alma olmak üzere empatiye dair dört boyut belirlemektedir. Başkalarına merhamet edebilme ve başkalarına karşı duyarlı olabilmeye işaret eden empatik ilgi, özellikle zor durumdaki birine ilgi ve şefkat gösterebilme yeteneğidir. Empatinin hayal gücü boyutu, özdeşim kurma süreci olarak işlerlik kazanmakta ve bir karakterin özelliklerini benimseme şeklinde görülmektedir. Üçüncü boyut olan kişisel sıkıntı, başkalarının maruz kaldığı üzüntü verici olay veya durum karşısında kişisel rahatsızlık ve endişe duymak olarak tanımlanmaktadır. Son boyut olan perspektif alma ise bir başkasının bakış açısını benimseme ve başkalarından öğrenerek kendi kişiliğine ekleme olarak ifade edilmektedir (akt. Yüksel, 2015, s.10). Dolayısıyla empati, başkalarının yerine kendini koyarak onu anlayabilmek gibi tek boyutlu bir süreçten ziyade anlama ediminin ardından kişinin kendisinde de değişikliğe neden olan ve dünyayı anlamlandırma biçimini yöneten çok boyutlu bir süreç olarak ele alınmalıdır.

DUYARSIZLAŞMA VE MEDYA

Bireylerin bir uyarana tekrar tekrar maruz kaldıktan sonra duygusal uyaranlara karşı daha az duyarlı hale geldikleri süreci ifade eden duyarsızlaşmanın medya tüketimi, şiddet ve sosyal etkileşimler de dahil olmak üzere çeşitli alanlarda önemli etkileri vardır. Duyarsızlaşmanın nedenlerini ve sonuçlarını anlamak, davranış ve toplumsal normlar üzerindeki etkilerini ele almak için önemlidir. Wolpe'a göre duyarsızlaşma, "olumsuz veya tiksindirici bir uyarana tekrar tekrar maruz kalındıktan sonra bu uyarana karşı duygusal tepkinin azalması"dır (akt. Fanti vd., 2009, s.179). Duyarsızlaşma bireyin doğrudan maruz kaldığı durumlarda ortaya çıkabildiği gibi bir başkasının maruz kaldığı duruma zaman içinde tepkisizleşmesi şeklinde de görülebilmektedir. Dolayısıyla empati kavramı ile de ilişkili bir kavramdır.

Duyarsızlaşmanın gerçekleşmesine neden olan en yaygın uyaranlardan biri şiddettir. Bireyler gerçek hayatta kendisinin maruz kaldığı şiddet için duyarsızlaştırma geliştirebileceği gibi medya içeriklerinde başkalarının maruz kaldığı şiddete de duyarsızlaşabilmektedir. Medyada yer alan şiddet içeriklerine aşırı maruz kalma sonucunda toplumsal duyarsızlaşma da söz konusu olabilmektedir. "Şiddete karşı duyarsızlaşma, gerçek hayattaki şiddete tekrar tekrar maruz kalmanın yanı sıra medyadaki şiddete maruz kalmanın bir sonucu olarak ortaya çıkabilen ince, neredeyse tesadüfi bir süreçtir" (Funk vd., 2004, s.25). Dolayısıyla rahatsız edici uyaranlar bir süre sonra "normal" hale gelerek bireylerde ve dolayısıyla toplumda tepki verilmesine gerek olmayan "yaygın durumlar" olarak kodlanmaktadır.

Duyarsızlaştırma gerçekleştikten sonra yaşanacak yeni şiddet olayları, duyarsızlaştırmanın yokluğunda meydana gelecek olandan farklı bilişsel ve duygusal tepkileri tetikler. Duyarsızlaşma ile birlikte bireylerin olayları algılamalarında yaşanacak değişiklik nedeniyle bireylerin saldırgan olayları fark etme olasılıkları düşebilir. Şiddet olayından sonra yaşanan yaralanmalar daha az ya da daha az ciddi olarak algılanabilir. Dolayısıyla şiddet mağdurlarına daha az sempati duyulabilir.

En nihayetinde duyarsızlaşma sonucunda şiddete karşı olumsuz tutumda azalma gözlenebilir (Carnagey vd., 2007, s.491).

Yaşanan ya da tanık olunan olumsuz duruma karşı azalan tepkiler zamanla gündelik hayat içerisinde bu durumun fark edilmesi ihtimalini de düşürmektedir. Şiddet içeriklerine sürekli maruz kalma sonucunda yaşanan olumsuz durumların gündelik hayatın bir parçası olduğuna ve diğerlerinin yaşadığı talihsiz durumlar olduğuna dair bir genel düşünce üretmeye zemin hazırlamaktadır. Böylece bireylerde diğerlerinin yaşadığı şiddete dair empati duygusu azalabilmektedir. "Bir zamanlar tahammül edilemez olarak görülen imgeler zamanla normal olarak kabul edilmeye başlanır. Dolayısıyla bir görüntünün potansiyel etkisi aşinalık nedeniyle kaybolur" (Seu, 2010, s.190). Özellikle medya aracılığıyla kolektif olarak tanık olunan şiddet içerikleri gerçek dünyadan bağımsız olarak algılanabilmekte ve duyarsızlaşmayı kolektif bir boyuta taşıyabilmektedir. "Toplum şiddetine tanık olmak başlangıçta güçlü olumsuz duygusal tepkiler ortaya çıkaracaktır, ancak toplum şiddetine tekrar tekrar maruz kaldıktan sonra bu duygusal tepkiler azalacak ve daha az duygusal sıkıntıya neden olacaktır" (Mrug vd., 2015, s.76). Bu da başlangıçta diğerlerinin yaşadığı olumsuz durumlara dair empati geliştirilebilirken aşırı maruz kalma sonucunda ortaya çıkan duyarsızlaşma nedeniyle kurulan empatide azalmaya işaret etmektedir.

GERÇEKLİĞİN SOSYAL İNŞASI VE NORMALLEŞTİRME

Birey, içine doğduğu toplumsal dinamikleri temel alarak dünya algısını oluşturur ve şekillendirir. Toplumsal bir aradalığın zorunluluğu içinde ortak kabullere dayanan kolektif davranışlar, bireyin gündelik hayat içerisinde nasıl bir vaziyet alacağını da belirlemektedir. Ancak buradaki en önemli nokta, bireyin kabul ettiği bu kolektif dinamiklerin bir inşa sonucunda ortaya çıkmış olması ve zamana ve topluma uygun olarak dönüşebilen bir yapıya sahip olmasıdır. Gerçekliğin sosyal inşası olarak kavramsallaştırılan bu süreç, gündelik yaşamın geçmişten bugüne anlamlı bir süreklilik içinde şekillenmiş bir yapı olduğuna işaret etmektedir. "Gündelik yaşam, insanlar tarafından yorumlanan ve tutarlı bir dünya olması anlamında onlara öznel olarak anlamlı gelen bir gerçeklik olarak kendini sunar" (Berger & Luchmann, 2018, s.29). Böylece bireyler ve içine doğdukları toplum kolektif bir tutarlılığı garanti altına almakta ve devam ettirmektedir.

Gündelik hayatın çağın ruhuna, coğrafi şartlara, çeşitli inanç biçimlerine uygun olarak belirlenmesi ve yine aynı dinamiklere uygun olarak dönüşebilmesi kabul edilen gerçekliğin de zaman içinde farklılaşabileceği sonucunu yaratmaktadır. Bu nedenle bireysel ve toplumsal olarak kabul edilen kati ve tek bir gerçeklikten ziyade sürekli devinen ancak bilişsel olarak kabul edilebilir olarak tutarlı birden fazla gerçeklik söz konusu olmaktadır. "Çoklu gerçeklikler arasında, kendini *par excellence* (en üstün) gerçeklik olarak sunan bir gerçeklik vardır. Bu, gündelik yaşam gerçekliğidir" (Berger & Luchmann, 2018, s.32). Bu anda kabul edilen bir gerçeklik olarak gündelik hayat, mümkün evrenler içindeki tek gerçeklik olarak kendini sunar. Dolayısıyla inşa edilmiş bir gerçeklik alanı olarak kolektif bir geçmiş algısı ve buna dayalı olarak gelecek tasavvuru sağlamaktadır.

Gündelik hayat içerisinde kolektif kabule dayanan dinamikler kendi normlarını yaratarak o topluma ait bireyleri bilişsel olarak etkisi altına almaktadır. Böylece inşa edilen gerçekliğe uygun sınırların içinde kalan anlamsal düğümler, "normal" olarak kabul edilir, aksi durumdakiler ise toplumun çoğunluğunda kabul görmez. Zamansal ardışıklık ile kendini belirleyen bu düğüm noktalarını bireyler, içselleştirme süreçlerinin bir sonucu olarak kabul etmektedir. İçselleştirme, "Nesnel bir olayın ifadelendirilmiş bir anlam olarak, yani bir diğer kişiye ait olup tam da bu yüzden benim için öznel bakımdan anlamlı hâle gelen öznel süreçlerin bir tezahürü olarak dolaysızca kavranması ya da yorumlanması"dır (Berger & Luchmann, 2018, s.193). İçselleştirme ile birlikte ötekine ve dolayısıyla bireye dair normlar kabul edilerek devam ettirilmektedir.

Bireyin içindeki bulunduğu topluma bilişsel ve davranışsal olarak uyum sağlaması sosyalizasyon sonucunda gerçekleşmektedir. "…sosyalizasyon, bireyin bir toplumun ya da toplumun bir

kesitinin nesnel dünyasına kapsamlı ve tutarlı şekilde girmesi olarak tanımlanabilir" (Berger & Luchmann, 2018, s.194). Böylece birey, sosyalizasyon sonucunda o topluma ait anlam düğümlerini kabul ederek, bilişsel olarak kendini bu sınırlara dahil etmektedir. Berger ve Luchmann'a göre aslî ve talî olmak üzere iki sosyalizasyon biçimi bulunmaktadır. "Aslî sosyalizasyon, bireyin çocukluk döneminde başından geçen ve onu toplumun bir üyesi haline getiren ilk sosyalizasyondur. Talî sosyalizasyon ise, zaten sosyalleşmiş olan bireyi kendi toplumunun nesnel dünyasındaki yeni kısımlara sokan herhangi bir sonraki süreçtir" (Berger & Luchmann, 2018, s.194). Dolayısıyla birey çocukluk döneminde yaşadığı ve genellikle aile dinamiklerine uygun olarak aslî sosyalizasyon sonrasında geliştirdiği normları, yetişkinlik döneminde talî sosyalizasyon ile devam ettirebilmekte ya da toplumsal yapılara uygun olarak dönüştürebilmektedir. Buradan hareketle norm, bireysel olduğu kadar kolektif olarak da çağın ruhuna uygun olarak kabul edilen anlam ağlarının sınırlarının içinde kalan mümkün sonuçlar olarak tanımlanabilir.

Bir toplumun gündelik hayat içerisinde karşılaştığı olaylar ve kolektifin bu olaylara verdiği tepkiler sonucunda bu sınırlarda değişiklik söz konusu olmaktadır. Özellikle dijital teknolojilerdeki gelişmelerin bir sonucu olarak dijital uzamın bir gerçeklik alanı olarak kendini sunması, algılanan gerçeklik süreçlerinde de çeşitli dönüşümlere neden olabilmekte ve normları değiştirebilmektedir. İletişim teknolojileri öncesinde bireylerin dahil olduğu küçük gruplarda yaşanan olayların küçük bir alanı etkileyebilme gücünden bahsetmek mümkünken, sosyal medya aracılığıyla tüm dünyada yaşanan olaylar bireyi doğrudan etkileyebilir duruma gelmektedir. Bir toplumda sosyal medya aracılığıyla aynı içeriklere tekrar tekrar maruz kalma durumu toplumsal duyarsızlaşmaya neden olabileceği gibi zamanla gerçekliğin farklı şekilde inşa edileceği bir süreci başlatarak normları da dönüşüme uğratabilmektedir. Böylece sosyal medyada yaygın hale gelen bir anlamsal düğümün tüm toplumda "normalleşebilmesi", olağan bir durum gibi karşılanabilmesi olası hale gelmektedir.

Televizyon ya da sosyal medya aracılığıyla maruz kalınan şiddet içerikleri, gerçek bir olay olduğu bilinmesine rağmen aracın doğası gereği içeriğin gerçek dışı olduğuna dair bir düşünce de yaratabilmektedir. Nitekim kurmaca içeriklerde sürekli tekrarlanan yapılar olarak ölüm, şiddet, işkence gibi sahneler bireyleri bu içeriklere karşı duyarsızlaştırmakta ve bu tarz olayların yaşanabilecek olaylar olarak kabul edilmesine neden olmaktadır. "Televizyondaki şiddet programlarını daha sıklıkla seyreden insanlar, ekranda seyrettikleri bu olayın gerçek dünyadaki normal olaylar olduğuna inanır hale gelebilmektedir" (Arkonaç, 2003, s.352). Dolayısıyla televizyon ya da sosyal medya aracılığıyla tanık olunan bir şiddet içeriğinin kurgu veya gerçek olması arasındaki farkındalık ortadan kalkmakta ve her ikisi de seyirlik bir meta gibi algılanabilmektedir. Bunun sonucunda da şiddet içerikleri gündelik hayatın bir parçası olarak normalleştirilmekte ve zamanla daha az tepki verilebilir duruma gelmektedir.

SONUÇ

İnternet ve sosyal medyanın ortaya çıkışı, bireylerin ve toplumların kendi gerçekliklerini yorumlama biçimlerini derinden değiştirmiştir. Bu dijital platformlar, farklı insan deneyimlerinin paylaşılmasını kolaylaştırıp coğrafi sınırları aşan bir empati biçimini teşvik ederken, önemli zorlukları da beraberinde getirmektedir. Hem geleneksel hem de sosyal medyada yaygın olan şiddet içeriğinin yaygınlaşması, endişe verici bir duyarsızlaşma eğilimine yol açabilir ve kolektif olarak empati yeteneğinin azalmasına neden olabilir.

Sosyal medyanın kullanıcı odaklı algoritmaları nedeniyle sürekli benzer içerikleri kullanıcıya önermesi, şiddet olaylarını barındıran içeriklere aşırı maruz kalmaya neden olmaktadır. Yankı odası ve filtre balonu gibi kavramsallaştırmaların işaret ettiği bu durumlar mevcut inançları pekiştirmekte ve farklı bakış açılarına maruz kalmayı sınırlandırarak duyarsızlaşmaya neden olabilmektedir. Bireylerin algoritma aracılığıyla sürekli maruz kaldığı şiddet içerikleri zamanla normal durumlar olarak içselleştirilmekte ve empatiyi ortadan kaldırmaktadır.

KAYNAKÇA

Aluja-Fabregat, A., Torrubia-Beltri, R. (1998). Viewing of Mass Media Violence, Perception of Violence, Personality and Academic Achievement. *Personality and Individual Differences*, 25(5), 973-989.

Anderson, C. A. & Bushman, B. J. (2018). Media Violence and the General Aggression Model. *Journal of Social Issues,* 74(2), 386-413 doi: 10.1111/josi.12275

Arkonaç, S. A. (2003). *Psikoloji Zihin Süreçleri Bilimi*. İstanbul: Alfa.

Berger, P. L. & Luckmann, T. (2018). *Gerçekliğin Sosyal İnşası Bir Bilgi Sosyolojisi İncelemesi*. (Çev. Vefa Saygın Öğütle). Ankara: Atıf.

Bushman, B. J. (1995). Moderating Role of Trait Aggressiveness in The Effects of Violent Media on Aggression. *J Pers Soc Psychol*, 69(5), 950-60. doi: 10.1037//0022-3514.69.5.950. PMID: 7473040.

Carnagey, N. L., Anderson, C. A. & Bushman, B. J. (2007). The Effect of Video Game Violence on Physiological Desensitization to Real-Life Violence. *Journal of Experimental Social Psychology*, 43(3), 0–496. doi:10.1016/j.jesp.2006.05.003

Dökmen, Ü. (2017). *Sanatta ve Günlük Yaşamda İletişim Çatışmaları ve Empati*. İstanbul: Remzi.

Ertürk, Y. D. (2010). *Halkla İlişkilerin İletişim Öznesi Empati*. İstanbul: Derin.

Fanti, K. A., Vanman, E., Henrich, C. C. & Avraamides, M. N. (2009). Desensitization to Media Violence Over a Short Period of Time. *Aggressive Behavior*, 35(2), 179–187. doi:10.1002/ab.20295

Funk, J. B., Baldacci, H. B., Pasold, T. & Baumgardner, J. (2004). Violence Exposure in Real-Life, Video Games, Television, Movies, and the Internet: Is There Desensitization?. *Journal of Adolescence*, 27(1), 0–39. doi:10.1016/j.adolescence.2003.10

Goleman, D. (2017). *Empathy (HBR Emotional Intelligence Series).* Boston: Harvard Business Review Press.

Mrug, S., Madan A. & Windle, M. (2015). Emotional Desensitization to Violence Contributes to Adolescents' Violent Behavior. *Journal of Abnormal Child Psychology*, 44(1), 75–86. doi:10.1007/s10802-015-9986-x

Seu, B. I. (2010). Your Stomach Makes You Feel That You Don't Want To Know Anything About It': Desensitization, Defence Mechanisms and Rhetoric in Response to Human Rights Abuses, *Journal of Human Rights*, 2(2), 183-196, DOI: 10.1080/1475483032000078170

Yüksel, A. (2015). Kavram, Kapsam ve Tarihsel Gelişim Bağlamında Empati. İçinde (Ed. Yücel Kabapınar), *Empatiyle Gelişmek Empatiyi Geliştirmek: Çocuk ve Empati*, ss.2-20. Ankara: Pegem Akademi.

GELİŞMELERİ KAÇIRMA KORKUSU (FoMO) KAVRAMININ AŞIRI ENFORMASYON YÜKÜ AÇISINDAN DEĞERLENDİRİLMESİ

EVALUATION OF THE FEAR OF MISSING OUT (FoMO) CONCEPT IN TERMS OF INFORMATION OVERLOAD

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ÖZET
İletişim teknolojilerindeki gelişmeler ile birlikte sosyal medya kullanımı oldukça yaygın hale gelmiştir. Gündelik hayat içerisinde her an erişilebilir olma özelliği ile kullanıcılara çeşitli alanlara yönelik enformasyon ve eğlence sunma niteliğine sahip sosyal medyanın aşırı ve kontrolsüz kullanımı, bağımlılık riskini de beraberinde getirmektedir. Medya bağımlılığı ile birlikte kullanıcılarda güncel paylaşım ve bilgileri kaçırmaya yönelik bir endişe de ortaya çıkabilmektedir. Türkçe literatürde "Gelişmeleri Kaçırma Korkusu" olarak kullanılan FomO (Fear of Missing Out), sağlıksız sosyal medya kullanımı ile ilişkili olarak sosyal medya içeriklerinden haberdar olamama endişesidir. Bu endişenin ortaya çıkmaması için ise sürekli sosyal medya kullanımı ve paylaşımların eksiksiz takip edilmesi bir görev haline gelmektedir. Özellikle gündemde olan her bilgi ve içeriğe erişmek "Aşırı Enformasyon Yükü" açısından kullanıcıları bilişsel olarak zorlamaktadır. Enformasyon Çağı'nın negatif sonuçlarından biri olarak kabul edilen "Aşırı Enformasyon Yükü" (Information Overload), bireylerin maruz kaldıkları bilgi bombardımanı karşısında artan bilgi miktarı ile anlamlandırma ve karar verme süreçlerinde ortaya çıkabilecek zorlanmalara işaret etmektedir. Bireyin enformasyona ilgisi, enformasyonu işleme güdüsü, dikkat ve bellek gibi içsel faktörlerden etkilenen "Aşırı Enformasyon Yükü", sosyal medyanın kullanıcı odaklı içerik sunan algoritması nedeniyle sürekli uyarılmaktadır. Böylece bireyler ilgi duydukları alandaki enformasyona erişebilmekte ve sınırsız olarak bu davranışı devam ettirebilmektedir. Ancak teknolojik araçlar ile bireye sunulan bu imkân gelişmeleri kaçırmaya dair bir endişe yaratmakta ve bireyleri sürekli kullanım için motive etmektedir. Gelişmeleri kaçırma korkusu kavramı ile aşırı enformasyon yükü kavramı arasında sosyal ağ yorgunluğu açısından ilişki kurmayı amaçlayan çalışmada, gelişmeleri kaçırma korkusunun dijital medyanın olumsuz psikolojik etkilerinden biri olduğu ve aşırı enformasyon yükü ile birbirini sürekli pekiştiren bir süreci olası hale getirebileceği tartışılmaktadır.

Anahtar Kelimeler: FoMO, Aşırı Enformasyon Yükü, Sosyal Medya, Medya Psikolojisi

ABSTRACT
With the developments in communication technologies, the use of social media has become quite widespread. Excessive and uncontrolled use of social media, which has the quality of providing users with information and entertainment in various fields with its feature of being accessible at any time in everyday life, brings with it the risk of addiction. Along with media addiction, users may also be concerned about missing out on current posts and information. FomO (Fear of Missing Out) is concerned about not being aware of social media content in relation to unhealthy social media use. In order to avoid this concern, it becomes a task to use social media continuously and to follow the posts completely. In particular, accessing every information and content that is on the agenda is cognitively challenging for users in terms of "Information Overload".

Information overload, considered one of the negative consequences of the Information Age, refers to the difficulties that may arise in the meaning-making and decision-making processes with the increasing amount of information that individuals are exposed to in the face of information bombardment. Information overload, which is influenced by internal factors such as the individual's interest in information, motivation to process information, attention and memory, is constantly stimulated by social media's algorithm that delivers user-oriented content. Thus, individuals can access information in the field they are interested in and continue this behavior indefinitely. However, this opportunity offered to the individual through technological tools creates a concern about missing out on developments and motivates individuals for continuous use. In this study, which aims to establish a relationship between the concept of fear of missing out and the concept of information overload in terms of social network fatigue, it is argued that the fear of missing out is one of the negative psychological effects of digital media and can make a process that constantly reinforces each other with information overload.

Keywords: FoMO, Information Overload, Social Media, Media Psychology

GİRİŞ

Gündelik hayat içerisinde yaygın bir kullanım alanına sahip olan sosyal medya, bireylerin öteki ile bir araya geliş biçimlerinde uzamsal ve zamansal olarak keskin bir dönüşüme neden olmuştur. Ağ teknolojilerinin gelişmesi sonucunda bireyler arası ilişkilerde ortaya çıkan ‘zamansızlık’ ve ‘mekânsızlık’ olgusu, bireyler için öteki ile sürekli bir ilişki ve iletişim halinde bulunma zorunluluğunu da beraberinde getirmiştir. Bilgiye erişimin düşük maliyetli ve neredeyse sınırsız olması, bireyler üzerinde daha çok bilgiye ulaşma konusunda bir baskıya neden olabilmektedir. Bahsedilen enformasyon bilimsel bir bilgi olabileceği gibi diğer insanların hayatlarına dair ayrıntıları da içerebilmektedir. Sosyal medya aracılığıyla diğer insanların hayatlarına dair anların takip edilebilirliği, diğer insanların daha iyi hayatlar yaşadığına dair içsel düşünceler, eksiklik hissi, sosyal ortamlardan izole edilme korkusu gibi pek çok konuda yaşanan kaygı, bireylerin aşırı enformasyona yönelmesine neden olabilmekte ve ileriki aşamalarda sosyal medya bağımlılığına neden olabilmektedir. Bağımlılıkla ilişkili bir kavram olarak gelişmeleri kaçırma korkusu ise bireyleri daha fazla enformasyon yüküne maruz bırakarak bir kısır döngüye neden olabilmektedir. Sosyal ağ kullanımı sonucunda ortaya çıkan bu döngü, bireylerde sosyal ağ yorgunluğuna neden olabilmekte, tükenmişlik gibi sonuçlar yaratabilmektedir.

Gelişmeleri Kaçırma Korkusu (FoMO) Kavramı

İnternetin toplumsal ve bireysel olarak insan hayatına sağladığı faydaların yanı sıra özellikle olumsuz psikolojik etkilere de neden olduğu söylenebilir. Bu olumsuz etkilerden biri olarak gelişmeleri kaçırma korkusu, sağlıksız sosyal medya kullanımı ile ilişkili olarak, her şeyi tüketen duyguyu ifade etmekte ve sosyal olarak bağlı kalma arzusu ile ilişkilendirilmektedir (Riordan vd., 2015, s.2). Sürekli tekrarlanan bir davranışı güdüleyen kaygı biçimi olarak gelişmeleri kaçırma korkusu, bireyin diğerlerinin yaptığı paylaşımları sürekli takip etmeye dair duyduğu arzu (Przybylski vd., 2013, s.1841) sonucunda yaşadığı kaygıya işaret etmektedir.

Gelişmeleri kaçırma korkusu, psikolojik ihtiyaç tatminindeki eksikliklerden kaynaklanan öz-düzenleyici bir belirsizlik olarak kavramsallaştırılabilir. İhtiyaç ve gelişmeleri kaçırma korkusu arasında doğrudan ve dolaylı olmak üzere iki şekilde ilişki kurulabilmektedir. İlk olarak, düşük düzeyde temel ihtiyaç tatmini olan bireyler, sosyal bağlantı, beceri geliştirme ve sosyal bağları güçlendirmek için algılanan bir kaynak olarak sosyal medyayla doğrudan etkileşime girebilir. İkinci olarak ise karşılanmamış psikolojik ihtiyaçlar gelişmeleri kaçırma korkusuna karşı hassasiyeti artırabilir. Böylece bireyler dışlanma duygularını hafifletmeye çalıştıkça sosyal medya katılımının artmasına yol açabilir. Dolayısıyla temel ihtiyaçlar ve bunların tatmini üzerine

yoğunlaşıldığında gelişmeleri kaçırma korkusu gibi psikolojik temelli davranışlar için bir bakış açısı sunulabilmektedir (Przybylski vd., 2013, s.1842).

İnternet çağında değişen ihtiyaçlar, gelişmeleri takip etme ve gündemden haberdar olmayı sıradan bir davranış olarak belirlemektedir. Ancak bu gelişmelerin sürekli takip edilmesine dair bir zorunluluk hissedilmesi ilerleyen süreçte kaygıya neden olabilmektedir. Alutaybi ve arkadaşlarının belirttiği gibi kaygı, literatürdeki gelişmeleri kaçırma korkusu tanımının önemli bir parçasıdır (Alutaybi vd., 2020, s.4). "Kişinin yaşadığı o anda ve gelecekte nasıl gerçekleşeceği belli olmayan; belki de gerçekleşmesi hiç muhtemel olmayan öznel bir durumla ilgili endişe ve tedirginlik duyma hali" (Şahin, 2019, s.119) olarak tanımlanabilecek kaygı, bireylerin gerçekleşme ihtimalinden kaçındıkları olay ya da durumu engelleyebilmek için çeşitli kompulsif davranışlar geliştirmesine de neden olabilmektedir. Kaygıyı azaltmak ve oluşan huzursuz edici durumdan kaçınmak üzere geliştirilen kompulsif davranışlar, bireyde geçici bir rahatlama hissi yaratmaktadır. Gelişmeleri kaçırmaya dair yaşanan kaygı, gelişmeleri sürekli takip etmeye yönelik tekrar eden davranış örüntülerine neden olarak sürekli kullanım yaratmaktadır. Dolayısıyla gelişmeleri kaçırma korkusu, "kompulsif davranışlara yol açabilir ve insanlar sosyal medyalarını kontrol etme dürtüsüne direnmekte ya da bunlarla meşgul olmayı bırakmakta başarısız olabilirler. Kompulsif davranış bağımlılıkla ilişkilidir" (Alutaybi vd., 2020, s.5). Bilgi kaynağının tekrar eden örüntüler ile güncellenmesi, başkalarının yaşadıkları hayatlara dair her ayrıntının araştırılması, sosyal ortamlardaki etkinliklerin sürekli takip edilmesi gibi süreklilik içeren davranışlar, internet bağımlılığı ile ilişkili hale gelmektedir.

Gelişmeleri kaçırma korkusunun nedenleri arasında "bireyin merak duygusu, ait hissetme ihtiyacı, rekabet ve gösterişte bulunma hissi, iletişim kültürünün değişmesi, gerçek hayatta elde edemediği hislere ulaşma arzusu ve eksik kalma hissi" (Tanhan vd., 2022, s.78) gibi pek çok neden bulunmaktadır. Ek olarak gelişmeleri kaçırma korkusunun temelinde, "diğer insanların daha iyi bir yaşamı olduğuna yönelik duyulan olumsuz ve sürekli devam eden hisler" (s.75) bulunmaktadır. Diğerlerinin yaşadığı hayata dair merak duygusu ile rekabet ve gösterişte bulunma hissinin bu temel düşünceden kaynaklandığı söylenebilir. Diğerlerinin daha iyi bir hayata sahip olduğuna dair düşünceleri olan bireyler yaşadıkları eksiklik duygusu ile baş edebilmek üzere kompulsif davranışlar geliştirebilmektedir. Dijital uzamın sağladığı olanaklar ile gerçek hayatta elde edemediği durumları, dijital uzam üzerinden elde edebilmiş gibi gösterebilen bireylerin yaşadıkları içsel çatışmalar, diğerlerinin yaşamlarının daha gerçek algılanmasına ve dolayısıyla kaygıyı güçlendirmeye neden olabilmektedir.

Sosyal Ağ (Medya) Yorgunluğu

Birçok disiplin tarafından incelenen ve kesinleşmiş bir tanımı bulunmayan yorgunluk kavramı, en temelde fiziksel ve psikolojik olarak sınıflandırılabilmektedir. Yorgunluğun fiziksel ve psikolojik faktörler arasındaki etkileşimin bir sonucu olarak ele alınabilecek bir kavram olduğunu ifade eden Potemta ve arkadaşları (1986, s.165) yorgunluğu, "fiziksel ve zihinsel çalışma kapasitesinin azalması durumu" olarak tanımlamaktadır. İletişim teknolojilerinin gelişmesi ile birlikte yorgunluğa etki eden faktörlerde de değişiklikler yaşanmaktadır. Son yıllarda yaygın olarak görülen ve internet kullanımının artmasına bağlı olarak ortaya çıkan yorgunluk üzerine yapılan çalışmalar sonucunda, sosyal ağ yorgunluğu kavramsallaştırması gündeme gelmiştir. Yoğunluğu değişebilen, kullanıcıya, dış çevreye ve sosyal ağ çeşidine ilişkin faktörlerden etkilenebilen bir durum olan sosyal ağ yorgunluğu, "sosyal ağ kullanımı ve etkileşimlerinin çeşitli yönlerini hedef alan yorgunluk, sıkıntı, öfke, hayal kırıklığı, temkinlilik, ilgi kaybı veya hissedilen ihtiyaç/motivasyon azalması gibi duyguları içeren öznel, çok boyutlu bir kullanıcı deneyimi" olarak tanımlanmaktadır (Ravindran vd, 2013, s.437).

Hem fiziksel hem de zihinsel yorgunluğa neden olan sosyal ağ yorgunluğu, artan kullanım sıklığına bağlı olarak etkisini göstermektedir. Bireylerin gerçek uzamdaki bir araç vasıtasıyla bilişsel olarak dijital uzamda faaliyet gösterebilmeleri, zamandan ve mekândan bağımsız bir

kullanıcı deneyimini mümkün kıldığı için yaşanan yorgunluk hem fiziksel hem de zihinsel olarak ortaya çıkmaktadır. Deneyimin çoğunlukla bilişsel bir sürece dayanması sonucu yaşanan odaklanma, kullanım süresini kontrol edebilmeyi de zorlaştırmaktadır. Bu deneyim sonucunda ortaya çıkan sosyal ağ yorgunluğu, "sosyal ağ etkinliklerine karşı yorgunluk, bıkkınlık, tükenmişlik, ilgisizlik ve düşük ilgi gibi olumsuz duygusal tepkiler olarak" tanımlanabilmektedir (Zhang vd.,2016, s.906). Tanımdan da anlaşılacağı üzere, negatif etki yaratan sosyal ağ yorgunluğu sonucunda, "bir kullanıcının bilgiye boğulduğunda sosyal medya katılımından geri çekilme eğilimi" (Bright vd., 2015, s.148) göstermesi beklenmektedir. Sağlıklı bir tepki olarak beklenen bu davranış, yorgunluğun giderilmesi ve fiziksel ve zihinsel toparlanma süreçlerine olanak tanınması açısından önemlidir. Ancak sosyal ağ kullanımının sağlıklı şekilde yürütüldüğü süreçlerde beklenen geri çekilme davranışının gösterilebilmesi, bağımlılık gibi bireyin kontrolünü aşan durumlarda zorlaşmaktadır. Aynı şekilde bağımlılık davranışıyla ilişkili bir olgu olan gelişmeleri kaçırma korkusu da kaygı ve bağımlılık nedeniyle geri çekilmeyi zorlaştırabilir.

Nitekim Dhir ve arkadaşlarının (2018, s.148) sosyal medya yorgunluğu ile psikososyal refah arasındaki ilişki üzerine yaptıkları araştırmada kompulsif sosyal medya kullanımının zamanla sosyal medya yorgunluğuna neden olduğu saptanmıştır. Aynı araştırmada sosyal medya yorgunluğunun zaman içinde anksiyete ve depresyonla pozitif yönde ilişkili olabileceği bulgulanmıştır. Ancak gelişmeleri kaçırma korkusu ile pozitif bir ilişki tespit edilememiştir. Bu araştırmada sosyal medya yorgunluğu ile pozitif ilişki içinde olan kompulsif kullanım, anksiyete (kaygı) ve depresyonun gelişmeleri kaçırma korkusu kavramı ile ortak olduğu görülmektedir. Ancak dürtüsel kullanım sonucunda ortaya çıkan gelişmeleri kaçırma korkusunun bireyde yarattığı yorgunluk açısından ele alınması, kompulsif davranışlar temelinde incelenmelidir.

Aşırı Enformasyon Yükü

Psikolojik yorgunluğa neden olan durumlardan biri de teknolojik gelişmeler ile bilgiye sürekli maruz kalma sonucu ortaya çıkan teknoloji aşırı yüküdür. Bilgi teknolojilerinin aşırı kullanımı sonucunda oluşan bilişsel, psikolojik ve davranışsal olarak olumsuz sonuçlara neden olan aşırı yüklenmenin anlamı bağlamına göre farklılık göstermektedir. Karr-Wisniewski ve Lu (2010), teknoloji aşırı yükü kavramı altında aşırı enformasyon yükü, aşırı iletişim yükü ve aşırı sistem özelliği yükü olmak üzere üç alt kavram önermektedir. Bu alt kavramlar yoluyla teknoloji tabanlı üretkenlik kayıplarına neden olan üç ana faktör belirlenmektedir. Lee ve arkadaşlarının (2016, s.53) aktardığı üzere, aşırı enformasyon yükü bireylerin bilişsel olarak kaldırabileceğinden daha fazla enformasyona maruz kalmaları durumudur. Aşırı iletişim yükü bilgi teknolojileri aracılığıyla her an iletişime açık durumda olma sonucu bireyin mümkün iletişim kapasitesinin zorlanmasıdır. Aşırı sistem özelliği yükü ise teknolojinin getirdiği sistemsel araçların amaçlanan işlem için fazla karmaşık olması durumunda ortaya çıkmaktadır.

Teknoloji aşırı yükü içinde tanımlanan aşırı enformasyon yükü, özellikle sürekli güncellenen veri akışına uyum sağlayabilme çabasının bir sonucu olarak ortaya çıkmaktadır. İnternet teknolojileri ile birlikte bilgiye olan sınırsız erişimin bireyler üzerinde yarattığı stres, aşırı enformasyon yükü ile bireylerde yorgunluk ve tükenmişliğe neden olabilmektedir. "Aşırı enformasyon yükü, bir bireyin belirli bir zaman birimini özümseme veya işleme yeteneğini aşan bilgi seviyesinin neden olduğu bir durum olarak tanımlanmaktadır" (Bright vd., 2015, s.151). Dolayısıyla mevcut tüm verilerin herhangi bir sınırlandırma ve kategorizasyon olmaksızın sürekli edinilmesi bilişsel süreçler açısından bazı sorunları da beraberinde getirmektedir. "Sosyal medya bağlamında, alıcı (veya kullanıcı) çok sayıda mesaj karşısında bunalmış hissedebilir ve bu nedenle mesajı işlemek için yeterli bilişsel kaynak ayıramayabilir" (Bright vd., 2015, s.151). Sağlıklı bireylerde aşırı enformasyon yükü sonucunda ortaya çıkacak yorgunluk, kullanıma ara verme ile dengelenmeye çalışılır. Ancak özellikle gelişmeleri kaçırma kaygısı yaşayan bireylerde bu dengeleme süreci beklendiği şekilde tamamlanmayabilir ve bunun sonucunda sosyal ağ yorgunluğu ve tükenmişlik yaşanabilmektedir.

Literatürde bir stres faktörü olarak gelişmeleri kaçırma korkusunun, sosyal ağ yorgunluğu ve aşırı enformasyon yükü ile ilişkisi üzerine çalışmalar mevcuttur. Chai ve arkadaşlarının (2019), 1319 ergen üzerinde yaptıkları araştırmada, sosyal ağ kullanımının teknolojik yük alt faktörlerinden sosyal aşırı yük yoluyla iyi oluş üzerinde baskılayıcı bir etkisi olduğu ancak gelişmeleri kaçırma korkusunun sosyal aşırı yük üzerindeki etkiyi hafiflettiği bulgulanmıştır. Bir kaygı faktörünün negatif bir etkiyi hafiflettiğine dair ulaşılan sonuç, kaygıyı ortadan kaldırmaya yönelik kompulsif davranışın pozitif bir etki ile yorumlandığına dair bir düşünceyi de beraberinde getirmektedir.
Dışsal akademik motivasyon ve sosyal medya yorgunluğu arasındaki ilişkide gelişmeleri kaçırma korkusu ve problemli sosyal medya kullanımının aracı rolünü inceleyen Shen ve arkadaşlarının (2020) 399 üniversite öğrencisi üzerinde yaptıkları araştırma sonucunda, gelişmeleri kaçırma korkusunun dışsal akademik motivasyon ile sorunlu sosyal medya kullanımı arasındaki ilişkiye aracılık ettiği ve sorunlu sosyal medya kullanımının gelişmeleri kaçırma korkusu ile sosyal medya yorgunluğu arasındaki ilişkiye aracılık ettiği bulgulanmıştır.

SONUÇ

Bireylerin gündemden haberdar olma ve diğer insanların hayatlarındaki gelişmeleri takip etmeye dair duyduğu arzunun bir sonucu olarak ortaya çıkan gelişmeleri kaçırma korkusu, internet kullanım sıklığının sürekli artmasına neden olarak kompulsif bir davranışa dönüşebilmektedir. Güncel bilgilere anında erişebilmek için sosyal ağların sürekli güncel tutulması ve içeriklerin sürekli takip edilmesi bilişsel açıdan bir yük yaratmakta ve bireylerde yorgunluğa neden olabilmektedir. Sosyal ağ kullanımı sırasında fiziksel ve zihinsel süreçlerin birlikte işlemesi fiziksel olduğu kadar bilişsel açıdan da yorgunluğa neden olabilmektedir. Sosyal ağların aşırı kullanımı sonucunda ortaya çıkan sosyal ağ yorgunluğu, gelişmeleri kaçırma korkusu ile sürekli takipte kalma dürtüsü sonucu oluşan aşırı enformasyon yükünün bir sonucu olarak yorumlanabilir.

Kaynakça

Alutaybi, A., Al-Thani, D., McAlaney, J. & Ali, R. (2020). Combating Fear of Missing Out (FoMO) on Social Media: The FoMO-R Method. *International Journal of Environmental Research and Public Health*, 17(17), 1-28, https://doi.org/10.3390/ijerph17176128.

Bright, F. L., Klesier, S. B. & Grau, S. L. (2015). Too Much Facebook? An Exploratory Examination of Social Media Fatigue. *Computers in Human Behavior.* 44, 148-155. http://dx.doi.org/10.1016/j.chb.2014.11.048

Chai, H. Y., Niu, G. F., Lian, S. L., Chu, X. W. & Sun, X. J. (2019). Why Social Network Site Use Fails to Promote Well-Being? The Roles of Social Overload And Fear of Missing Out. *Computers in Human Behavior*. doi:10.1016/j.chb.2019.05.005

Dhir A., Yossatorn Y., Kaur P., Chen S. (2018). Online Social Media Fatigue and Psychological Wellbeing— A Study of Compulsive Use, Fear of Missing Out, Fatigue, Anxiety and Depression. *International Journal of Information Management*, 40, 141-152. https://doi.org/10.1016/j.ijinfomgt.2018.01.012

Karr-Wisniewski, P. & Lu, Y. (2010). When More is Too Much: Operationalizing Technology Overload And Exploring its Impact on Knowledge Worker Productivity. *Computers in Human Behavior*. 26, 1061-1072. doi:10.1016/j.chb.2010.03.008

Potemta, K., Lopez, M., Reid, C. & Lawson, L. (1986). Chronic Fatigue. *Image*, 18, 165-169.

Przybylski, A. K., Murayama, K., DeHaan, C. R. & Gladwell, V. (2013). Motivational, Emotional, And Behavioral Correlates of Fear of Missing Out. Computers in Human Behavior. 29, 1841-1848. http://dx.doi.org/10.1016/j.chb.2013.02.014

Ravindran, T., Chua, A., & Goh, D. (2013). Characteristics of Social Network Fatigue. *10th International Conference on Information Technology: New Generations*. 431-438.
Riordan, B. C., Flett, J. A. M., Hunter, J. A., Scarf, D. & Conner, T. S. (2015). Fear of Missing Out (FoMO): The Relationship Between FoMO, Alcohol Use, and Alcohol-Related Consequences in College Students. Annals of Neuroscience and Psychology, 2(7), 1-7.
Shen, Y., Zhang, S., & Xin, T. (2020). Extrinsic Academic Motivation and Social Media Fatigue: Fear of Missing Out and Problematic Social Media Use as Mediators. *Current Psychology*. doi:10.1007/s12144-020-01219-9
Şahin, M. (2019). Korku, Kaygı ve Kaygı (Anksiyete) Bozuklukları. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi*. 6(10, 117-135.
Tanhan F, Özok H. İ. & Tayiz V. (2022). Gelişmeleri Kaçırma Korkusu (FoMO): Güncel Bir Derleme. *Psikiyatride Güncel Yaklaşımlar*. 14(1), 74-85. doi:10.18863/pgy.942431
Zhang, S., Zhao, L., Lu, Y. & Yang, J. (2016). Do You Get Tired of Socializing? An Empirical Explanation of Discontinuous Usage Behaviour in Social Network Services. *Information & Management*. 53, 904-914. http://dx.doi.org/10.1016/j.im.2016.03.006

TURKEY CICIM WEAVINGS

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ABSTRACT – From cities in Italian literature... to the smart city. A philosophical-legal reading

Starting from a reprise of Italo Calvino's famous text (The Invisible Cities), we will reflect on the characteristics – as well as the anthropological implications and sociological values – of the city. The idea is to reaffirm the city as the fulcrum of relationality.
The city is, in fact, a "foundational" place for the human, which – especially today in the era of new technologies, non-places and nine marginalisations – must be rethought.
In particular, literature – through philosophical-legal hermeneutics – provides valuable indications for thinking about the "increasingly smart but still human" city of tomorrow.

Keywords: Human Rights; City; Smart-City; Inclusion; Justice.

ENHANCING THE INCLUSIVE PREPAREDNESS OF SOCIALLY-ORIENTED STUDENTS IN AN EDUCATIONAL CLUSTER ENVIRONMENT USING A COMPETENCY-BASED APPROACH

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ABSTRACT

The formation of essential professional competencies for highly qualified inclusive education teachers, aligned with global standards, is crucial for the sustainable development of lifelong learning. This involves updating the content of inclusive education programs, directing the content of specialized subjects toward practical skills, and focusing on creating modern conditions for preparing specialists for pedagogical activities through scientific research. The aim of the research is to develop the inclusive readiness of socially-oriented students in an educational cluster environment based on a competency-based approach. Methods of the research include studying and analyzing scientific sources, regulatory documents, and educational-methodological literature related to the topic, as well as pedagogical observation, surveys, generalization, question-and-answer sessions, interviews, pedagogical experiments, and mathematical-statistical methods. The results of the research include the development and implementation of several tools for preparing socially-oriented students for professional activities: A program called "Management System for Students' Demographic Electronic Database.", an educational guide titled "Pedagogical Skills.", a methodological manual named "Pedagogical Technologies for Developing the Inclusive Readiness of Socially-Oriented Students." Additionally, innovative educational technologies aimed at preparing socially-oriented students for professional activities have been developed and implemented, including "Cluster," "Problem-Based Learning," and "Project-Based Learning," along with corresponding teaching forms, methods, and tools. The scientific significance of the research results is marked by the creation of a methodological model and methodological support based on a conceptual systematic model of interdisciplinary integrated teaching, utilizing innovative educational technologies to enhance the inclusive readiness of students in social sciences at higher education institutions.

Key words: competencies, experiments, educational technologies, inclusive, students

THE STUDY OF THE RELATIONSHIP BETWEEN STRESS AND A SENSE OF OPTIMISM IN STUDENTS

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Abstract
The purpose of this paper is necessary to determine whether the determinant of the state of stress in students is optimism and the factors that cause stress in the process of educational activities. Currently, world psychological science has accumulated a wealth of material on self-control and self-improvement, self-education, which, in turn, provides scientific and practical information about the change and rebirth of human attitudes, goals, states, experiences, providing a variety of psychology of everyday life. Psychology has probably become an extremely applied, applied science with the possibility of identifying, forming, transferring to new conditions, improving the human psyche, ensuring the dynamics of its development, registering the transition to a new qualitative level. The fields of psychological science testify to its importance for practice.
Keywords
Stress, optimism, improvement, the relationship, human attitudes, students

Introduction

It cannot be said that every student entering a higher educational institution will also be fully aware of the profession, the specialty that he wants to master, and the difficulties that arise in the process of mastering this profession-specialty. But along with the positive aspects of learning activities, there are also difficulties, problems that continue to arise for students who come with non-dreams and hobbies. This means that most students of higher education institutions begin to face the problems and obstacles inherent in students from the very beginning of their studies to graduation.(U.N. Khodjamkulov,86) On the other hand, the emergence of obstacles and difficulties, if they are designated in a psychological term, causes a state of stress for most students.

Analyzing their students on this day based on simple observation, you can see on their part a rapid loss of self-control in stressful situations and a delay in finding ways out of this state. This can be explained, on the one hand, by the fact that they are used to living carefree as a result of various external influences and do not have the will to endure life difficulties, and on the other hand, by their lack of psychological knowledge, skills and abilities in this regard. The incorrect perception of obstacles that arise on the way to achieving the goal, and understanding them as “insurmountable”, negatively affects not only the mental state of the student, but also his educational activities, and most importantly, his physiological health.

Nowadays, the increase in demand and needs and the satisfaction of these needs, combined with the fact that satisfaction of needs is the daily life activity of a student, is also considered as a problem that is unique. Currently, most students give up their opportunities in educational activities or life processes.

It is considered that I have to take on more responsibilities. As a result of the desire to act beyond their strength and capabilities and better, they spend the energy reserves available in their body more than necessary. This eventually causes stress in some students.

The paper is divided into four parts:

The first section outlines the background to study of the relationship between stress and a sense of optimism in students: the study and the broader framework within which it was conducted, drawing out the connection between the child as a category and the participation of 'flesh-and-blood' children and their entry into policymaking.

The second section provides a description of the methodology and analytical approach adopted in the study.

The third section presents the results, organizing them thematically and by policy-agenda- setting body.

The fourth section offers a detailed discussion of the findings.

Finally, the conclusions section summarizes the main outcomes of the study, reflecting on the relationship between stress and a sense of optimism in students.

Experimentally studied the stress problem observed in students

Most of the scientists who studied the origin of stress conditions in students paid great attention to the factors affecting their mental stress. As a result of the student's inability to properly organize educational activities, most students experience a state of fatigue.

E.P.Ilyin (1976) notes that the duration of the process of compensated fatigue is influenced by age, motivation, level of preparedness, and psychophysiological characteristics of the individual.(Khimmataliev D.O., 168 p) In his opinion, fatigue in the educational process is also due to specific age characteristics, that is, fatigue is weak in primary school students. They may complain of fatigue, as well as suspend their activities. With age, that is, when it comes to college age, the ability to continue working without reducing intensity increases, even when you are tired. In high school students and students, the period of compensated fatigue is more pronounced. That is, they continue even when they get tired, consciously realizing that the work cannot be stopped.

Most of the authors who studied stress during the student period took the exam, which is the most difficult period in history, and experimentally studied the processes associated with the exam period. This is reflected in the works of such scientists as E.P.Ilyin, M.N.Ilyina, L.V.Kulikova, I.M.Eliseev, A.I.Vinokurova, E.I.Kirshbaum.

I.M.Eliseeva and colleagues (1991) found that students' emotional arousal and self-confidence during stressful events have gender differences. Experiments conducted by the author showed that before the exam, female students rated their level of emotional arousal higher than male students. They had lower confidence that they would be able to pass the exams correctly than young people. However, after the exam, a decrease in their own emotional arousal was more often observed in girls than in boys. Thus, it can be concluded that both an increase and a decrease in their own emotional arousal in female students are rather extreme estimates compared to male students.

A.I.Vinokurov, on the other hand, tried to determine the physiological aspects of stress associated with the exam in students. According to his data (1996), young people have impaired autonomic control, which leads to an increase in blood pressure before the exam, which will lead to normal blood circulation.

In girls, on the contrary, vegetative control increases, which leads to their blood circulation going out of the norm, and their heart rate is also higher. A.I.Based on these data, Vinokurov noted that male schoolchildren in stressful situations have a large expenditure of energy by the body.

According to E.P. Ilin (1979), students who were excited before the exam had better intellectual mobilization (determined by the accuracy and speed of work) than students who behaved depressed.

Among the types of stress inherent in the student gift, special attention is paid to information stress, the reason for which is the fact that on this day, students are trying to assimilate too much

information to satisfy their desire to keep up with the times, as a result of factors such as “lack of time” or “excessive abundance of information flow” students experience psychological (informational) stress in a particular case. origin.(Delamare F, 27–46.)

Methodology

From the analysis of the literature, it became known that responses to psychological stress arise depending on the reaction of the functional system and the behavior and behavior of an individual in the process of his relationship with the environment. The nature of the response to a stressful factor is largely related to the psychological characteristics of a person's personality. But it is worth noting separately that the intensity and degree of increase in external influence are also of particular importance.(Ergasheva G.S., 56 b.) V.A. Gilyarovsky also argues that a pronounced reaction to an external factor that poses a danger to the individual and has an intense effect usually proceeds extremely roughly and reflects personality traits. The human backlash, which is expressed in a slightly lower level of exposure and weaker factors, is also somewhat distinct.

As a result of the analysis of the reaction to stressful (extreme) situations, L.A.Kitaev-Smik came to the conclusion that short-term, but strong enough affect divides the pronounced behavioral reaction to external influences into two general forms: active-emotional and passive-emotional.

There is a lot of data on stress conditions in a student, studied by several Russian scientists, and on stressful factors that cause stress in a student. In particular, V.K.Zaresky and N.B.Sazontev studied stressful situations that arise in the course of students' educational activities to complete tasks assigned to them, solve problems, as well as during the exam period in the process of studying the lack of time and the perception of tasks as difficult.

Also, the stress experienced by students was studied precisely in connection with the peculiarities of their thinking. N.G.Gorbunov, together with his co-authors, based on the results of a study devoted to the study of stressful states in students, emphasized that factors such as different stress in them, fragmentation of attention, a variety of information flows, and lack of time can be considered as factors provoking stress.

We have also organized an experimental model of our work, in which we conduct research within our topic, based on three stages. We will talk more about their descriptions below:

The first stage consisted of two parts, in the first part an attempt was made to study what the stressogenic factors that cause stressful states in the subjects during the period of educational activity consist of. At the same time, the method ”identification of stressful factors“ was used, borrowed from the book ”psychological tests for business people". The research work was carried out among students of the 1st and 4th courses of CHSPU, 60 students participated in the study. The methodology provides 12 judgments, each of which can be a stress-causing factor. When analyzing the test results, four sections can be used: conflicts in communication (affirmations 1, 2, 3); stress related to educational activities (affirmations 4, 5, 6); information stress (affirmations 7, 8, 9); stress in vertical relationships (affirmations 10, 11, 12). The results of the subjects were analyzed on the basis of these sections.

The methodology also raises questions aimed at finding out what methods students use to eliminate the stress they are experiencing, which are divided into constructive (for example, someone's support, doing household chores, physical activity, walking in the fresh air) and destructive (sweet food, drinking, smoking, sleeping) ways to overcome the focus.

The second stage is aimed at identifying and analyzing the personal qualities of the subjects. Because, according to most authors, the problem of a person's stress state arises in direct connection with her specific psychological characteristics of the personality.

At this stage, it was developed by foreign scientists L.S.Schuller and A.L.Komunian and Russian scientist V.A.Bodrov to study activity, optimism and pessimism in a person tested in the Russian environment, which we used [9] AOS (scale of excitability and optimism – scale of optimism and activity).

The technique consists of 15 affirmations, the answers to affirmations can be of four types, these are the answers to affirmations - no, I absolutely disagree, sometimes so, often (often) Yes, that's right (always).
The advantage of the technique is that when analyzing the results obtained, there are keys by which, based on the scores obtained, the subjects can identify realists, active optimists, active pessimists, passive optimists according to their personal position.
The result of the technique indicates comments with low to 14-16, medium to 17-19, high to 20-22 and very high to 23-25.
The third stage-the results obtained during the study were comparatively analyzed by the method of mathematical statistics. (Shishov S.E.,404 p.)Our goal in conducting this analysis was to identify the relationship, as well as the links between the factors causing stress in the subjects and their personal characteristics obtained as a result of testing conducted at the first and second stages of the study. It was this goal that they tried to achieve at the third stage of the study, based on a mutual comparison of all the results obtained.

The study of the presence of stressful factors in educational activities

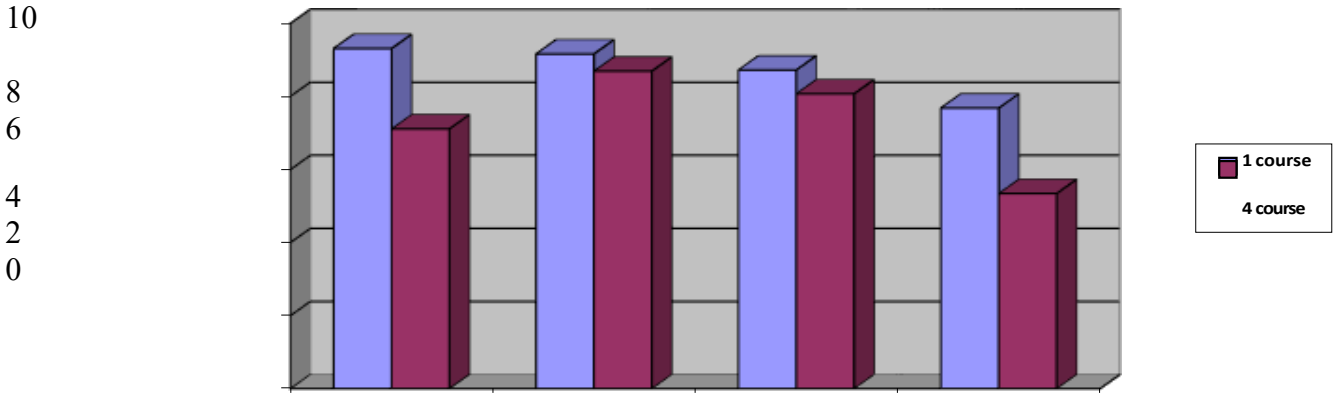
Student youth is considered to be the most visible, intellectually rich part of the youth. During the student period, the course of psychological and emotional processes, corresponding and inherent in their life activity, is natural. Their interest in learning, their pursuit of knowledge and their desire to get a specialty lead them to progress. And this progress does not happen spontaneously and carelessly, but rather unique difficulties arise along the way, obstacles that we have already indicated above as the basis of such terms as a state of frustration, a state of stress. Considering various fields of psychological knowledge as a result of their integration, we can say that one of the problems that arise in subsequent years as a subject of research is the problem that consists in studying stress and its various forms or types.
As is known, among the works devoted to the study of psychological stress in foreign and Russian literature, the role of socio-psychological theories is important. In most works on the study of stress, an important place is occupied by works devoted to the study of social and socio-psychological stress factors.
At the same time, it should be said that this condition is characteristic of our environment, and many socio-psychological aspects of stress are also insufficiently studied in our environment. In particular, the stressful conditions observed in students, their factors and ways to overcome this condition are one of the problems that has not been thoroughly studied by researchers.
Although the problem of stress conditions associated with educational activities in general, including those observed in students, was studied in subsequent years as a subject of research, many aspects in this regard still remain unexplored.
With this in mind, we conducted a study among students in order to study the relationship between stress and a sense of optimism during their student years.
Our research was conducted on 1st and 4th year students of the Pedagogical Faculty of CHPU in the field of pedagogy and psychology. The study involved 60 students aged 20 to 35 years.
Considering that the purpose of our study was to identify the stress resistance factor in students, we divided the experimental stage in the study of the subject into two parts. The first part was aimed primarily at identifying stressors that arise in the course of students' educational activities and determining their level of stress resistance, and the second was to study and identify the relationship between students' optimistic attitude to life and stress resistance.
At the first stage of the study, a “Questionnaire for identifying stressful factors during educational activities” was conducted in a group of subjects in order to study the influence of stressful factors during students' educational activities. The technique was carried out in a group of subjects, the results were analyzed quantitatively and qualitatively. The results of the quantitative analysis are reflected in tables and diagrams in the following case.

Table of the average performance of results for determining stress-inducing factors in the process of educational activity in testers

Table 1.

course	Conflict in communication	Related to academic activities stress	Informative stress	In vertical relationships stress
1 course	9,31	9,16	8,72	7,68
4 course	7,11	8,69	8,07	5,34

These results are expressed in the diagram as follows (diagram 1)



Among the testers according to tables and diagrams, differences can be observed depending on the courses. The initial scale of the methodology was that conflict in communication was 9.31 – high in 1 course and 7.11 – medium in 4 courses. These results can be analyzed as follows: a high figure in this parameter in 1 year students can be justified by the fact that they do not yet know each other well, do not deeply know each other's personal and individual characteristics, family aspects, as a result of which there is a high probability of conflict and conflict in the interaction between them.

On the contrary, 4 course examiners find that the indicator on this parameter is lower than the fact that they have been well aware of each other's feats in the jararayan of solving several life problems together over the past years, one- little observation of the state of conflict in interpersonal relationships between them on the basis of such pronouns as being boxabar from one's personal secrets, moreover, it can be explained by the fact that as the duration of their stay together in the student community increases according to the laws of Group relations, the occurrence of conflicts as a result of On the basis of observations, it can be said that even when conflicts arise among the 4 course examiners, it can be observed that this has little effect on their emotional state.

The results on the stress scale associated with educational activities were a very high figure of 9.16 in 1 Course, which was defined in relation to such factors as the lack of time for studying at the required level in students, the feeling that they could not afford to master all the necessary information, the feeling of being buried by work. As you know, every day of student life there are these factors, and this is natural. But the high level of perception of these factors as a stressogenic

factor is justified by the fact that in small courses students do not yet know how to plan their activities, the skills of working with the current flow of information are not sufficiently formed.
It is also justified by the fact that in 4 courses this indicator is slightly lower (8,69), which led to a more productive planning of their time in connection with an increase in the level of adaptation to educational activities, psychological knowledge, skills and qualifications, an expansion of concepts and visions related to the sciences and professional sphere.
Among the testers, almost no difference is visible in the indicators associated with the informative stress scale.
Considering that informational stress is caused by an extremely large flow of information, a shortage of time to assimilate them or a lack of individual cognitive capabilities, informational stress in both courses averaged (8.72 in the 1st course; 8.07 in the 4th course), reflecting a slightly higher state in 1 course. This can be explained in such a way that the inability to apply in practice the theoretical knowledge acquired in them, the inability to align the theory with practical life, can be classified in themselves by the occurrence of contradictions in thoughts that are now being formed by existing thoughts up to this time.
Experts say that informational stress occurs in a situation of overexertion that occurs for both the organism and the psyche, such as when the subject works extremely hard to cope with the task assigned to him in the process of performing a certain activity, loading himself with an impossibility, feeling a high sense of responsibility in the process, compressing situations that arise.
According to this information, the analysis is based on the fact that if we analyze the results of the 4 course examiners, they are still not able to adequately analyze the results of their activities, they are not able to fully formulate skills and competencies, such as mastering scientific research work, processes related to practice, disciplines important for their formation as specialists,
Results on stress in vertical relationships showed a high of 7.68 in 1 course. Analyzing this indicator, such situations as the strong desire to have a specific position and attitude in interpersonal relationships in the team of students studying in students admitted to the first course after various educational lessons, as well as their lack of awareness of the specific internal procedures of the higher educational institution, unwillingness to paint them even after being informed, create specific internal and external conflicts They are also unable to anticipate the reaction of teachers in classes as a result of not yet recognizing, not knowing teachers, and this is also part of a series of factors that can cause misunderstandings in vertical relationships.
Another factor is that while a 1-year student can adapt to the conditions in which he is operating, he will also assess the activities and gait of his mentors, who are giving him knowledge, within the framework of his thoughts and views. When necessary, he tries to prove his views, opinions, instill them. This in itself leads to some misunderstandings, tensions among teachers, deanery staff, and students.
The same indicator showed low – 5.34 in 4 courses. This is characterized by the high level of trust, sincerity, openness in relations with them as a result of the recognition and knowledge of the teacher and Dean's staff in them, the acceptance of the requirements imposed by them without discussion, the effort to work cooperatively at the best possible level.
From the results of the methodology, it can be concluded that all the stressors present in the process of educational activities are taken seriously by students, and this is also reflected in their educational activities.
It has also been observed that all factors related to academic performance in 1 year students have a stronger effect as a stressogenic factor compared to 4 years.
Our second task in the first part of our study consisted in determining the level of stress addiction in students and studying the dependence of this indicator on their demographic characteristics

The results we received in this direction are reflected in the table as follows:
Average stress tolerance in testers

2 table

Testers	High	middle	low
1 course	59.1	30.3	10.6
4 course	32.4	38.5	29.1

According to the results of the methodology, stress hypersensitivity was observed in 59.1% of 1 course testers and 32.4% of 4 course testers. Analyzing these results, we can see that stress tolerance is high in the testers of the 1 course. This situation can be caused by the process of flexibility in the first year of study in them, as well as the perception of the information given in the educational process as abundant and difficult, as well as the inability to properly distribute their time to complete their personal life and study assignments. In addition, the lack of skills in students of 1 year to be able to distinguish the necessary information from nokeragi when mastering educational materials, as well as the occurrence of time shortages as a result of their eventual accumulation without timely completion of tasks in the educational process, is also more likely to cause stress in the student's personality.

It is this indicator that is observed in 32.4% of 4 courses, which can be explained by the absence of problems in this regard due to the fact that most of them are adapted to the educational institution and have acquired skill skills in the distribution of time when completing the assigned tasks. In a certain part of them, too, the presence of stress addiction can be expressed as occurring in connection with personal characteristics and personal life problems in them.

It should be noted that the indicators of age and familiarity, which are the main ones in demographics, also have a special importance in reacting to stressogenic factors. In particular, the low incidence of exposure to stressogenic factors among our testers was precisely because of the high rate of stress tolerance in testers who were 23-25 years old and who were married, that is, who were married and whose age was some time older. This can be explained in such a way that students with families and older have experienced more different life difficulties and have a certain psychological experience in this regard, so they have shown that they are more resistant to stresses in the process of educational activity.

On the contrary, most of the 1 course examiners are single and, taking the example of young people aged 19-22, they had a greater susceptibility to stress, which can be explained in such a way that they have not yet experienced much life difficulties, since the lack of formation of skills and abilities in this regard also reflected negative attitudes towards

Analyzing the results obtained from the point of view of gender characteristics, another of the demographics, the boy had a high stress stability factor in most of the testers (56%).

This can be analyzed in such a way that in our mintalitet, the fact that boys are taught from an early age to act together with the father in solving problems in the family can cause them to react more steadily to the stressogenic factors that they later face in their life. Correspondingly, our daughters have been observed to have a high rate of stress tolerance in their reflection (57%). This is due to the fact that emotional sohaninng prevails in women and girls, as well as the fact that women from an early age lean on difficult situations in solving life problems to their father, brother, spouse, since most representatives of this sex have a negative attitude towards stressogenic factors in the process of educational fvolity.

Based on the results of the methodology in students with a high degree of stress addiction, it can be observed again that constructive methods that are fundamental in them as a stress relief factor –

physical activity-feeling support in sports, being busy with household chores, walking in the fresh air or interacting with others, using their advice, are less used and
– they said that they use more, such as sleeping, watching TV, taking Alam from others, eating sweets. These methods, on the other hand, do not help in any way to eliminate the state of stress in a person.
The results of the study we conducted generally showed that stress levels in both course examiners were high enough, and this was also reflected in their academic activities. This led to a. As Rissler points out," the external situation or situation is a sign that it is perceived by individ as the demand of others who threaten his abilities and capabilities." In this, it will be possible to show cases when students perceive the opposite objectivity at the subjective level, that is, teachers as "strict", given assignments are extremely difficult, there are no resources to master" or, conversely, "there are too many resources "that are required to be" mastered".
Substantiation of the connection between stress and a sense of optimism in the student Foreign and Russian scientists have conducted research on the study of stressful conditions associated with the educational activities of students, as well as on the study of the influence of conditions such as optimism, pessimism, which are present in humans in this process.
The stability of the level of psychophysiological activity and mental stress of the individual in relation to unforeseen situations in the process of a particular activity has been specially studied by researchers. The results of the conducted research have shown that the reaction of a person in emergency situations is based on its perception and assessment as negative (harmful, dangerous) with the qualities and characteristics inherent in the individual that ensure an individual psychological reaction of a person.
Many researchers note that the uniqueness of the stress response lies in the fact that not only the nature of external influence plays an important role in it, but also the psychological characteristics of the subject are of great importance. In this regard, their personal and psychological characteristics were studied depending on the different attitudes and reactions of individuals to the same stressor. At the same time, the emotional reaction of an individual is considered as an internal state that ensures his mental activity. It is in this context that it is emphasized that the individual's individual response to external influences plays an important role in the occurrence and development of stress. A person reacts to external influences through his psyche, and often through his emotionality.
Optimism and pessimism in him also influence the range of his personal qualities that justify the attitude of a person to stressful situations.
There are many scientists who have made a significant contribution to the study and coverage of the problem of optimism-pessimism, among them in foreign psychology
M.E. Zelingman, L. Abramson, K. Peterson, Gl. Carver, M. Scheyer, S. Maddy, in Russian Psychology.Abulkhanova, T.N.Berezina, O.A.Sichev, L.E. Keselman, M.G. Maskevich, K. Muzdibaev, P. Yusupov, N.G. Kapustin.
It is noted that the formation of ideas about situations such as real or potential danger, damage, loss, difficulties is carried out through cognitive processes. The assimilation of information in this way on the basis of the interrelation of various mental processes leads to a selective attitude towards it, as a result of which information of certain importance is selected, which leads to the interruption of information in memory.
The literature indicates that the functional reliability of the activity performed by a person directly depends on how correctly and in a timely manner he can make changes to the state of the object he manages. One of the Russian scientists who studied this problem in connection with student times was O.N.Stolpovskaya. According to Stolpovsky, when a student sees his professional future during his academic activity, it becomes important for him to strive for high academic results. To achieve this desire, the student must be an optimist, if he believes that compliance is related to his faith in his abilities and strengths, then it will be easy for him to make progress. To do this, the

student must feel that failures and failures are temporary circumstances, and the possibility of achieving compliance is permanent.
As a result of his research, the author comes to the conclusion that the coherence of educational activities during the student period is also directly related to understanding events in an optimistic style.
Based on this, we also tried to determine the relationship between stress tolerance and optimism in students in our research work. The indicator of the results obtained is shown in the table below.

An indicator of the interdependence of the feeling of stress and optimism in the testers

3 table

№	The parameter of optimism and activity	Stress resistance	Stress addiction
1.	Realists	20.8	15.3
2.	Active optimists	21.2	14.2
3.	Passive optimists	16.8	22.2
4.	Active pessimists	17.1	22.6
5.	Passive pessimists	14.4	24.8

These indicators take place as follows in the diagram view:
Real – FO – PO – FP - PP
The results of the table can be analyzed as follows: according to the results, the stress tolerance index in the "realists" category of testers represented an average of -20.8 - high, and stress tolerance - low (15.3). This result can be analyzed as follows, realists adequately assess the current situation at the level of their possibility and do not “jump into the sky”to show themselves, they live in life satisfied with their existing capabilities. Therefore, they are more resistant to psychological stress. But they also tend to succumb to stress. Their achievement will quickly get out of stress in search of opportunities to overcome difficulties with a correct assessment of the situation.
Those in the" active optimists " category also showed high stress tolerance – 21.2 and low stress absorption – 14.2. Active optimists believe in their strength and capabilities, take a positive attitude towards their future, take active actions to achieve the goal that they set for themselves. They are cheerful, cheerful, do not succumb to resentment and bad mood, they easily and patiently overcome them, no matter how painful the blows of life are. In difficult and difficult situations, they tend to use effective ways to overcome stress.
Optimism is understood as a situation in which the methodology is mainly concerned with a person's confidence in his strength and successes, the expectation of positive attitudes from life and the people around him. "Optimists", usually extraverts, engage in a sincere and open attitude in the process of communication. Pessimists who are people of the opposite category, on the other hand, are skeptical about their own strength and the desire for good, benevolence of those around them, expect incompetence, strive to avoid a wider circle of relationships, be buried in their inner world (introversion). As a concept of activity, on the basis of this methodology, serfdom, cheerfulness, cheerfulness, carelessness, calmness and a tendency to take risks are understood. Passivity, on the other hand, is expressed in the strength of anxiety hadixirash, low self-confidence and unwillingness to do something.

"Passive optimists" - stress resistance of testers in the" lazy " category - showed a low of 16.8, and stress tolerance was a high of 22.2. The motto of those who enter this category can be expressed in one word: "apple pie, fall in the mouth...". Those in this kind believe that “everything will be fine”even if they do nothing. They are sociable, cheerful and know how to find a favor even worse, but their disadvantage lies in the lack of activity in extreme situations. They believe more in coincidences, luck, than in trusting their power. With passivity, they observe the development of events and push decision-making back. Therefore, while they have moderate stress absorption, low stress tolerance levels, in difficult situations they do not act, and eventually succumb to stress in anticipation until they lead to an increase in problem size.

Discussion

The general conclusion is that the subjects included in the group of realists and active optimists showed a lower level of stress resistance and, conversely, higher stress resistance, and this is explained by their desire to overcome difficulties arising in the process of life and educational activities with a correct assessment of their strength capabilities.

The reason why subjects in the group of active pessimists, passive optimists and passive pessimists have high stress tolerance and low stress tolerance can be explained by their inability to properly devote their strength and capabilities and be passive when they face difficulties.

* The stress observed in students occurs in connection with their educational activities and is a consequence of various difficulties in this process and the lack of personal cognitive abilities of the student in overcoming them.

• According to most studies, the excessive amount of information and assignments that students should receive, the lack of time to complete them, the need to responsibly perceive and work with assigned tasks are considered factors that cause them psychological stress.

* All stress factors present in the learning process are taken seriously by students, and this affects their learning activities.

* It was also noticed that for 1st year students, all factors related to educational activities have a stronger impact as stressful factors compared to 4th year students.

• The subjects included in the group of realists and active optimists showed a lower level of stress resistance and, conversely, higher stress resistance, and this is due to the fact that they strive to overcome difficulties arising in the process of life and educational activities, correctly assessing their strength capabilities.

* The reason why subjects in the group of active pessimists, passive optimists and passive pessimists have high stress tolerance and low stress tolerance can be explained by their inability to properly devote their strength and capabilities and be passive when they face difficulties.

Although high activity is typical for people belonging to the category of "active pessimists" or "negativists", but this activity is often destructive in nature. People of this type prefer to “break the old rather than create a new one.” In difficult situations, they tend to use aggressive behavioral strategies aimed at eliminating problems. Our testers in this category showed stress resistance of -17.1, and stress resistance of -22.6. This means that they show their aggressive behavior and blame someone instead of finding a solution to a problem in difficult situations, as a result of which their stress levels increase.

The indicators of the category "passive pessimists" showed low stress resistance - 14.4 and very high stress resistance - 24.8. This category includes people who do not believe in anything or anyone, do not take any action or actions to change their lives for the better. They are characterized by low self-confidence, gloom and despondency, the predominance of depression, and high passivity. In difficult situations, they prefer to avoid the problem rather than find a solution, and consider themselves victims of the situation, pretending to be victims. This condition increases their tendency to stress.

Final thoughts

• The problem of stress initiallyIn comparison with the concept studied by Sel, in subsequent years it was studied by foreign and Russian scientists with huge changes. In the scientific literature, the concept of stress is considered as an uncoordinated response of the body to changes in environmental conditions or vital activity.

Optimism and pessimism are derivatives of the Latin words optimus - better, pessimus–worse, this concept is used to denote a system of ideas about the world that reflects a positive or negative attitude towards current or future events.

• The stress observed in students by foreign and Russian scientists is mainly based on research work devoted to the study of unforeseen effects of factors related to the pre-examination or examination process.

• According to most studies, the excessive amount of information and assignments that students should receive, the lack of time to complete them, the need to responsibly perceive and work with assigned tasks are considered factors that cause them psychological stress.

* All stressful factors present in the learning process are taken seriously by students, and this affects their learning activities. It was also noticed that for 1st year students, all factors related to educational activities have a stronger effect as a stressful factor compared to 4th year students.

• The subjects included in the group of realists and active optimists showed a lower level of stress resistance and, conversely, higher stress resistance, and this is due to the fact that they strive to overcome difficulties arising in the process of life and educational activities, correctly assessing their strength capabilities.

* The reason why subjects in the group of active pessimists, passive optimists and passive pessimists have high stress tolerance and low stress tolerance can be explained by their inability to properly devote their strength and capabilities and be passive when they face difficulties.

Recommendations

For 1st year students, it is advisable to conduct trainings with them at the beginning of the academic year, taking into account the fact that interpersonal relationships are a stressful factor for them.

Taking into account the fact that 1st year students become more susceptible to stress as a result of anxiety about conflicts in vertical relationships, the subject “Introduction to the specialty”, which they study in the first semester, should take the form of more practical classes

Given that students save their time and don't know how to plan, which is also a stressful factor, the way students learn to plan helps them avoid stress.

Given that the condition that affects the occurrence of stress – the more unfair, excessive and unbearable an event or event is considered to have occurred, that is, the more pessimistic it is viewed, the more likely it is that stress will worsen - it is important to teach students to form and develop an optimistic attitude. To do this, students must first determine the volitional qualities in themselves.

When the student's personality develops the ability to make the right decisions, his stress tolerance increases and stress tolerance decreases

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References

1. G‘.I.Muxamedov., U.N.Xo‘jamqulov “Klaster ta’limga nisbatan innovatsion yondashuv sifatida” / Ta’lim, fan va innovatsiya, 2020 yil
2. U.N. Khodjamkulov, Pedagogical education cluster: experience of Tashkent region (Tashkent, University, 2020)
3. Usarov J.E., Haydarova S.A. Fanni kompetensiyaviy yondoshuv asosida o‘qitishning o‘quvchi yosh psixologik xususiyatlariga bog‘liq jihatlari. SCIENCE AND EDUCATION SCIENTIFIC JOURNAL. ISSN 2181-0842 VOLUME 2, SPECIAL ISSUE 1 MAY 2021
4. Usarov J.E., D.O.Khimataliyev., N.B.Kuvatova., Sh.A.Atakhujayeva., V.P.Chudakova., N.N.Akbarova. “Pedagogical competence” Monograph. Publishing house "Pero" offset printing. Condition of printing.l.7.5 Prepared for printing by OOO "Colloquium"2022.
5. Khimmataliev D.O. Integration of pedagogical and technical knowledge in the diagnosis of preparation for professional activity. Monograph. - Tashkent, "Uzbekistan", 2018. - 168 p
6. J.E.Usarov, D.O.Khimmataliyev, I.D.Qodirov, G.R.Ergasheva, and S.N.Khamidova. “Edukational cluster environment as criteria for professional competence development of students”. https://doi.org/10.1051/e3sconf/202342010037 *EBWFF 2023*. -1-14 p
7. Ergasheva G.S. Biologiya ta’limida interaktiv dasturiy vositalardan samarali foydalanishni takomillashtirish. Ped. fan. dok. (DSc) ... dis. avtoref. – T.: TDPU, 2018. − 56 b.
8. Kadirov.I.D., Principles of preparing students for innovative activities in the educational cluster environment // “European Journal of Research and Reflection in Educational Sciences”. Vol.10No. 3, 2022. - P. 52-58
9. Kadirov.I.D., Effective organization of history lessons based on personality-oriented educational technologies / “Наука - эффективный инструмент познания мира. Современная наука как основа инновационного прогресса:” материалы II Международной научно-практической конференции. Минск, 2022. -P. 90-95.
10. Шкерина Л.В., Панасенко А.Н. Моделирование математической компетенции бакалавра.
– Москва, 2012.
11. Шишов С.Е. Концептуальные проблемы мониторинга качества общего образования:монография. Москва: Издательство НЦС и МО, 2008. 404 с.
12. Bill Roberts, Sandy Mac Kenzie. Mathematics: Higher level for the IB diploma (CD inside).
Oxford University Press. 2007. 184 p.
13. Delamare F. & Winterton J. What is Competence? – Human Resource Development International, Vol. 8, No.1, March 2005. pp. 27–46.
14. Geography Education Research Recommendations and Guidelines for Research in Geography Education: http: // media. nationalgeographic. Org / assets / file / NGS_RoadMap_GERC_6- 21.pdf
Inncheon declaration/Education 2030: Towards inclusive and euitable quality education ang lifelonglearning forall (Word Education Forum, 19-22 may 2015, Incheon, Republic of Korea).
1. Burieva, K., & Kamilova, Z. (2023). Jahon oziq-ovqat bozori va dunyoning turli mamlakatlarida rivojlanish tendentsiyalari va xususiyatlari. *Interpretation and researches*, *1*(1).
2. Buriyeva, K. (2023). O'smirlarda mustaqil fikrlashni rivojlantirishning asosiy xususiyatlari. *Академические исследования в современной науке*, *2*(1), 110-112.
3. Buriyeva, K., & Kamilova, Z. (2022). Ta'limda mustaqil fikrlashining o'rni. *Theoretical aspects in the formation of pedagogical sciences*, *1*(5), 300-303.
4. Burieva, K. E., & Kamilova, Z. A. (2022). The psychology of adolescence. *Scientific progress*, *3*(4), 923-929.

ARE FINANCIAL MARKETS EFFICIENT? A CRITIQUE FROM THE BEHAVIORAL FINANCE PERSPECTIVE

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ABSTRACT

The Efficient Markets Hypothesis has achieved success in both theoretical and empirical aspects since its inception in the 1960s. Scholars have provided compelling theoretical justifications and several empirical studies to support the concept. Many subjects related to securities analysis have been influenced by the Efficient Markets Hypothesis and its implementations. Nevertheless, recently, the Efficient Markets Hypothesis has faced criticism based on both theoretical and empirical factors. The Efficient Markets Hypothesis literature may have overestimated the influence and strength of variables such as arbitrage and investors' rationality on efficient markets. Recent studies on security pricing has contradicted the previous conclusions reached by the efficient market hypothesis supporters. In this realm, behavioral Finance started to acknowledge other perspectives about the efficiency of financial markets. According to this perspective, the markets exhibit inefficiency. Long-term departures from market efficiency may emerge due to systematic and important factors. Behavioral Finance seeks to provide explanations for deviations that are considered anomalous from the standpoint of the Efficient Markets Hypothesis. The alternative view - Behavioral Finance - attempts to explain what's happening in practice in financial markets and differs from the traditional Efficient Markets view which has rigid assumptions. In this context, the present study aims to explain various consequences for investors, companies, market regulators and policymakers.

For investors, if it is not possible for financial markets to function effectively all the time, it could result in investors searching for investment opportunities where they can get extra returns and diverting their resources to find mispriced assets in the market. Moreover, informing investors about the psychological traps that await them will make the markets even more active. For companies, the fact that the markets are active means that the cost of equity is calculated correctly, and the state of market prices will not affect the company's capital structure decisions. Behavioral finance shows that companies can choose the best time to make profitable capital structure decisions (for example, when issuing new stocks). Furthermore, the knowledge of investors' psychological preferences enables correct pricing to be carried out in company mergers. It should be taken into account that the way in which information about the company is marketed (numerically or explicitly) affects the perception of investors and therefore the reaction of the market. Market regulators and policymakers should take measures to minimize the impact of behavioural trends on asset prices, and regulate their behaviour by pricing closely to the ideal expectations of traditional market theory.

As a result, behavioral finance has become an integral theory, and it cannot be said to have exactly replaced the traditional financial paradigm. However, the analytical tools and models offered by the traditional EPH enrich behavioral finance with various practices that address factors such as the psychology of investors and human behavior, and allow a comparison between the theoretical ideal situation and the actual situation. Behavioral models are therefore focused on finding the factors that lead to deviations from traditional EPH models. The most significant disadvantage of

EPH, which has theoretically interconnected elements and offers testable models, is that all investors are rational and rely on unrealistic assumptions, such as the existence of endless arbitration opportunities in the market.

Key Words: Efficient Markets Hypothesis, Behavioral Finance, Corporate Finance Theory, Security Pricing

ASSESSMENT OF FLOOD SPREADING IMPACT ON GROUNDWATER QUALITY AND GROUNDWATER LEVEL VARIATION USING GEOSPATIAL AND ERS TECHNIQUE

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Abstract
This study was carried out in the vulnerable and arid climatic regions of the study area, namely Hala Tehsil of Matiari, Sindh, which has experienced unpredictable droughts and extreme floods in recent decades. Thus, this study focuses to on explaining and visualizing variations in groundwater recharge and groundwater quality along an ephemeral stream that has been modified by flood spreading via an electrical resistivity survey (ERS) and GIS 10.4 of the research area. The ERS was conducted using the ABEM Terrameter SAS 1000 at 14 locations. ABEM Terrameter SAS 6000 has been used to record vertical electric prospecting using a Schlumberger array. The two outer electrodes A and B are used for the current, and the resulting potential difference is measured across the two inner electrodes M and N. The distance of the current and potential electrodes from the center, which are referred to as AB/2 and MN/2, respectively, characterizes the array. MN/2 is always kept sufficiently small relative to AB/2. The results showed the overall dominant quality of regional groundwater up to 60 m deep as 25% fresh, 50% marginal fresh, and the rest as saline water. On the other hand, the water quality of groundwater from 120 m to the depth of 300 m was found to range from marginal water to high salt water. The quantity of good-quality groundwater has also been estimated with ArcGIS interpolation techniques. In addition, groundwater samples were also collected from 16 deep wells located at different distances, and groundwater quality was followed via Total Dissolved Solids (TDS), Electrical Conductivity (EC), and pH measurements. The results show a significant impact of flood spreading on the groundwater table and groundwater salinity variation. The groundwater table decreased in all study wells.

Keywords: Electrical resistivity survey; groundwater, GIS, flood modelling.

THE USE OF ZEBRAFISH (*Danino rerio*) AS A MODEL IN TYPE 2 DIABETES STUDIES

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ABSTRACT
Zebrafish (*Danio rerio*) has become a widely used model organism in recent years for research on metabolic diseases, particularly obesity and diabetes. The increasing prevalence of obesity and diabetes as global health issues has emphasized the strong connection between these two diseases. Diabetes, characterized by insulin resistance and impaired beta-cell function of the pancreas, results from complex interactions between genetic and environmental factors.
The World Health Organization reports that 1.9 billion adults worldwide are overweight, and excess weight is a significant risk factor for Type 2 diabetes. Recent studies show that obese individuals are six times more likely to develop diabetes compared to individuals with normal weight.
Zebrafish is considered an ideal model for studying obesity and diabetes. A large portion of fundamental biological functions, such as lipid metabolism, adipose tissue biology, pancreatic structure, and glucose regulation in humans, are preserved in zebrafish. Due to its ease of genetic manipulation, rapid reproductive cycle, and optically transparent embryos, zebrafish offers researchers significant advantages in understanding the mechanisms of these diseases and developing new therapeutic targets.
The similarities in glucose homeostasis mechanisms between zebrafish models and humans make zebrafish an important model for understanding the pathophysiology of diabetes. The endocrine pancreas of zebrafish, like in mammals, contains alpha, beta, delta, and ghrelin cells, which secrete hormones such as glucagon, insulin, and somatostatin. This makes zebrafish an ideal model for studying both Type 1 and Type 2 diabetes.
In this context, research on zebrafish is of great importance for investigating the genetic and environmental factors associated with diabetes and identifying potential new targets for its treatment. In this review, studies on diabetes using zebrafish as a model in recent years are presented.

Keywords: Diabetes, Zebrafish, Lipid metabolism

ÖZET
Zebra balığı (*Danio rerio*), son yıllarda metabolik hastalıklar, özellikle obezite ve diyabet araştırmalarında yaygın olarak kullanılan bir model organizma haline gelmiştir. Obezite ve diyabetin küresel bir sağlık sorunu olarak artan prevalansı, bu iki hastalık arasındaki güçlü bağlantıyı vurgulamıştır. İnsülin direnci ve pankreasın beta hücre fonksiyonlarının bozulmasıyla karakterize edilen diyabet, genetik ve çevresel faktörlerin karmaşık etkileşimlerinden kaynaklanır.

Dünya Sağlık Örgütü, Dünya genelinde 1,9 milyar yetişkinin aşırı kilolu olduğunu, aşırı kilonun da Tip 2 diyabet için önemli bir risk faktörü oluşturduğunu bildirmektedir. Son yapılan araştırmalar, obez bireylerin normal kilolu bireylere kıyasla altı kat daha fazla diyabet riskine sahip olduğunu göstermektedir.
Zebra balığı, obezite ve diyabet hastalığını incelemek için ideal bir model olarak kabul edilmektedir. İnsanlardaki lipid metabolizması, yağ dokusu biyolojisi, pankreas yapısı ve glukoz düzenlenmesi gibi temel biyolojik işlevlerin büyük bir kısmı zebra balığı ile korunmuştur. Zebra balığı, kolay genetik manipülasyon, hızlı üreme döngüsü ve optik olarak şeffaf embriyoları sayesinde araştırmacılara, bu hastalıkların mekanizmalarını anlamada ve yeni tedavi hedefleri geliştirmede önemli avantajlar sunar.
Zebra balığı modellerinin glukoz homeostazı üzerindeki benzerlikleri, diyabetin patofizyolojisini anlamada önemli bir model olmasını sağlar. Zebra balığının endokrin pankreası, memelilerde olduğu gibi alfa, beta, delta ve ghrelin hücrelerini içerir ve bu hücreler glukagon, insülin ve somatostatin gibi hormonlar salgılar. Bu da zebra balığını Tip 1 ve Tip 2 diyabet araştırmaları için ideal bir model yapar.
Bu bağlamda, zebra balığı üzerine yapılan araştırmalar, diyabet ile ilişkili genetik ve çevresel etmenlerin incelenmesi ve bu hastalığın tedavisine yönelik potansiyel yeni hedeflerin belirlenmesi açısından büyük önem taşımaktadır. Bu derlemede son yıllarda zebra balığının model olarak kullanıldığı diyabet ile ilgili çalışmalar sunulmuştur.

Anahtar Kelimeler: Diyabet, Zebra balığı, Lipid metabolizması

INTRODUCTION

Diabetes is a chronic metabolic disease affecting more than 537 million people worldwide and this number is projected to increase to 537 million by 2045 (Ogurtsova et al., 2022). More than 90% of diabetes cases are diagnosed as Type 2 diabetes (Whicher et al., 2020). Type 2 diabetes is characterised by a persistent increase in blood glucose (hyperglycaemia) as a result of inadequate insulin secretion by pancreatic β-cells and impaired action of insulin in the target tissue. Persistent hyperglycaemia over many years can activate physiological pathways that often result in both micro- and macrovascular complications. These complications have caused 6.7 million deaths and this number is estimated to increase to 73.6 million by 2045 (Benoni et al., 2022). Diabetes can only be controlled at this point; there is no known cure. For this reason, diabetes research is crucial, as is the search for a top-notch animal model that accurately captures the pathophysiology of Type 2 diabetes in humans.
Over the years, animal models have provided new insights into the mechanism of β-cell dysfunction, insulin resistance and diabetic complications, and have provided essential information for the clinical translation of new drug targets. For example, metformin, the most widely prescribed antidiabetic drug in the world (Avci et al., 2013), was discovered in rabbits in 1929 for its sugar-lowering effect and the first trial of metformin in humans was conducted in 1959 for the treatment of diabetes (Nobel et al., 2023). However, the percentage of new drug candidates that are successful during clinical trials is very low due to poor initial screening and evaluation on non-equivalent animal models.
The most widely used model is the rodent-based model (Sethupathy et al., 2016). However, its high cost, labour-intensive nature and technical issues have been a major obstacle for the continued use of the rodent-based model. Nevertheless, the rodent-based model has provided a wide-ranging means of advancement in T2D research, such as genetic modification and metabolic phenotype assessment (Olivares et al., 2017).
The zebrafish model has continued to attract interest in diabetes research as an alternative to the rodent-based model. Recent research has reported structural and physiological similarities in energy metabolism between zebrafish and humans (Schlegel and Stainier, 2007). Furthermore,

zebrafish have been found to offer a system for the discovery and characterisation of novel diagnostic and therapeutic targets for metabolic disorders such as obesity (Oka et al., 2010) and diabetes (Kinkel and Prince, 2009).

The disease model in an animal should be able to replicate a similar pathophysiology of the disease state in man. For example, a T2D animal model should be able to confirm the critical biochemical mechanism of insulin resistance in combination with partial pancreatic β-cells dysfunction (Etuk, 2010). A wide range of literature has led to the successful establishment of zebrafish models of T2D using different methods, each with its own advantages and disadvantages.

General Characteristics of Zebrafish

Zebrafish (*Danio rerio*, Hamilton, 1822) are a species of the Cyprinidae family (Nelson, 1994). This family is represented by 2000 fish species consisting of 275 genera and has a wide distribution in North America, Europe, Africa and Asia (Demirsoy, 1998; Fabacher and Little, 2000). Zebrafish (Danio rerio) have undergone a revision regarding their scientific names. These fish were first included in the genus Brachydanio, but later moved to the genus Danio with taxonomic changes. The name *Brachydanio rerio* was changed to *Danio rerio* in 1981 (Chu, 1981). Zebrafish species used in the scientific model organism are also known as *Brachydanio rerio* or *Danio rerio* (Figure 1, Figure 2).



Figure 1. *Danio rerio*



Figure 2. *Brachidanio albolineatus*

The Some Advantages of Zebrafish

1- **Fast growth and short reproductive cycle:** The eggs of zebrafish carry out the embryogenesis process within one day and the organ formation of the hatchlings is completed in five days. Due to their high reproductive potential (approximately 180-200 eggs per week), these characteristics make them superior in scientific studies compared to other model organisms (Song et al., 2016).

2- **Transparent embryos:** Zebrafish embryos are transparent, which allows easy observation of their development. It is an ideal feature for embryological development studies.

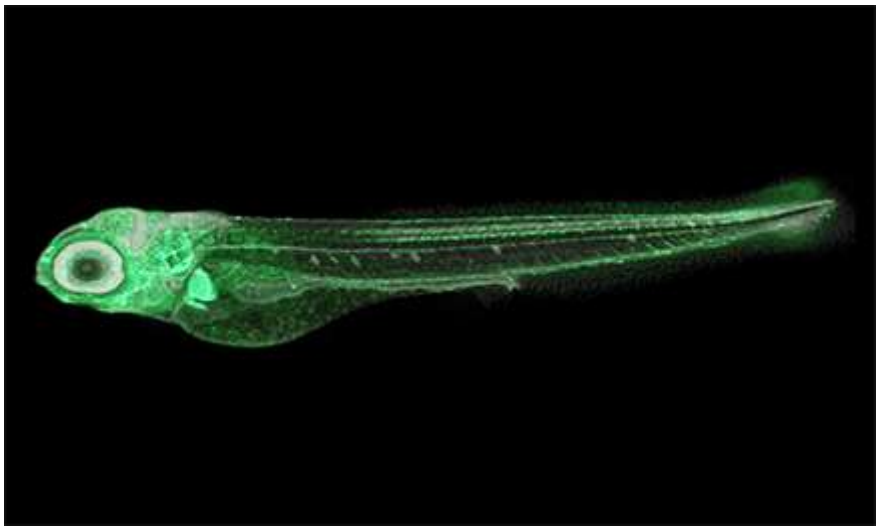


Figure 3. Zebrafish larvae

3- Genetic similarity to human genes: Approximately 70% of the genetic sequences of zebrafish, especially orthologous (genes derived from a common ancestor), are identical to the gene structure of humans. This genetic similarity allows researchers to more effectively study and understand the mechanisms of genetic diseases using zebrafish as model organisms (Howe et al., 2013).

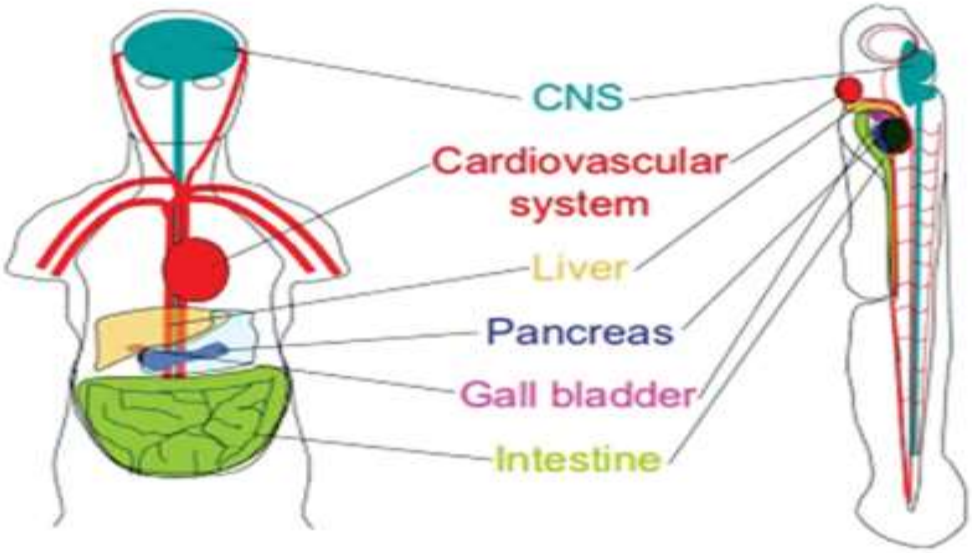


Figure 4. Some of the conserved organ systems between zebrafish and humans

4. Easy maintenance: Zebrafish are hardy fish that can be easily maintained under laboratory conditions. This makes them an ideal model organism for researchers (Monteiro et al., 2015).

Zebrafish Type 2 Diabetes Model

Various non-genetic zebrafish models have been developed over the years to replicate disease pathophysiology in humans using different procedures. These procedures can be categorised as follows.

Glucose Solution Method

This method of inducing hyperglycaemia is widely used in the zebrafish model. Adults or larvae are immersed in glucose solution for a certain period of time. Different solutions have been used by different researchers to induce hyperglycaemia. Studies on this subject are presented in Table 1.

Table 1. Glucose solution method for zebrafish T2D model

Glucose Solution Concentration	Duration	Stage of Zebrafish	Remark	Reference
Immersion in 2%	30 days	Adult zebrafish (1–3 years)	Perpetual submersion in a 2% glucose solution results in temporary hyperglycemia (434 ± 1.4 mg/dL), which varies based on ambient glucose concentrations.	Gleeson et al., 2007
Gradational increasing of glucose concentration (from 1%, 2%, 3%)	2 months	Adult zebrafish (1–3 years) and young (4–11 months)	In younger adult zebrafish, a gradient in glucose concentration led to hyperglycemia that lasted for two months.	Connaughton et al., 2016
Immersion in 111 mM	14 days	Adult zebrafish	Blood glucose levels increased four to five times as a result of the model. Even after 7 days of carbohydrate withdrawal, the blood glucose level was remained nearly twice as high as in the control group.	Capiotti et al. 2014
Immersion in 4 %	28 days	Adult zebrafish	Induced brief hyperglycemia up to 500 mg/dL or higher	Carnovali et al., 2016
Immersion in 4 %	5 days	Larvae	Induced brief hyperglycemia up to 500 mg/dL or higher	Singh et al., 2019

Diet-Dependent Obesity Modelling Method

Obesity is the leading risk factor for T2D, as more than 90% of T2D patients are obese or overweight (Maggio and Pi-Sunyer, 2003). Therefore, induction of obesity will manifest the classic symptoms of T2D, such as hyperglycaemia, hyperinsulinaemia and ultimately insulin resistance. The mechanism involves activation of NF-kβ signalling, which promotes insulin resistance and pancreaticβ-cell dysfunction (Choudhary et al., 2011; Malle et al., 2015). Several experimental procedures have been developed to induce T2D in zebrafish using the diet-induced method and these are summarised in Table 2.

Table 2. Diet-induced methods of zebrafish T2D model.

Glucose Solution Concentration	Duration	Stage of Zebrafish	Remark	Reference
6-fold overfeeding per day with Otohime B2 containing 11% crude fat, 51% crude protein, 2.3% crude calcium, 1.5% phosphorous, a maximum of 15% ash, 3% crude fiber	8 weeks	Adult male zebrafish (4–6 months old	The blood glucose level rose from 46 ± 5 mg/dL to 68 ±11 mg/dL after 8 weeks, a substantial increase. The calories were reduced for 2 weeks, and the blood glucose level fell (from 64 ± 11 to 48 ± 12 mg/dL.	Zang et al. 2017
Fed twice daily with high-fat diet (1% egg yolk representing high fat diet) together with brine shrimp (60 mg cysts)	10 weeks	Adult zebrafish	Insulin resistance was established and the blood glucose level after fasting was much higher.	Meng et al., 2017

Chemical Methods

Alloxan and streptozotocin are widely used in rodent models of T2D. However, the use of these chemicals in a zebrafish model has only been documented in Type 1 diabetes (Olsen et al., 2010; Wang et al., 2020). Bisphenol compounds have been reported to modulate glucose metabolism (Moreman et al., 2017; Zhao, et al., 2018). Furthermore, recently, two studies have demonstrated the use of bisphenol compounds to induce the zebrafish T2D model. The studies exposed zebrafish larvae to different derivatives of bisphenol compounds for 28 days (Zhao, et al., 2018). At 10 μg/L, each derivative showed similar diabetogenic effects such as insulin resistance, decreased plasma insulin level and impaired glucose homeostasis, while hepatic gluconeogenesis and glycogenolysis were promoted.

Combined Diet-Induced and Glucose Concentration Methods

T2D is a complex and multidimensional metabolic disease and most of the models discussed above have one or the other flaw; therefore, researchers have taken approaches to find alternative models that would be consistent with T2D conditions in humans. Therefore, they have combined diet-induced and glucose concentration methods.

Wang et al. (2013) were the first researchers to develop a combination of diet-induced and glucose concentration methods. They exposed zebrafish larvae to 2% glucose concentration and at the same time fed the larvae a high cholesterol diet (10% cholesterol). This model was a manifestation of the diabetes model in rodents. It also explained many of the defects in each of the models (i.e. glucose concentration and diet-dependent methods). For example, persistent hyperglycaemia was absent in the glucose concentration method but was possible in this combined method. Similarly, the longer induction time (usually 6-10 weeks) in the diet-induced approach was greatly reduced (2 weeks). The same method was applied by the same author to adult zebrafish with little modification using a 3% glucose concentration and the same cholesterol content in the diet for 19 days (Wang et al., 2020). The outcome of this model is similar to the T2D phenotype in humans.

Tools Used in Zebrafish Type 2 Diabetes Model Validation

T2D is characterised by hyperglycaemia as a consequence of insulin resistance and pancreaticβ-cell dysfunction (Xu et al., 2020). Therefore, any animal model developed to mimic T2D in humans should be able to demonstrate that cells fail to respond to insulin, β-cells do not produce enough insulin, and persistent high blood glucose. As a result, tools such as persistent hyperglycaemia, insulin resistance testing, glucose tolerance testing, morphological examination

of pancreatic β-cells and antidiabetic drug response testing are frequently used to validate animal models of T2D.

Zebrafish Type 2 Diabetes Studies

Zebrafish are commonly used in the study of pancreas development. Pancreatic cells are also found in zebrafish and the insulin-producing beta cells are highly similar to the human pancreas. Therefore, the development and dysfunction of pancreatic cells provides an important model for studying the pathophysiology of T2D. Studies such as the development of obesity and insulin resistance by high-fat dietary administration, genetic manipulations to study pancreatic beta cell dysfunction, and the generation of diabetic gene mutations by CRISPR-Cas9 have revealed that zebrafish is a powerful tool for understanding the molecular and cellular mechanisms of T2D (Oka et al., 2010; Hwang et al., 2013; Zang et al., 2017). These studies are also used to test the effects of existing drugs and the efficacy of new therapeutic approaches (Eames et al., 2010; Gut et al., 2013). The main study findings and references related to zebrafish as a Type 2 diabetes model are given in Table 3.

Table 3. Zebrafish as a Model for Type 2 Diabetes: Key Study Findings and References

Study Title	Finding	Reference
Zebrafish lipid metabolism: from mediating early patterning to the metabolism of dietary fat and cholesterol	Phenotypes similar to T2D can be obtained by genetic manipulation of insulin producing cells.	Anderson et al., 2011
Regeneration of the pancreas in adult zebrafish.	B-cell necrosis, decreased neuromast number.	Moss et al., 2009
Diet-induced obesity in zebrafish shares common pathophysiological pathways with mammalian obesity.	High-fat diet-fed zebrafish exhibited insulin resistance, pancreatic dysfunction, and hyperglycemia.	Oka et al., 2010
Blood sugar measurement in zebrafish reveals dynamics of glucose homeostasis.	Disruptions in insulin signaling pathways led to insulin resistance and glucose metabolism disorders.	Eames et al. 2010
Efficient genome editing in zebrafish using a CRISPR-Cas system.	CRISPR-Cas9 created disruptions in insulin and pancreatic functions, leading to insulin deficiency.	Hwang et al., 2013
Whole-organism screening for gluconeogenesis identifies activators of fasting metabolism.	Metformin reduced glucose levels in zebrafish; new compounds protected pancreatic functions.	Gut et al., 2013
Synergistic potentials of coffee on injured pancreatic islets and insulin action via KATP channel blocking in zebrafish.	B-cell necrosis, decreased neuromast number.	Nam et al., 2015
Centroacinar cells are progenitors that contribute to endocrine pancreas regeneration.	Pancreatic removal through physical means, increased levels of blood glucose.	Delaspre et al., 2015
Trigonelline promotes auditory function through nerve growth factor signaling on diabetic animal models.	B-cell necrosis, decreased neuromast number.	Castañeda et al. 2017
Development of a novel zebrafish model for type 2 diabetes mellitus.	Mutations in Pdx1, Ins, and Glut2 genes caused insulin deficiency, increased glucose levels, and pancreatic	Zang et al., 2017

	dysfunction.	
Three DPP-IV inhibitory peptides from Antarctic krill protein hydrolysate improve glucose levels in the zebrafish model of diabetes	The findings suggest that DPP-IV inhibitory peptides from Antarctic krill protein hydrolysate can be used as useful food supplements to manage diabetes. It also highlights their role in lowering blood glucose levels and improving metabolic health.	Ji et al.,2021
Skeletal muscle insulin resistance in zebrafish induces alterations in β-cell number and glucose tolerance in an age- and diet-dependent manner	Insulin resistance and overnutrition cause high fasting blood glucose levels, which indicates that dietary factors play a big role in the vulnerability of β-cells.	Maddison et al.,2015

CONCLUSION

The challenges of using zebrafish as a model for T2D, such as unstable and inconsistent hyperglycaemia, the sometimes toxic effect of chemicals and doses used for induction, and the inability to cover different disease stages given the remaining functional β-cell mass, lead to a constant search for an ideal model that accurately reflects the pathophysiology of T2D in humans. Despite the limitations, the zebrafish has optical transparency that can enable non-invasive imaging and real-time monitoring of metabolic processes during early developmental stages, enabling investigation of beta-cell functionality, glucose uptake and mechanistic and therapeutic aspects of antidiabetic drugs. To advance our understanding of the molecular mechanisms underlying T2D, future research should improve the current non-genetically induced T2D model in zebrafish by validating the metabolic defects present in the model with the same metabolic defect in humans, with the aim of bridging the gap between preclinical research and clinical trials.

REFERENCES

Anderson, J. L., Carten, J. D., & Farber, S. A. (2011). Zebrafish lipid metabolism: from mediating early patterning to the metabolism of dietary fat and cholesterol. *Methods Cell Biol.* 101, 111–141.

Asaoka, Y., Terai, S., Sakaida, I., & Nishina, H. (2014). The expanding role of fish models in understanding non-alcoholic fatty liver disease. *Dis. Models Mech.*, *7*, 409.

Avci, C.B., Harman, E., Dodurga, Y., Susluer, S.Y., & Gunduz, C. (2013). Therapeutic potential of an anti-diabetic drug, metformin: Alteration of miRNA expression in prostate cancer cells. *Asian Pac. J. Cancer Prev. 14*, 765–768.

Benoni, R., Sartorello, A., Uliana, M., Solomon, H., Bertolino, A., Pedot, A., Tsegaye, A., Gulo, B., Manenti, F., & Andreani, G. (2022). Epidemiological factors affecting outpatient department service utilization and hospitalization in patients with diabetes: A time-series analysis from an Ethiopian hospital between 2018 and 2021. *J. Glob. Health*, *12*, 04087.

Capiotti, K.M., Junior, R.A., Kist, L.W., Bogo, M.R., Bonan, C.D., & Da Silva, R.S. (2014). Persistent impaired glucose metabolism in a zebrafish hyperglycemia model. Comp. Biochem. Physiol. Part B Biochem. Mol Biol., 171, 58–65.

Carnovali, M., Luzi, L., Banfi, G., & Mariotti, M. (2016). Chronic hyperglycemia affects bone metabolism in adult zebrafish scale model. Endocrine, 54, 808–817.

Castañeda R., Rodriguez I., Nam Y. H., Hong B. N., & Kang T. H. (2017). Trigonelline promotes auditory function through nerve growth factor signaling on diabetic animal models. *Phytomedicine* 36, 128–136.

Choudhary, S., Sinha, S., Zhao, Y., Banerjee, S., Sathyanarayana, P., Shahani, S., Sherman, V., Tilton, R.G., & Bajaj, M. (2011). NF-κB-inducing kinase (NIK) mediates skeletal muscle insulin resistance: Blockade by adiponectin. *Endocrinology*, *152*, 3622–3627.

Chu, X.L. (1981) A preliminary revision of fishes of the genus Danio from China. *Zoology Research* 2: 145– 156.
Connaughton, V.P., Baker, C., Fonde, L., Gerardi, E., & Slack, C. (2016). Alternate immersion in an external glucose solution differentially affects blood sugar values in older versus younger zebrafish adults. *Zebrafish*, 13, 87–94.
Delaspre, F., Beer R. L., Rovira M., Huang W., Wang G., & Gee S., et al. (2015). Centroacinar cells are progenitors that contribute to endocrine pancreas regeneration. *Diabetes*, 64, 3499–3509.
Demirsoy, A. (1998). Yaşamın temel kuralları. Meteksan, Ankara, 975-7746-13-4.
Eames, S. C., Philipson L. H., Prince V. E., & Kinkel M. D. (2010). Blood sugar measurement in zebrafish reveals dynamics of glucose homeostasis. *Zebrafish*, 7, 205–213.
Etuk, E. (2010). Animals models for studying diabetes mellitus. Agric. Biol. J. N. Am., 1, 130–134.
Fabacher, D.L., & Little, E.E. (2000). 'Introduction' in The Laboratory Fish (Editor - Ostrander, G.K); Academic Press, San Diego.
Gleeson, M., Connaughton, V., & Arneson, L. (2007). Induction of hyperglycaemia in zebrafish (*Danio rerio)* leads to morphological changes in the retina. Acta Diabetol. 44, 157–163.
Gut, P. et al. (2013). Whole-organism screening for gluconeogenesis identifies activators of fasting metabolism". *Nature Chemical Biology*.
Howe, K., Clark, M. D., Torroja, C. F., Torrance, J., Berthelot, C., Muffato, M., & McLaren, S. (2013). The zebrafish reference genome sequence and its relationship to the human genome. *Nature,* 496(7446), 498–503.
Hwang, W., Fu, Y., Reyon, D. *et al.* (2013). Efficient genome editing in zebrafish using a CRISPR-Cas system. *Nat Biotechnol,* 31, 227–229.
Kinkel, M.D. & Prince, V.E. (2009). On the diabetic menu: Zebrafish as a model for pancreas development and function. Bioessays, 31,139–152.

Ji , W., Zhang, C., Song, C., & Ji, H. (2021). Three DPP-IV inhibitory peptides from Antarctic krill protein hydrolysate improve glucose levels in the zebrafish model of diabetes. *Food Science and Technology*, *42*, e58920.

Maggio, C.A., & Pi-Sunyer, F.X. (2003). Obesity and type 2 diabetes. *Endocrinol. Metab. Clin.*, *32*, 805–822.
Malle, E.K., Zammit, N.W., Walters, S.N., Koay, Y.C., Wu, J., Tan, B.M., Villanueva, J.E., Brink, R., Loudovaris, T., & Cantley, J. (2015). Nuclear factor κB–inducing kinase activation as a mechanism of pancreatic β cell failure in obesity. *J. Exp. Med.*, *212*, 1239–1254.
Meng, X.-H., Chen, B., & Zhang, J.-P. (2017). Intracellular insulin and impaired autophagy in a zebrafish model and a cell model of type 2 diabetes. *Int. J. Biol. Sci*., 13, 985.

Maddison, L. A., Joest, K. E., Kammeyer, R. M., & Chen, W. (2015). Skeletal muscle insulin resistance in zebrafish induces alterations in β-cell number and glucose tolerance in an age-and diet-dependent manner. American Journal of Physiology-Endocrinology and Metabolism, 308(8), E662-E669.
Monteiro, M.S., Pavlaki, M., Faustino, A., Rema, A., Franchi, M., Gediel, L., Loureiro, S., Domingues, I., Von Osten, J.R., & Soares, A.M.V.M. (2015). Endocrine disruption effects of p, p '-DDE on juvenile ebrafish. *Journal of Applied Toxicology,* 35: 253-260.
Moreman, J., Lee, O., Trznadel, M., David, A., Kudoh, T., & Tyler, C.R. (2017). Acute toxicity, teratogenic, and estrogenic effects of bisphenol A and its alternative replacements bisphenol S, bisphenol F, and bisphenol AF in zebrafish embryo-larvae. *Environ. Sci. Technol.*, *51*, 12796–12805.

Moss, J. B., Koustubhan, P., Greenman, M., Parsons, M. J., Walter, I., & Moss L. G. (2009). Regeneration of the pancreas in adult zebrafish. *Diabetes* 58, 1844–1851.
Nam, Y. H., Hong, B. N., Rodriguez, I., Ji M. G., Kim K., & Kim U. J., et al. (2015). Synergistic potentials of coffee on injured pancreatic islets and insulin action via KATP channel blocking in zebrafish. *J. Agric. Food Chem.* 63, 5612–5621.
Nelson, J.S. (1994). Fishes of the world' John Wiley & Sons Inc, New York.
Nobel, P. (2023). Discovery of Insulin Type 1 Diabetes Type 2 Diabetes Animal Models Current Treatments. Available online: https://www.animalresearch.info/it/progressi-medicina/malattie-e-ricerca/diabetes (accessed on 14 October 2023).
Ogurtsova, K., Guariguata, L., Barengo, N.C., Ruiz, P.L.-D., Sacre, J.W., Karuranga, S., Sun, H., Boyko, E.J., & Magliano, D.J. (2022). IDF diabetes Atlas: Global estimates of undiagnosed diabetes in adults for 2021. *Diabetes Res. Clin. Pract.*, *183*, 109118.
Oka, T., Nishimura, Y., Zang, L., Hirano, M., Shimada, Y., & Wang Z., et al. (2010). Diet-induced obesity in zebrafish shares common pathophysiological pathways with mammalian obesity. *BMC Physiol.* 10:21.
Olivares, A.M., Althoff, K., Chen, G.F., Wu, S., Morrisson, M.A., DeAngelis, M.M., & Haider, N. (2017). Animal models of diabetic retinopathy. *Curr. Diabetes Rep.* **2017**, *17*, 93.
Olsen, A.S., Sarras, M.P., Jr., & Intine, R.V. (2010). Limb regeneration is impaired in an adult zebrafish model of diabetes mellitus. *Wound Repair Regen.*, *18*, 532–542.
Schlegel, A., & Stainier, D.Y.R. (2007). Lessons from “lower” organisms: What worms, flies, and zebrafish can teach us about human energy metabolism. *PLoS Genet.*, *3*, e199.
Sethupathy, P. (2016). The promise and challenge of therapeutic microRNA silencing in diabetes and metabolic diseases. *Curr. Diabetes Rep.*, *16*, 52.
Singh, A., Castillo, H.A., Brown, J., Kaslin, J., Dwyer, K.M., & Gibert, Y. (2019). High glucose levels affect retinal patterning during zebrafish embryogenesis. Sci. Rep., 9, 4121.
Song, Z., Zhang, X., Jia, S., Yelick, P.C., & Zhao, C. (2016). Zebrafish as a model forhumanciliopathies. Journal of Genetics and Genomics, doi.org/10.1016/j.jgg.2016.02.001.
Stoletov, K., Fang, L., Choi, S.-H., Hartvigsen, K., Hansen, L.F., Hall, C., Pattison, J., Juliano, J., Miller, E.R., & Almazan, F. (2009). Vascular lipid accumulation, lipoprotein oxidation, and macrophage lipid uptake in hypercholesterolemic zebrafish. *Circ. Res.*, *104*, 952–960.
Wang, J., Li, Y., Lai, K., Zhong, Q., Demin, K.A., Kalueff, A.V., & Song, C. (2020). High-glucose/high-cholesterol diet in zebrafish evokes diabetic and affective pathogenesis: The role of peripheral and central inflammation, microglia and apoptosis. *Prog. Neuro-Psychopharmacol. Biol. Psychiatry*, *96*, 109752.
Wang, Z., Mao, Y., Cui, T., Tang, D., & Wang, X.L. (2013). Impact of a combined high cholesterol diet and high glucose environment on vasculature. *PLoS ONE*, *8*, e81485.
Whicher, C., O’Neill, S., & Holt, R.G. (2020). Diabetes in the UK: 2019. *Diabet. Med.*, *37*, 242–247.
Xu, H., Du, X., Xu, J., Zhang, Y., Tian, Y., Liu, G., Wang, X., Ma, M., Du, W., & Liu, Y. (2020). Pancreatic β cell microRNA-26a alleviates type 2 diabetes by improving peripheral insulin sensitivity and preserving β cell function. *PLoS Biol.* , *18*, e3000603.
Zang, L., Shimada, Y., & Nishimura, N. (2017). Development of a novel zebrafish model for type 2 diabetes mellitus. *Sci. Rep*., 7, 1461.
Zhao, F., Jiang, G., Wei, P., Wang, H., & Ru, S. (2018). Bisphenol S exposure impairs glucose homeostasis in male zebrafish (*Danio rerio*). *Ecotoxicol. Environ. Saf.*, *147*, 794–802.

COVID 19, UZAKTAN ÇALIŞMA MODELİ VE ÇALIŞANLARIN YAŞADIĞI SOSYAL İZOLASYON DUYGUSU

COVID 19, REMOTE WORKING MODEL AND THE FEELING OF SOCIAL ISOLATION EXPERIENCED BY EMPLOYEES

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Özet

Teknolojik gelişmelere ve dijitalleşmeye bağlı olarak işgücü piyasalarında uzaktan çalışma modeli yaygınlaşmaya başlamıştır. Özellikle gelişmiş ülke işgücü piyasalarında yaygınlaşmıştır. Bu modelin tüm dünyada en çok yaygınlaştığı dönem covid-19 pandemisi dönemidir. Bu dönemde salgının yaygınlaşmasını engellemek amacıyla alınan tedbirler, modelin uygulanmasını gerektirmiştir. Model tüm dünya ülkelerinde uygulanmıştır. Bu modelin uygulanması ile ekonomilerde yaşanacak duraklamaların önüne geçilmiştir. Çalışanların çoğu bu dönemde bu modeli ilk defa deneyimlemişlerdir. Çalışanlar bir uyum süreci yaşamak durumunda kalmışlardır. Covid-19 pandemisi Mart 2020 ile Mayıs 2022 yılları arasında etkisini göstermiştir. Uzaktan çalışma kısaca işlerin teknolojik aletler kullanarak işverenin işin yapılması organize ettiği mekanın dışında gerçekleştirilmesidir. Bu mekan çalışanların evleri veya başka ortamlarda olabilir. Uzaktan çalışma modeli özellikle hizmet sektöründe yaygın olarak uygulanmaktadır. Pandemi dönemi sonrasında modelin uygulanma oranı azalmış olsa da ülkelerin işgücü piyasalarında hala uygulanmaktadır. Uzaktan çalışma modelinin çalışanlar açısından avantajları olması yanında dezavantajları da bulunmaktadır. En önemli dezavantajlarından birisi çalışanların yaşadığı sosyal izolasyon duygusudur. Sosyal izolasyon, diğer insanlarla herhangi bir ilişki halinde olmamak şeklinde de tanımlanabilir. İlişki içerisinde olmamak yüzyüze ilişki içinde olmamaktır. Uzaktan çalışan kişiler teknolojik aletler sayesinde birbirileriyle iletişim halindedirler. Fakat bir ofis ortamında olmadıklarından yalnızlık duygusu yaşamaktadırlar. Sosyal izolasyon süreci uzadıkça insanlarda stres ve korkunun arttığını, beraberinde ankisiyete ve depresyon gibi ruhsal sorunların ortaya çıktığı görülmüştür. Sosyal izolasyon ruh sağlığının bozulması açısından risk faktörü oluşturmaktadır. İnsanların üzerinde davranışsal, sosyal, fizyolojik ve psikolojik belirtilerde değişim ve olumsuz artış gözlenmiştir. Bu çalışmanın amacı, pandemi döneminde yaygınlaşan uzaktan çalışma modeline vurgu yapmak ve modelin dezavantajlarından olan sosyal izolasyon duygusunu detaylarıyla ele almaktır. Ayrıca yapılmış olan nitel çalışma verilerinden yararlanarak çalışanların düşüncelerini ortaya koymaktır.

Anahtar Kelimeler: Covid-19, Uzaktan Çalışma, Sosyal İzolasyon, İletişim

Abstract

Due to technological developments and digitalization, the remote working model has become widespread in labor markets**.** It has become widespread especially in developed country labor markets. The period when this model became most widespread all over the world was the covid-19 pandemic period. The measures taken to prevent the spread of the epidemic during this period required the implementation of the model. The model has been implemented in all countries of the world. With the implementation of this model, economic stagnation has been prevented. Most of the employees experienced this model for the first time during this period. Employees had to go

through an adaptation process. The Covid-19 pandemic had its impact between March 2020 and May 2022. Remote working is, in short, the performance of work outside the place where the employer organizes the work to be done, using technological devices. This location may be in employees' homes or other environments. The remote working model is widely applied especially in the service sector. Although the rate of application of the model has decreased after the pandemic period, it is still applied in the labor markets of the countries. The remote working model has advantages for employees, but it also has disadvantages. One of the most important disadvantages is the feeling of social isolation experienced by employees. Social isolation can also be defined as not having any contact with other people. Not being in a relationship is not being in a face-to-face relationship. People working remotely communicate with each other through technological devices. However, since they are not in an office environment, they experience a feeling of loneliness. It has been observed that as the social isolation process gets longer, stress and fear increase in people, and psychological problems such as anxiety and depression emerge. Social isolation poses a risk factor for mental health deterioration. Changes and negative increases in behavioral, social, physiological and psychological symptoms have been observed in people. The aim of this study is to emphasize the remote working model that has become widespread during the pandemic period and to discuss in detail the feeling of social isolation, which is one of the disadvantages of the model. It is also to reveal the thoughts of the employees by using the qualitative study data.

Keywords: Covid-19, Remote Work, Social İsolation, Communication

DENİZ ULAŞIM ARAÇLARININ İKİ ÜLKE ARASINDAKİ İLİŞKİLERİN GELİŞTİRİLMESİNDEKİ ÖNEMİ: TÜRKİYE-JAPONYA ÖRNEĞİ

THE SIGNIFICANCE OF MARITIME TRANSPORTATION IN FOSTERING RELATIONS BETWEEN TWO NATIONS: THE EXAMPLE OF TURKEY AND JAPAN

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Özet
Uluslararası ilişkiler, ülkeler arasındaki karmaşık etkileşimlerin ve işbirliklerinin bir sonucu olarak şekillenmektedir. Bu bağlamda, askeri işbirliği ve teknoloji transferi, özellikle stratejik öneme sahip alanlarda, ülkeler arasındaki bağları güçlendiren ve diplomatik ilişkileri derinleştiren önemli faktörlerden biri olarak öne çıkmaktadır. Bu makalenin odak noktasını oluşturan askeri deniz ulaşım araçları hem ulusal savunma kapasitesinin artırılması hem de uluslararası işbirliğinin geliştirilmesi açısından kritik bir rol oynamaktadır.
Türkiye ve Japonya, coğrafi konumları, tarihsel deneyimleri ve stratejik hedefleri bakımından farklı özelliklere sahip olmalarına rağmen, denizcilik alanında önemli bir potansiyel işbirliği zeminine sahiptirler. İki ülke arasındaki ilişkiler, 1890 yılında yaşanan trajik Ertuğrul Fırkateyni olayıyla başlamış ve zaman içinde gelişerek çok boyutlu bir nitelik kazanmıştır. Bu tarihsel arka plan, günümüzdeki askeri ve teknolojik işbirliğinin temelini oluşturmaktadır. Askeri deniz ulaşım araçları, sadece savaş zamanında değil, barış dönemlerinde de çeşitli görevler üstlenmektedir. Bu araçlar, insani yardım operasyonları, doğal afet müdahaleleri, deniz güvenliğinin sağlanması ve bilimsel araştırmalar gibi geniş bir yelpazede kullanılmaktadır. Dolayısıyla, bu alandaki işbirliği, iki ülke arasındaki ilişkilerin askeri boyutunun ötesine geçerek, bilimsel, teknolojik ve insani alanlarda da etkileşimi artırmaktadır. Türkiye, "Mavi Vatan" doktrini çerçevesinde deniz gücüne ve yerli savunma sanayiine büyük önem vermektedir.
Bu çalışma, Türkiye ve Japonya arasındaki ilişkilerin geliştirilmesinde askeri deniz ulaşım araçlarının rolünü incelemektedir. Çalışma, tarihsel perspektiften başlayarak günümüze kadar olan süreci ele almakta ve gelecekteki potansiyel işbirliği alanlarını değerlendirmektedir. Makalenin amacı, iki ülke arasındaki askeri deniz işbirliğinin sadece savunma kapasitelerini artırmakla kalmayıp, aynı zamanda ekonomik, diplomatik, teknolojik ve kültürel alanlarda da nasıl olumlu etkiler yarattığını ortaya koymaktır.

Anahtar Kelimeler: Ertuğrul Fırkateyni, askeri deniz ulaşım araçları, Türk-Japon ilişkileri

Abstract
The intricate connections and collaborations among nations influence international relations. In this setting, military collaboration and technology transfer, especially in strategically important domains, emerge as crucial elements that enhance bilateral relations and intensify diplomatic connections. The military maritime transport vehicles central to this study are essential for augmenting national defense capabilities and fostering international collaboration.

Turkey and Japan, however differing in geographical characteristics, historical experiences, and strategic objectives, possess considerable potential for collaboration in the maritime sector. The relationship between the two countries commenced with the terrible Ertuğrul Frigate incident in 1890 and has since developed into a complex character. This historical context underpins contemporary military and technical collaboration. Naval military vessels perform a variety of duties in both war and peacetime. Applications for these vehicles include humanitarian assistance, disaster response, maritime security, and scientific research. Consequently, collaboration in this domain is augmenting interactions beyond the military aspect of relations between the two nations, while also intensifying involvement in scientific, technological, and humanitarian sectors. Turkey prioritizes naval strength and its domestic defense sector under the "Blue Homeland" strategy.

This paper analyzes the significance of military marine transport vehicles in the evolution of relations between Turkey and Japan. The paper examines the process from a historical viewpoint to the present and assesses prospective avenues for future collaboration. The paper intends to demonstrate that maritime cooperation between the two nations not only strengthens defense capabilities but also yields beneficial outcomes in the economic, diplomatic, technological, and cultural domains.

Keywords: Ertuğrul Frigate, military naval transport boats, Turkish-Japanese connections.

TEK KARBON METABOLİZMASI, İLİŞKİLİ VİTAMİNLER VE KANSER İLİŞKİSİ

ONE-CARBON METABOLISM, RELATED VITAMINS AND CANCER RELATIONSHIP

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Özet
Kanser hücrelerin kontrolsüz bölünmesi ve çevre dokulara yayılması ile karakterize olan bir sağlık problemidir. Erkeklerde en sık görülen kanser türleri sırasıyla akciğer, prostat ve kolorektal kanser; kadınlarda ise sırasıyla göğüs, kolorektal ve akciğer kanseridir. Kanser oluşumunda birçok mekanizma rol almaktadır. Bu mekanizmalardan biri ise tek karbon metabolizmasıdır. Bu çalışmanın amacı literatürde yer alan bilgiler ışığında tek karbon metabolizması, tek karbon metabolizmasında görevli vitaminler ve kanser ile ilişkisini açıklamaktır. Kanser oluşumunda tek karbon metabolizmasıyla ilişkili 4 mekanizma bulunmaktadır. Bu mekanizmalar metilasyon yolağı, serin ve glisin sentezi, nükleotit sentezi ve NADH/NADPH üretimidir. Birçok genin hipo-hiper metilasyonu, pürin ve pirimidin gibi nükleotitlerin sentezi, serin ve glisin üretimi, indirgenme reaksiyonları sonucu oluşan NADH kanser hücrelerinde metabolizmayı değiştirerek kanser gelişimini hızlandırmaktadır. Tek karbon metabolizmasında folat, riboflavin, pridoksin, kobalamin, kolin ve betain gibi mikronutrientler görev almaktadır. Bu mikronutrientler birçok genin ve DNA'nın metilasyonunu düzenleyerek, DNA'yı sentezleyerek ve DNA'yı onararak kanser oluşumunu önleyebilmektedir. Örneğin Riboflavin (FAD) metilentetrahidrofolat redüktaz enziminin koenzimi olup homosisteinin remetilasyonuna ve DNA metilasyonunda görevlidir. B6 vitamini serin hidroksimetiltransferaz (SHMT) ve transsülfürasyon yolağının önemli bir enzimi olan sistationin β-sentaz'ın koenzimidir ve DNA sentezinde, metilasyonunda ve onarılmasında rol almaktadır. Sonuç olarak kanser oluşumunda rolü olan metabolik yolaklardan biri tek karbon metabolizmasıdır. Tek karbon metabolizmasında rol oynayan vitaminlerin yetersiz alımı kanser oluşum riskini arttırabilmektedir. Bireylere sağlıklı beslenme alışkanlıkları kazandırılarak makro ve mikro besin ögelerinin yeterli ve dengeli düzeyde alması sağlanmalıdır.

Anahtar Kelimeler: Betain, folat, kanser, metilasyon, pridoksin, tek karbon metabolizması.

Abstract
Cancer is a health problem characterized by the uncontrolled proliferation of cells and their metastasis into surrounding tissues. The most common types of cancer in men are lung, prostate and colorectal cancer, and in women breast, colorectal and lung cancer, respectively. Many mechanisms are responsible for cancer formation. One of these mechanisms is one-carbon metabolism. The aim of this study is to elucidate one-carbon metabolism, vitamins related to one-carbon metabolism and its relationship with cancer in the light of the literature. There are 4 mechanisms associated with one-carbon metabolism in cancer development. These mechanisms are methylation pathway, serine and glycine synthesis, nucleotide synthesis and NADH/NADPH production. Hypo-hyper methylation of many genes, synthesis of nucleotides such as purines and pyrimidines, serine and glycine production, production of NADH as a result of reduction reactions change the metabolism in cancer cells and promote cancer development. Micronutrients such as

folate, riboflavin, pyridoxine, cobalamin, choline and betaine are implicated in one-carbon metabolism. These micronutrients can prevent cancer by regulating the methylation of many genes and DNA, synthesizing DNA and repairing DNA. Riboflavin (FAD), for example, is a coenzyme of the enzyme methylenetetrahydrofolate reductase and is involved in the remethylation of homocysteine and DNA methylation. Vitamin B6 is a coenzyme of serine hydroxymethyltransferase (SHMT) and cystathionine β-synthase, an important enzyme of the transsulfuration pathway, and is involved in DNA synthesis, methylation and repair. In conclusion, one of the metabolic pathways that play a role in cancer formation is one-carbon metabolism. Insufficient intake of vitamins that play a role in one-carbon metabolism may increase the risk of cancer development. Individuals should be encouraged to adopt healthy eating habits and should be provided with adequate and balanced intake of macro and micronutrients.

Keywords: Betaine, cancer, folate, methylation, pyridoxine, one-carbon metabolism.

COMBATING SEPSIS: THE PIVOTAL ROLE OF OMEGA 3 FATTY ACIDS IN TREATMENT AND RECOVERY

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ABSTRACT

Sepsis is a critical condition affecting millions of children worldwide, with 48.9 million cases and 11 million deaths in 2017 (20% of deaths worldwide). Sepsis is defined as life-threatening organ dysfunction, stemming from an unbalanced response of the body to infection. Organ dysfunction severity is assessed using scoring systems like Sequential Organ Failure Assessment (SOFA) scores, which identify dysfunction as 2 points or more in total score following infection. Sepsis-induced inflammation is characterized by mitochondrial dysfunction, oxidative stress, and inflammatory cytokine release, while omega-3FAs modulate inflammation and immune response.

Databases were searched using PubMed and Google Scholar for studies on the impact of Omega-3FAs on sepsis and its effects on the heart, liver, kidneys, platelets, lungs, and central nervous system.

A few studies show the impact of Omega-3FAs on SOFA scores. Control groups in these studies exhibited the highest SOFA scores. Various studies have demonstrated the effect of Omega-3FAs on the different organs involved in SOFA scores.

C-reactive-protein was found to be significantly lower in groups administered with omega-3FAs. Omega-3FAs exhibited antiarrhythmic effects and lowered Blood Pressure but no impact on Mean Arterial Pressure. Its intervention benefited clinical outcomes in lung dysfunction and gas exchange. Supplementation of Omega-3FAs has been shown to reduce platelet aggregation. Omega-3FAs as an emulsion reduced triglyceride with direct bilirubin and improved liver function. In neurological outcomes, GCS scores improved after Omega-3FAs supplementation. It also lowers the risk of proteinuria but has less or no effect on serum creatinine. The repeated impact reviewed showed reduced length of stay and duration of mechanical ventilation in most of the studies.

This narrative review suggests the impact of Omega-3FAs on sepsis as per the sepsis-3 definition. Omega-3FAs have a different impact on different organs involved in sepsis. A precise approach might be necessary to ameliorate Omega-3FAs role in sepsis.

Keywords: C-reactive protein, Inflammation, Length of stay, Omega-3, SOFA Score, Sepsis

ÖRGÜTSEL SOSYALLEŞME VE ÖRGÜTSEL BAĞLILIK ARASINDAKİ İLİŞKİNİN NİTELİKSEL ROLÜ: HAVACILIK SEKTÖRÜNDE BİR ARAŞTIRMA

QUALITATIVE ROLES OF THE RELATIONSHIP BETWEEN ORGANIZATIONAL SOCIALIZATION AND ORGANIZATIONAL COMMITMENT: A RESEARCH IN THE AVIATION SECTOR

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Özet
Bu çalışma, örgütsel sosyalleşme ile örgütsel bağlılık arasındaki ilişkilerin niteliğini incelemek amacıyla havacılık sektöründe gerçekleştirilmiştir. Örgütsel sosyalleşme, yeni çalışanların örgütün normlarını, değerlerini ve beklentilerini öğrenmelerini ve içselleştirmelerini sağlayan kritik bir süreçtir. Örgütsel bağlılık, çalışanların örgüte duygusal ve psikolojik olarak bağlanmasını ifade eder ve iş performansı, iş tatmini, devamsızlık ve işten ayrılma gibi iş çıktıları üzerinde önemli etkileri vardır. Bu değişkenler arasındaki ilişkiye odaklanan bu araştırmanın amacı, örgütsel sosyalleşmenin çalışanların örgüte bağlılık derecesinde oynadığı rollerin öncüllerini ve sonuçlarını anlayarak bir yol modeli tasarlamaktır. Bu kapsamda havacılık alanında çalışan orta-üst düzey profesyonellerle MAXQDA nitel analiz yazılımı kullanılarak odak grup görüşmeleri gerçekleştirilmiştir. Görüşmelerden elde edilen veriler kavramsal olarak kodlanmış ve içerik analizine tabi tutulmuştur. Analiz sonucunda elde edilen veriler, bağlantı ilişkisinin yoğunluğuna ve yönüne göre açıklamalarla sunulmuştur. Çalışmanın sonuçları, örgütsel sosyalleşmenin çalışanların motivasyonu, iş tatmini ve örgütsel bağlılığı üzerinde olumlu etkileri olduğunu göstermektedir. Özellikle iş tatmini ile motivasyon arasındaki ilişkinin güçlü olduğu ve bu ilişkinin çalışanların işyerinde kalma isteğini pekiştirdiği tespit edilmiştir. Araştırma sonucunda örgütsel sosyalleşme ve bağlılık arasındaki ilişkiyi açıklayan bir model önerilmiştir.

Anahtar Kelimeler: Örgütsel Sosyalleşme, Örgütsel Bağlılık, Havacılık Yönetimi, Örgütsel Davranış

Abstract
This study was conducted in the aviation industry to examine the nature of the relationships between organizational socialization and organizational commitment. Organizational socialization is a critical process that enables new employees to learn and internalize the norms, values and expectations of the organization. Organizational commitment refers to the emotional and psychological attachment of employees to the organization and has significant effects on job outcomes such as job performance, job satisfaction, absenteeism and turnover. Focusing on the relationship between these variables, the purpose of this research is to design a path model by understanding the antecedents and outcomes of the roles that organizational socialization plays in the degree of employees' commitment to the organization. In this context, focus group interviews were conducted with mid-senior level professionals working in the field of aviation using MAXQDA qualitative analysis software. The data obtained from the interviews were conceptually coded and content analyzed. The data obtained as a result of the analysis are presented with

explanations according to the intensity and direction of the connection relationship. The results of the study show that organizational socialization has positive effects on employees' motivation, job satisfaction and organizational commitment. In particular, it was found that the relationship between job satisfaction and motivation is strong, and this relationship reinforces employees' desire to stay in the workplace. As a result of the research, a model explaining the relationship between organizational socialization and commitment is proposed.

Keywords: Organizational Socialization, Organizational Commitment, Aviation Management, Organizational Behavior

RESEARCH OF TECHNICAL MEASURES TO IMPROVE THE SAFETY OF THE FUNCTIONING OF THE MIDDLE LEVEL OF MİCROPROCESSOR CENTRALIZATION OF SWITCHES AND SIGNALS, WHICH ALLOW TO INCREASE THE MAXIMUM TIME OF PERIODIC MOITORING OF THE SERVICEABILITY OF ELEMENTS

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ABSTRACT

Increasing the time of periodic control while maintaining functional safety indicators (FB) that meet the appropriate level of requirements allows for less stringent requirements for the qualifications of operational and technical personnel, as well as to reduce their emotional tension. This allows you to increase the ergonomics and versatility of the system. Therefore, it is necessary to apply additional methods and measures to increase the reliability of computer dependencies of microprocessor centralization of arrows and signals (MPC), aimed at increasing the time of periodic control. In work [1], the calculation of the functional safety indicators was performed for the basic configuration of the systems of the MOC NVP SATEP with decentralized and centralized placement of lower-level equipment (MOC-D and MOC-C, respectively).
According to a similar method, the calculation is performed for the MOC system with combined placement of equipment (MOC-S) [2-6].

INTRODUCTION

Implementation of a number of measures that are developed in this article will allow to increase the indicators of functional safety of these MOC systems or to increase the time of periodic control while preserving the previous indicators from FB, mainly due to the reorganization of the interface of interaction with lower-level devices.

Measures to increase safety. To increase the functional safety of one backup channel of the logical dependency processing subsystem, which is the middle level of the MOC system, the following set of organizational and technical measures can be provided:

- removal of dependencies of individual elements from the calculation and logic scheme of the FB (RLSFB) of the computer due to automatic diagnosis of their condition and termination of the computer in the event of their malfunction;
- reducing the intensity of failures of individual components of the RLSFB due to their reconfiguration.

The removal of individual elements from the RLSFB requires additional measures that would guarantee that the failure of these elements will not lead to a dangerous failure of the MOC as a whole. An element such as a cooler [1] can be removed from the RLSFB EOM of dependencies. In this case, the cooler provides the necessary temperature microclimate inside the computer dependencies, in which other computer components maintain their reliability indicators. When removing the cooler, we provide the following additional measures to ensure FB:

- software and hardware control of cooler operation;
- automatic shutdown of the PC dependencies when the cooler stops working.

The reconfiguration of component EOM dependencies consists in carrying out technical measures aimed at the transition from serial to parallel connection of internal components of separate MOC components. In this case, this reconfiguration can be applied to the technical means of the CAN interface based on the PCI-1680U-AE CAN cards, which is used to exchange data between dependency computers and object controllers of field devices, as well as input and output modules. The scheme of the organization of a serial SAN interface on the example of interaction with one group of centralization objects is shown in Figure 1 [2-4].

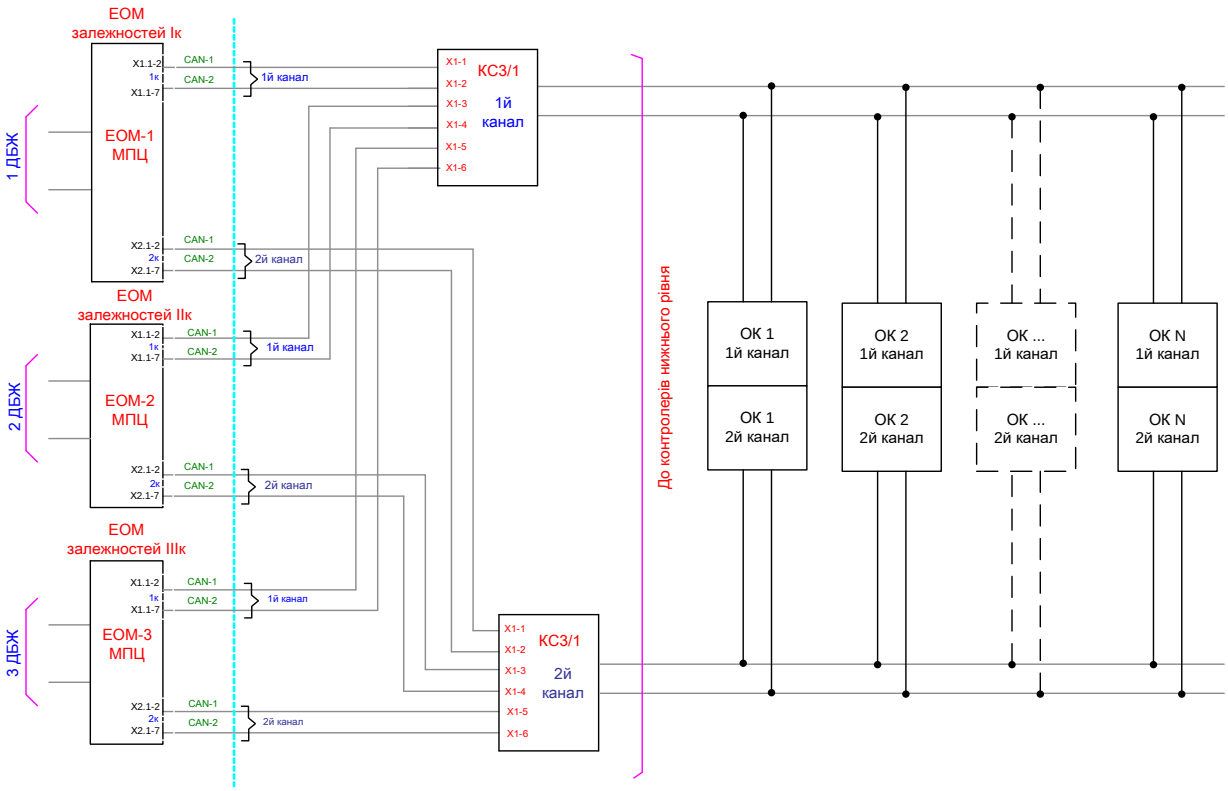


Figure 1 – Organization of the SAN-interface in the systems of MOC NVP SATEP

The control command is formed in each dependency computer and is transmitted through each channel of the serial SAN interface to the majorizing devices - KS3/1 communication switches of each channel. Under the condition of matching information in at least two EOM dependencies on each channel, the corresponding KS3/1 switch transmits a command to the channel connected to it to the controller of the field device.

The command is subject to execution only if it arrives on both channels of the SAN interface to both channels of the controller, which is possible only if the information matches at least in two channels of the middle level reservation of the MOC on both channels of the SAN interface. Transmission of control signals is carried out in reverse order.

If the control information on both channels of the SAN interface does not match, the state of the corresponding object is perceived as the most dangerous. But the organization of both channels of the SAN interface for the corresponding group of objects in each dependency computer is carried out on two ports within the framework of one physical interface SAN board (Figure 2), which contains elements common to both channels, which can form a dangerous failure on both channels .

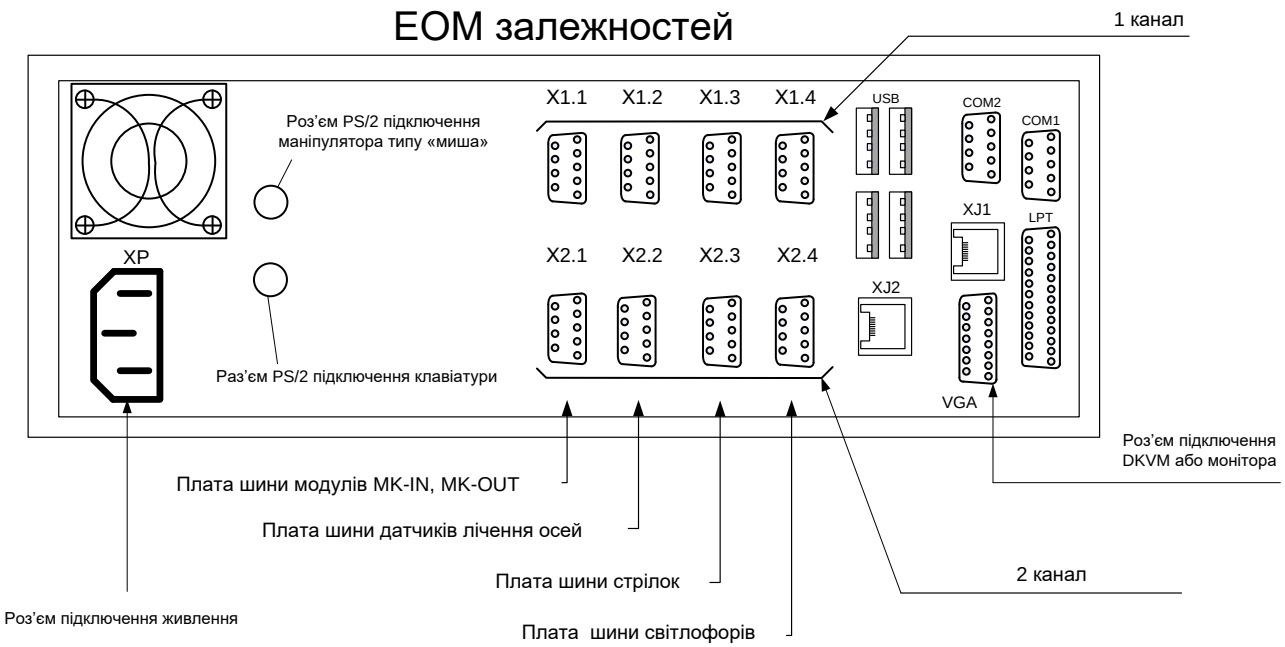


Figure 3 – Scheme of the organization of two CAN interface channels within one CAN board for a group of objects

Determining the degree of influence of the board's common elements on its functional safety requires additional research, which is complicated by the lack of information about the intermodule interaction of components in the PCI-1680U-AE board.

Therefore, according to [7, 8], the entire interface board is considered as a single device, regardless of the declared independence of the SAN interface ports by the manufacturer [9] (the principle of choosing the "worst" option when calculating FB indicators). In this regard, all four SAN-boards are connected in the RLSFB of the PC of dependencies with this approach in series (Figure 4).

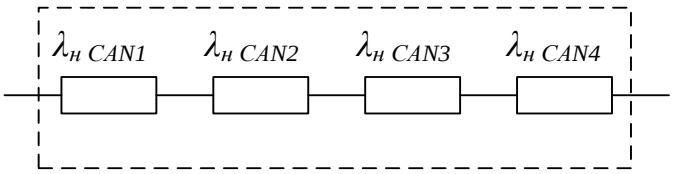


Figure 4 – RLSFB of SAN boards before the reconfiguration of the SAN interface

The reconfiguration consists in organizing two channels of the SAN interface for each group of objects not within the framework of one SAN board, but on two ports on different (adjacent) SAN boards according to the principle shown in Figure 5.

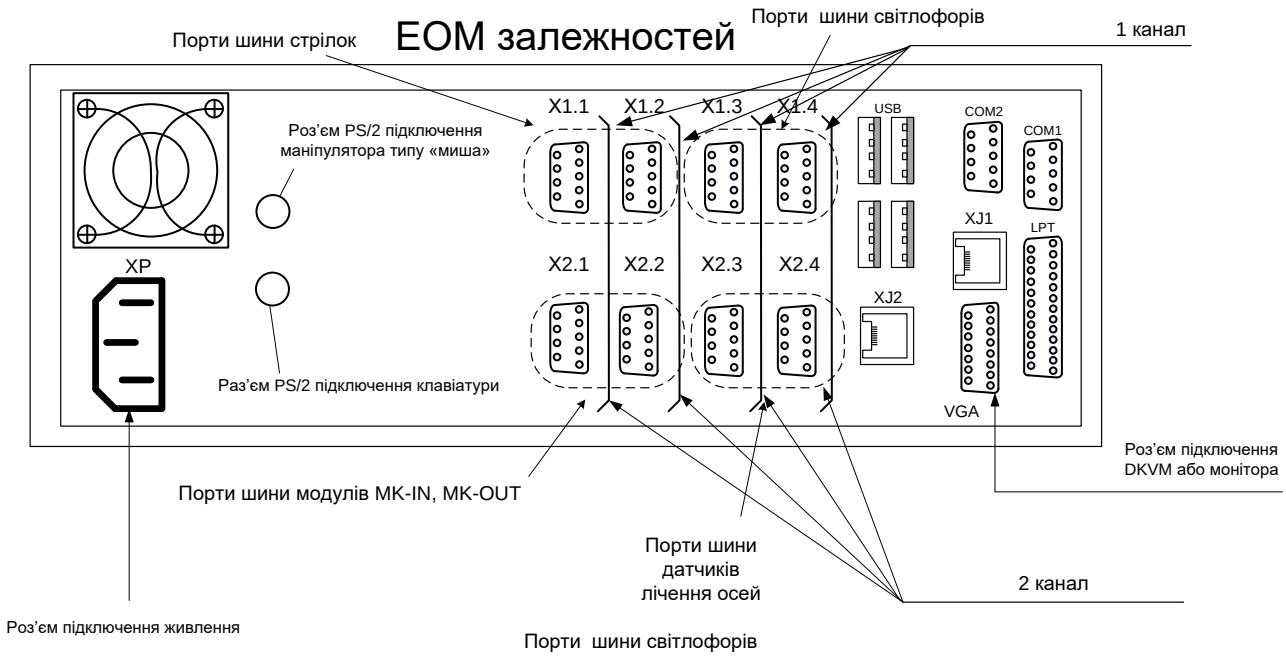


Figure 5 – Scheme of the organization of two channels
of the SAN interface within the framework of two SAN boards for a group of objects

When organizing the channels of the SAN interface according to this principle, the RLSFB for SAN boards according to [7] has the form shown in Figure 6.

At the same time, taking into account the identity of the PCI-1680U-AE boards, there should be equality:

$$\lambda_{н\ CAN1} = \lambda_{н\ CAN2} = \lambda_{н\ CAN3} = \lambda_{н\ CAN4} = \lambda_{н\ CANj}$$

Figure 6 shows a mixed (series-parallel) type of connection of elements in RLSFB [7, 8].

With the exponential law of the distribution of dangerous failures, the probability of a dangerous failure of a technical device is determined by the formula [7, 8]:

$$Q_н(t) = 1 - e^{-\lambda_н t}, \quad (2)$$

where λn is the intensity of dangerous failures of the technical means;

t is the operating time of the technical means.

If the functional safety of j-elements in a parallel connection is the same, then the total probability of dangerous failure of the technical means is equal to [7, 8]:

$$Q_н(t) = Q_{нj}^m(t),$$

where Qнj(t) is the probability of a dangerous failure of an element of a parallel connection;
m is the number of elements in a parallel connection.

On the basis of formulas (1) – (3) and the method of calculating functional safety indicators when elements are mixed in the RLFSB [7, 8], the intensity of dangerous failures of PCI-1680U-AE SAN boards when they are connected in the RLFSB as shown in Figure 6, is defined as:

$$\lambda_{н\ CAN} = - K_{ФБ\ CAN} \frac{2ln[1-(1 - e^{-\lambda_{н\ CAN_j} t})^2]}{t},$$

where KFB CAN is the factor of FB of PCI-1680U-AE boards, set according to the data of expert evaluations of the developing company at the level of 0.1 (10%).

By substituting into formula (4) the value of the intensity of dangerous failures of one SAN-board, found in work [1] (2.347×10-6 1/h), and considering the operating time of the system equal to 10 years (87648 hours), taking into account the coefficient of dangerous failures for PCI-1680U-AE boards, we get the following value of the intensity of dangerous failures when they are mixed together:

$$\lambda_{н\ CAN} = -\,0{,}1\,\frac{2ln[1-(1-e^{-(2{,}347\times10^{6})87648})^{2}]}{87648} = 4{,}694\times10^{-7}\ 1/год.$$

After removing from the RLSFB the middle level of the MOC system of the RLSFB cooler, the EOM of dependencies, according to [1], has the form shown in Figure 7

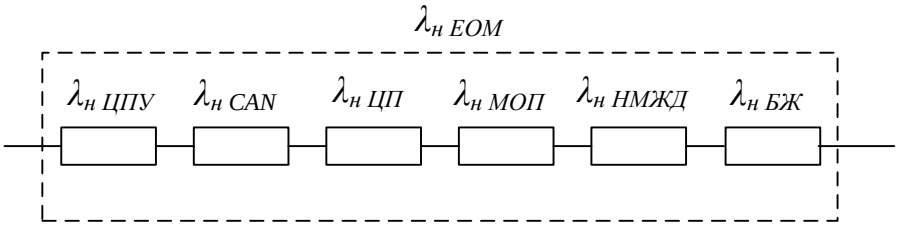


Figure 7 – RLSFB EOM dependencies of MOC

The intensities of dangerous failures of components of the RLSFB, as well as the total intensity of dangerous failures of computer dependencies after the reconfiguration of the SAN interface, which is defined as the sum of the intensities of dangerous failures of computer components of dependencies according to [1], corresponds to Table 1. In table 1, the coefficients of dangerous failures are taken into account for all elements, established in [1].

Determination of the intensity of dangerous failures of computer dependencies

№ п\п	The type of element or group of elements	Designation in RLSFB	Intensity of dangerous failures, 1/h
1	Motherboard	ЦПУ	$9{,}472 \times 10^{-8}$
2	PCI-1680U-AE boards	CAN	$4{,}694 \times 10^{-7}$
3	Central processor	ЦП	$7{,}69 \times 10^{-8}$
4	RAM	МОП	$1{,}0 \times 10^{-7}$
5	Hard disk ("Winchester")	НЖМД	$2{,}0 \times 10^{-8}$
6	Power supply unit	БЖ	$1{,}0 \times 10^{-7}$
Total intensity of dangerous failures, λnEOM:			$8{,}61 \times 10^{-7}$

Determination of the intensity of dangerous failures of computer dependencies

Let's determine the maximum possible period of periodic control, at which the third and fourth levels of functional safety requirements are achieved with the obtained intensity of dangerous failures of computer dependencies with majority loaded redundancy "2 out of 3" [1, 7, 10].

$0{,}7 \times 10^{-10} = 3\times(8{,}61 \times 10^{-7})^{2} \times t_{к(III\ рівень)}$,
$t_{к(III\ рівень)} \approx 31{,}475$ год;

$0{,}14 \times 10^{-10} = 3\times(3{,}92 \times 10^{-7})^{2} \times t_{к(IV\ рівень)}$,
$t_{к\ (IV\ рівень)} \approx 6{,}295$ год.

Therefore, with the application of additional methods for increasing functional safety, it is possible to achieve the third level of functional safety requirements of the average level of MOC systems

with an acceptable time of periodic control, which is more than 31 hours, with the configuration of computer dependencies given in [1], and with an acceptable time of periodic control a little more than 6 hours to reach the 4th level of functional safety requirements.

Conclusion.

Thus, increasing and changing the structure of the RLSFB of microprocessor control systems allows, in a number of cases, to significantly increase the time of periodic control of the serviceability of elements. For MOC systems with centralized, decentralized and combined placement of equipment, this effect is achieved mainly due to the reorganization of the interaction interface with lower-level objects.

Key words: microprocessor, signals, interface

Literature

1. Kamenev, O.Yu. Calculation of safety indicators of microprocessor centralization of arrows and signals with minimal detailing of the structure [Text] / O.Yu. Kamenev // Collection of scientific works of UkrDAZT. – 2011. – Issue 122. - P.165-175.
2. Kustov, V.F. Study of the functional safety of the MOC-D system [Text] / V.F. Kustov, O.V. Davydchuk // Collection of scientific works of UkrDAZT. – 2010. – Issue 118. - P.7-12.
3. Kustov, V.F. Study of the functional safety of the microprocessor system MOC-C [Text] / V.F. Kustov, S.V. Osadchiy // Collection of scientific works of UkrDAZT. – 2011. – Issue 126. - P.72-76.
4. Kustov, V.F. Microprocessor system for controlling arrows and signals with combined arrangement of equipment [Text] / V.F. Kustov, O.V. Neychev, A.M. Shulga // Information and control systems on railway transport. – 2010. – No. 4. - P.19.
5. Kamenev, A.Yu. Peculiarities of calculation of indicators of functional security of microprocessor centralization systems MOPC-D, MOPC-C and MOPC-S [Text] / A.Yu. Kamenev // Information and control systems in railway transport. – 2010. – No. 4. - P.61-62.
6. LLC "NPP SATEP". Systems and devices. [Electronic resource] – Access mode: http:// www.satep.com.ua/ – Title. from the screen. – (Date of circulation 20.06.2012)
7. Kustov, V.F. Basics of the theory of reliability and functional safety of railway automation systems [Text]: Study. guide for universities / V. F. Kustov. - Kh.: UkrDAZT, 2008. - 218 p.
8. Methodology for proving the functional safety of microelectronic complexes of train control and regulation systems [Text]. Approval and enter into force by the order of "Ukrzaliznytsia" No. 452-Ts of 08/17/2001 - K.: Ed. PP "Alkor", 2002. - 106 p.
9. RTS-Ukraine. Products. Equipment for industrial data transmission networks [Electronic resource] – Access mode: http:// www.rts.ua/ – General. from the screen. – (Date of circulation 20.06.2012).
10. DSTU 4178-2003. Complexes of technical means of train control and regulation systems. Functional safety and reliability. Requirements and test methods [Text]. - K.: Derzhspozhivstandard of Ukraine, 2003.-32 p.

CAUCHY UZAYLARIN TOPOLOJİK KATEGORİSİNDE KAPANIŞ OPERATÖRLERİ

THE NOIONS OF CLOSURE OPERATORS IN THE TOPOLOGICAL CATEGORY OF CAUCHY SPACES

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Özet
Küme tabanlı topolojik kategorilerde kapalılık ve kuvvetli kapalılık kavramları Baran tarafından ortaya atılmıştır ve bu kavramlar, iyi bilinen bazı topolojik kategorilerde Dikranjan ve Giuli'nin ifade ettiği anlamda bir kapanış operatörü oluşturmaktadır.
Bu çalışmada, Cauchy uzaylarının topolojik kategorisinde iki kapanış operatörü tanımlanmış ve bu operatörler (zayıf) kalıtsallığı, productivity ve idempotentliği sağlamaktadır. Bunun yanında bu kapanış operatörlerini kullanarak her bir Ti; i= 0; 1; 2 Cauchy uzayı ile tanımlanan alt kategoriler elde edilmiştir ve her birinin birbirine izomorfik olduğu gösterilmiştir.

Anahtar Kelimeler: Topolojik kategori, Cauchy uzayı, Cauchy dönüşümü , ayırma aksiyomları , bağlantılılık, kompaktlık.

Abstract
The notions of closedness and strongly closedness in set based topological categories are introduced by Baran and these notions form an appropriate closure operatör in the sense of Dikranjan and Giuli in some well-known topological categories.
In this paper, we introduce two notions of closure operators in the topological category of Cauchy spaces which satisfy (weak) hereditariness, productivity and idempotency, and we charactetize each of these subcategories are isomorphic.

Keywords: Topological category, Cauchy space, Cauchy map, seperation, connectedness, compactness

DO BUSINESS GROUP AFFILIATES TEND TO USE MORE DEBT THAN STAND-ALONE COMPANIES?

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ABSTRACT

The emergence and presence of business groups worldwide have garnered the attention of numerous academics. The primary motivations may be categorized as mitigating market defects and information asymmetry, minimizing market uncertainties, and diversifying risks. This research investigates the impact of business group affiliation on the capital structure of enterprises in Turkey. For this aim, a panel data set was constructed consisting of 50 companies from the non-financial sector that are listed on the Istanbul Stock Exchange. The data set covers a total of 250 observations over the period of 2018-2022, which spans over 5 years. The dynamic panel data analysis has been conducted based on the GMM (Generalized Method of Moments) estimations. The primary conclusion of the research is that enterprises associated with a business group possess more power compared to organizations that are not related. This result provides evidence in favor of the hypotheses about business groups and internal capital markets. Consequently, the firms affiliated with a business groups have more convenient and economically efficient access to both internal and external capital markets compared to the enterprises that are not affiliated. Business group companies tend to choose borrowing over equity due to the reduced expenses associated with financial difficulties. Therefore, business groups have the potential to effectively mitigate market defects such as information asymmetry, taxes, and agency costs, which are key concepts in current finance theory. Market imperfections provide significant barriers to industrial development and growth in many developing economies. Hence, it is necessary to integrate the conventional principles of capital structure from contemporary finance theory in emerging economies with the ideas pertaining to business groups.

Keywords: Corporate governance, capital structure, business groups, emerging markets

BACTERIAL DIVERSITY ON MICROPLASTIC SAMPLES COLLECTED FROM THE BARENTS SEA

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Abstract
In the study conducted within the scope of the Third National Arctic Scientific Expedition (TASE-III), bacterial diversity was examined in microplastics collected from the Barents Sea using a manta trawl net. The microplastics were incubated in 400 mL of Luria-Bertani Broth at 150 rpm for one day. After incubation, the broth was passed through 0.22 µm filter papers using a membrane filtration technique and they were placed on media as R2A Agar, Aeromonas Agar Base, Cetrimide Agar, Actinomycete Selection Agar, Thiosulfate Citrate Bile Source, Sulphate Reducing Bacteria Agar, Zobell Marine Agar. Then they were incubated at temperatures between 4°C and 30°C for 24 to 72 hours. Purified colonies were stored in 20% skim milk at -20°C. To determine the species of the isolates, bacterial DNA was initially extracted. The extracted DNA was amplified using universal primers 27F and 1492R. The PCR products, measuring approximately 1400 to 1600 bp, were confirmed through visualisation on a 2% agarose gel electrophoresis. These PCR products were subsequently sequenced via Sanger sequencing through a service provider. The gene sequences were then identified at the species level using BLAST analysis. In conclusion, *Bacillus*, *Stenotrophomonas*, *Sutcliffiella*, *Psychrobacter*, *Micrococcus*, *Acinetobacter*, *Enterococcus*, *Priestia*, *Pseudomonas*, *Planococcus*, *Exiguobacterium*, *Desemzia*, *Staphylococcus*, *Kocuria*, *Mammaliicoccus*, *Microbacterium* bacteria genera were found. This study was supported by the TUBITAK KUTUP 1001 Project, numbered 122G270. The authors thank TUBITAK for their support.

Keywords: Bacteria, Barents Sea, Biodiversity, Microplastic.

CIRCULAR ECONOMY POLICIES IN ENGLAND AND ROMANIA

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ABSTRACT
CIRCULAR ECONOMY POLICIES IN ENGLAND AND ROMANIA
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The world economy rises in the energy sector; with its strategic leadership in economic growth. While global development and population increase continues, the demand and need for energy scale up. This is the end of the "below average growth" era. With the impact of developing technology, renewable energy cost goes down and the transformation process is sped up by government incentives for environmentalist energy production. But; it seems that for long years, still, fossil fuels system will continue. Developments in fossil fuel-possessing countries, especially oil, have a direct impact on energy prices. As a result; the global trend for energy demand is towards clean (green) energy sources. The fight against CO2 release and climate change will become more important. Although in the predictable future, the supremacy of fossil fuels will continue; government policies and incentives will be shaped in support of works to minimize their negative impacts on nature. Demand for energy and natural resources has been increasing due to economic and population growth. Over recent years, the country has experienced the fastest surge in energy demand among OECD countries, and according to the International Energy Agency (IEA) forecasts is set to double its energy use over the next decade. will provide value to literature by increasing the importance of renewable energy sources for nature, humans, and the world. The study aims to reveal whether there is a bidirectional interaction between the renewable energy production of countries in England and Romania and their gross domestic product. In this study, the relationship between renewable energy production and gross domestic product was investigated bidirectionally.

Keywords: Energy, Sustainable Development, Renewable Energy, Natural Resource Economics
Jel Codes: F53 International Agreements and Observance . International Organizations, G18 Government Policy and Regulation, O1 Economic Development, Q2 Natural Resources including Energy, Natural Resources Renewable, Z13 Economic Sociology . Economic and Social Stratification,

1. INTRODUCTION

World economy rises on energy sector; with its strategic leadership in economic growth. While global development and population increase continuesly, the demand and need for energy scales up. The fight against CO2 release and climate change will become more important. Although in predictable future, supremacy of fossil fuels will continue; government policies and incentives will be shaped in support of works to minimize their negative impacts to nature.

Demand for energy and natural resources has been increasing due to economic and population growth in Turkey. Over recent years, the country has experienced the fastest surge in energy demand among OECD countries, and according to the International Energy Agency (IEA) forecasts, is set to double its energy use over the next decade. The projections of the Ministry of Energy and Natural Resources confirm that this trend will continue for the medium and long term.

In my study, I will provide a value to literature by increasing importance of renewable energy sources for nature, human and world. I will try to look the impact of renewable energy on economic growth specific to Italy. Using clean, renewable energy is one of the most important actions you can take to reduce your impact on the environment. Electricity production is our first source of greenhouse gases, more than all of our driving and flying combined, and clean energy also reduces harmful smog, toxic buildups in our air and water, and the impacts caused by coal mining and gas extraction. But replacing our fossil-fuel infrastructure will take time—and strong, consistent support from both state and federal mandates to build renewable energy generation and demand for clean energy from consumers and businesses. Renewable energy sources can be used to produce electricity with fewer environmental impacts. It is possible to make electricity from renewable energy sources without producing carbon dioxide (CO2), the leading cause of global climate change. Renewable energy provides reliable power supplies and fuel diversification, which enhance energy security, lower risk of fuel spills, and reduce the need for imported fuels. Renewable energy also helps conserve the nation's natural resources.

Turkey has a substantial amount of renewable energy potential, and utilization of this potential has been on the rise over the last decade.

2. LITERATURE REVIEW

Renewable energy has become very hot topic for 20 years. Renewable energy has been analysed in different aspects, data and methodology. However, the most attractive topic has become searching the relationship between the growth and the renewable energy. They are summarized below.

Rafiq, Salim and Bloch (2014) by the method of multi variable vectoral error correction model are studied in China dnd India between 1972-2011. India’s renewable energy Technologies contribution to its development; and China’s clean Technologies adoption related to production and carbon emission, have impact on their sustainable development.

Akar, (2016), Dynamic parallel data analysis is applied to Balkan countries between 1998-2011. It is determined that there is a negative and meaningfull relation between economic growth and renewable energy consumption.

Cadoret and Padovana (2016), Paralel data analysis is applied to 26 EU countries between 2004-2011. It is studied that manufacturing industry loby activities delay renewable energy management. In addition, according to environment and energy policies analysis income per capita has a negative impact on renewable energy distribution.

Lin, Omoju and Okonkwo (2016), Time series analysis and Vectoral error correction are applied to study in China between 1980 and 2011. It is concluded that in China, financial development has positive impact on renewable energy’s share on electricity consumption; as well as in GDP and foreign investment.

Papiez, Smiech and Frodyma (2018); simple linear regression analysis is applied to EU countries sample group between 1995-2014. As per this research, renewable energy growth is the main indicator to define the components of energy sources mix. These are the GDI, SWI and energy consumption cost of fossil fuel.

Hondroyiannis, (2002) He has worked on the correlation between Greece’s energy consumption and economic growth between 1960-1996, by the mean of vectoral error correction model.

Empirical evidences show that in long run considered variables are co-integrated, and energy consumption has a significant role in economic growth.
Lau vd (2018), Co-integration analysis, Autoregressive distributed delayed boundries test, Granger causality test, are applied to Malaysia between 1980-2015. According to this study, economic growth and direct foreign investment are the main components of renewable electricity consumption. It is determined that renewable electricity consumption has negative impact on trade deficit in long run.
The second attractive topic related to renewable energy is efficiency and utilization. They are mainly conducted by Rafiq and Alam (2010), Mehrara, Rezaei and Razi (2015), Marwues vd. (2011) and ALTAS, (1998).
Rafiq and Alam (2010) by using Parallel data and time series analysis he analysed Brasil, China, India, Indonesia, Philippines and Turkey as sample group between 1980-2006. This study comes to the conclusion that developping countries efforts to decrease carbon density is related to their increase of renewable energy efficiency.
Mehrara, Rezaei and Razi (2015), using Average most smaller squares technique and Bayesci model average technique, OECD countries are studied bewteen 1992-2011. It is stated that rural population, enviromental institutions and human capital are the most important variables affecting renewable energy consumption. Also, adverse effect of CO2 emmission have impact on its utilization increase.
Marwues vd. (2011), by the mean of Dynamic data analysis, 24 countries (21 EU countries and Turkey, Switzerland and ıceland) are sampled between 1990 and 2006. In this study it is stated that , especially at the beginning, encouriging policies to endorse the utilization of renewable energy sources should be supported against pressures from fossil fuel lobies.

3. METHODOLOGY

In this study about the impact of renewable energy on economic growth, ARDL boudary test; developped by Pesaran (2001) will be utilized. This test is more convenient in comparison to co-integration methods, developped by Engle & Granger (1987) and Johansen (1988). The reason is that, it is able to test the existace of co-integration relation give that series stability level is different.

In order to detect an existance of co-integration relation between series, by the mean of ADRL boundary test, first; an unlimited error correction model is to be builted. Evidences about the existance of co-integration between variables will be obtained and, accordingly, short term and long term ARDL models will be created.

Economic analysis suggests that there is a long run relationship between variables under consideration as stipulated by theory. This means that the long run relationship properties are intact. In other words, the means and variances are constant and not depending on time. However, most empirical researches have shown that the constancy of the means and variances are not satisfied in analyzing time series variables.

In the event of resolving this problem most cointegration techniques are wrongly applied, estimated, and interpreted. One of these techniques is the Autoregressive Distributed Lag (ARDL) cointegration technique or bound cointegration technique. Hence, this study reviews the issues surrounding the way cointegration techniques are applied, estimated and interpreted within the context of ARDL cointegration framework. The study shows that the adoption of the ARDL cointegration technique does not require pretests for unit roots unlike other techniques. Consequently, ARDL cointegration technique is preferable when dealing with variables that are

integrated of different order, I(0), I(1) or combination of the both and, robust when there is a single long run relationship between the underlying variables in a small sample size.

In this study about the impact of renewable energy on economic growth, also Granger Causality test will be applied. Causality between two variables X and Y can be proved with the use of the so-called Granger causality test, named after the British econometrician Sir Clive Granger. This test makes use of Student's t-statistic and F-statistic tests and testifies when values of the variable X provide statistically significant information about the evolution of the future values of the variable Y. Let us assume that Y and X are two variables having stationary time series of data or observations. To test the null hypothesis that X does not Granger-cause Y, we first find the appropriate p lagged values of Y (the order p of the AR(p) process) to include in an AR (autoregression) process of Y.

In order to detect an existance of causal inference relation between series, Granger Causality test will be applied. It was fairly quickly understood that, unlike correlation, regression has a natural direction: the regression of Y on X does not pro- duce coefficient estimates that are the algebraic inverse of those from the regression of X on Y. The direction of regression should respect the direction of causation.

We should once again distinguish between correlation and causality. Correlation is the existence of a mutual relationship or connection between two or more processes or phenomena that tend to vary, be associated, or occur together in a way not expected on the basis of chance alone. Causality (referred to also as cause and effect) is the rational relationship between two processes, the first of which (the cause) is partially or totally responsible for the second, while the second is partially or totally dependent on the first. A process can have many causes, which beginning from the past can determine quantitatively the evolution of effects in the future. Causality cannot exist without a form of correlation; however, any correlation does not mean the existence of causality. In addition, causality cannot exist unless the cause happens prior to its effect and moreover it provides statistically significant information about its effect

The null hypothesis that variable X does not Granger-cause variable Y is accepted when no lagged values of the variable X are retained, after the application of t-statistic and F-statistic tests, in Eq. (7.4). Otherwise, we reject the null hypothesis in favor of the alternative, and we conclude that variable X Granger-cause variable Y and thus the future values of variable Y are depended on the present values of variable X.

Annual renewable energy sources of wind power energy, hdyro power energy and sun power energy production capacity data series from 1990 to 2020, eligibility threshold and market openness data series from 1990 to 2020 will be used in the study. On the other side Gross Domestic Product (GDP) growth, Capital and Labor series will be used in the study. The main data series are mostly taken from Ember, EWEA, GWEC, WWEA and others.

Hypothesis;

H0: There is no relationship between economic growth and renewable energy sources

H1: There is a relationship between economic growth and renewable energy sources

The dependent variable, GDP (Production), will be explain with the help of following independent variables;

The independent variable, Renewable Energy Sources (Wind Power Production+Sun Power Production+Hydro Power Production)

Labor
Capital,
Standard error (ui)

$GDP = \beta_0 + \beta_1 W + \beta_2 S + \beta_3 H + \beta_4 K + \beta_5 L + ui$

Independent Variables are RES (renewable energy sources) items as S (solar), W (wind) and H (hydro) additionally labor and capital are also taken as independent variable. GDP (gross domestic product) is dependent variable and yearly datas of dependent and independent variables will be used.

RES S+W+H & L & K independent variable
GDP dependent variable

Firstly t test and F test will be applied after test results will demonstrate the number of variables are decreased or increased. Therafter I will try to apply Granger Causality and ADRL Test for my hypothesis conclusion.

The main purpose of this study is to examine the effects of renewable energy sources and some macroeconomic indicators on gross dometic products in England and Romania for period 1990-2020 by using ARDL bound testing approach, Granger Causality testing, Vector Error Correction Model(VECM)

VECM, Error Correction Model, time series It is a type of econometric model used in analysis. This model long-term balance between variables that are interdependent deals with relationships. Error correction model, between variables rapid short-term fluctuations and long-term differences between these variables. It combines forward balance relations.

The error correction model is usually derived from the VAR (Vector Autoregression) model is derived. VAR model calculates past values of a set of variables. It is used to predict future values using. However, VAR model deals with long-term equilibrium relationships between series can't get it.

The error correction model adds a correction term (error) to the VAR model (correction term). This term refers to the long-run equilibrium between series represents their relationships. The model uses this long-term relationship between variables tries to return to equilibrium relations, that is, between the series tries to correct errors caused by deviations.

The error correction model is usually expressed as:

$\Delta Yt=\alpha(Yt-1-\beta Xt-1)+\sum i=1p-1\phi i\Delta Yt-i+\epsilon t$
Here, Δ denotes the first difference of the variables, Yt and Xt
variables represent the series at time t, α is the long-run equilibrium
relationship, β is the error correction term, ϕi is the short-term dynamics and ϵt is
represents the error term.

Error correction model, long-term relationships between series understanding, identifying temporary fluctuations and future values used to predict. error correction model with short term questions the status of long-term convergence of knowledge. The error correction coefficient being

negative and significant indicates short-term It results in the trend getting closer to cointegration in the long run. That's exactly the purpose.

Macroeconomic indicators which used in this study are: Capital, Labor, gross domestic product (GDP). Renewable Energy Sources indicators which used in this study are: hydro, sun and wind.

Hypothesis;

H0: There is no relationship between economic growth and renewable energy sources
H1: There is a relationship between economic growth and renewable energy sources
The dependent variable, GDP (Production), will be explain with the help of following independent variables;
The independent variable, Renewable Energy Sources (Wind Power Production+Solar Power Production+Hydro Power Production), labor and capital

In this study, the determinants of gross domestic products in England and Romania for the period of 1990-2020 empirically questioned. The model established for this purpose is as follows.

gross domestic product (GDP)
Labor(L),
Capital(K),
Wind(W),
Sun(S),
Hydro(H),
Standard error (ui)

Gdp, labor and capital are macroeconomic indicators these dataset obtained from the World Bank Development Indicators (World Bank, 2020)

Hydro, wind and sun are renewable energy sources these dataset obtained from England Ministry of Energy and Romania Ministry of Energy

In the model, datas were taken as per capita and logarithmic (ln) transformations of all data were made.

$GDP = \beta 0 + \beta 1W + \beta 2S + \beta 3H + \beta 4L + \beta 5K + ui$

4. METHODS and FINDINGS

Firstly t test and F test will be applied after test results will demonstrate the number of variables are decreased or increased. Therafter I will try to apply Granger Causality and ADRL Test for my hypothesis conclusion.

The main purpose of this study is to examine the effects of renewable energy sources and some macroeconomic indicators on gross dometic products in England and Romania for period 1990-2020 by using ARDL bound testing approach, Granger Causality testing, Vector Error Correction Model(VECM)

VECM, Error Correction Model, time series It is a type of econometric model used in analysis. This model long-term balance between variables that are interdependent deals with relationships. Error correction model, between variables rapid short-term fluctuations and long-term differences between these variables. It combines forward balance relations.

4.1. SHORT-TERM – LONG-TERM CAUSATION WITH ARDL TEST

For England, ARDL(2, 1, 1, 1, 2, 0, 1, 1) ARDL model independent variable lags are taken as max 2 due to the large number of independent variables.

The process of determining the lags of independent variables in the ARDL model has a complex structure. Because there are many independent variables involved in the model, it is important to determine lag times appropriately. In this context, the maximum number of delays was preferred as 2 due to the large number of independent variables.
Additionally, the process of determining appropriate lag times for each independent variable included in the model was carried out by the automatic configuration of the model.

H0: There is no cointegrated relationship between variables.
HA: There is a cointegrated relationship between variables.

5.392191 Since the F-statistic value remains above the entire I0 bound critical value, the hypothesis that there is no cointegration between the variables is rejected. There is a long-term relationship between variables.

According to the Bounds test results, the F statistic of 5.392191 exceeds the critical value at the 1% significance level. This provides statistically significant evidence that independent variables causally affect dependent variables in the short run.

That is, bounds test results, which evaluate the short-term effects of independent variables, show that the relationships in the model are statistically significant. This shows that the effects of independent variables on the dependent variable are evident at the short-term level, as predicted by the model. This analysis is an important tool for evaluating and understanding the model's short-term causal relationships.

For Romania, ARDL(2, 0, 0, 2, 1, 0, 1)ARDL model independent variable lags were taken as max 2 due to the large number of independent variables, and the lag of all independent variables included in the model was determined by the model as 2.

The process of determining the lags of independent variables in the ARDL model has a complex structure. Because there are many independent variables involved in the model, it is important to determine lag times appropriately. In this context, the maximum number of delays was preferred as 2 due to the large number of independent variables.

Additionally, the process of determining appropriate lag times for each independent variable included in the model was carried out by the automatic configuration of the model.

H0: There is no cointegrated relationship between variables.

HA: There is a cointegrated relationship between variables.

The f statistic value of 3.738704 appears to the left of the I1 bound critical value at 1%, that is, in the unstable region. However, since I1 bound remains above its critical value at 10%, 5% and 2.5%, the hypothesis of no cointegration is rejected. There is a long-term relationship between variables.

According to the Bounds test results, the F statistic of 3.738704 exceeds the critical value at the 2.5% significance level. This provides statistically significant evidence that independent variables causally affect dependent variables in the short run.

That is, bounds test results, which evaluate the short-term effects of independent variables, show that the relationships in the model are statistically significant. This shows that the effects of independent variables on the dependent variable are evident at the short-term level, as predicted by the model. This analysis is an important tool for evaluating and understanding the model's short-term causal relationships.

4.2. DIAGNOSTICS TESTS

For England,

Ramsey Reset Test:

H0: Model Specification is Correct.
HA: Model Specification is Incorrect.

Since the probe value is 0.3318>0.05, H0 hypothesis cannot be rejected. There is no Specification error in the model. The model is set up correctly.

Breusch-Godfrey Serial Correlation LM Test:

H0: There is no serial autocorrelation among errors.
HA: There is Serial Autocorrelation Among Errors.

According to the Breusch-Godfrey LM test result, the hypothesis that there is no serial autocorrelation between errors is rejected. (PROB<0.05) = There is an autocorrelation problem in the series.

Heteroskedasticity Test:

H0: There is no heteroscedasticity between errors.
HA: There is Heteroscedasticity Among Errors.

According to the Heteroskedasticity ARCH test result, the hypothesis that there is no heteroscedasticity between errors cannot be rejected (prob>0.05) = There is no heteroscedasticity problem in the series.

Jarqua-Bera test:

H0: Residuals are suitable for normal distribution.

HA: Residuals Do Not Suit Normal Distribution.

According to the Jarqua-Bera test result, the hypothesis that the residues are suitable for normal distribution cannot be rejected. (prob>0.05). Residues Suit Normal Distribution.

Cusum Squares:

According to the results of Cusum Squares, the parameters have met the stability condition. There is no relationship between the variances.

For Romania,

Breusch-Godfrey Serial Correlation LM Test:

H0: There is no serial autocorrelation among errors.
HA: There is Serial Autocorrelation Among Errors.

According to the Breusch-Godfrey LM test result, the hypothesis that there is no serial autocorrelation between errors is rejected. (PROB<0.05) = There is an autocorrelation problem in the series.

Heteroskedasticity Test:

H0: There is no heteroscedasticity between errors.
HA: There is Heteroscedasticity Among Errors.

According to the Heteroskedasticity ARCH test result, the hypothesis that there is no heteroscedasticity between errors cannot be rejected (prob>0.05) = There is no heteroscedasticity problem in the series.

Ramsey RESET Test:

H0: Model Specification is Correct.
HA: Model Specification is Incorrect.

Since the probe value is 0.7534>0.05, H0 hypothesis cannot be rejected. There is no Specification error in the model. The model is set up correctly.

Jarqua-Bera Test:

H0: Residuals are suitable for normal distribution.
HA: Residuals Do Not Suit Normal Distribution.

According to the Jarqua-Bera test result, the hypothesis that the residues are suitable for normal distribution cannot be rejected. (prob>0.05). Residues Suit Normal Distribution.

Cusum Squares:

According to the Cusum Squares result, the parameters did not meet the stability condition because they were not within the estimated confidence limits. There is a relationship between variances.

4.3. VECM TEST

For England;

The CointEq(-1) coefficient in the short-term balance model represents the error correction coefficient with a value of -0.428369. The probe value of this coefficient is expected to be less than 0.05; It is statistically significant and the coefficient is negative. This shows that the error correction mechanism is working. It can be said that the error in the model will decrease by -0.428369 after a period.

When the short term is controlled, all of the variables appear to be significant. The coefficients of E, H, K, W variables appear to be negative and the coefficients of the others appear to be positive. When the coefficients are checked, it is seen that the CO2 coefficient, H coefficient and S coefficient are high in units, that is, their effect on GDP in the short term is high.

When we control the long-term effects of the independent variables, only the independent variables CO2, H, K, S, W appear to be insignificant. Other independent variables are significant. In particular, the coefficients of the independent variables CO2, H, K, S and W are negative.

This analysis evaluates the statistical significance and long-term effects of the parameters in the model, showing that the econometric model is used in a healthy way, but reveals the negative effects of certain independent variables on economic growth. These findings can help policymakers develop strategies to support economic growth by focusing on relevant variables.

The coefficient of the independent variable E is positive and statistically significant at the 5% level. However, it is observed that this variable has little effect on GDP. This means that variable E has less impact on GDP than other factors.

The coefficient of the independent variable L is positive and statistically significant at the 1% level. However, it is observed that this variable has little effect on GDP. This suggests that the L variable has a more limited effect on economic growth than other factors.

Table 1

Long Run Coefficients for England

Long Run Coefficients				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
CO2	-741.934992	4663.739001	-0.159086	0.8762
E	0.027048	0.010538	2.566788	0.0247
H	-15111.053647	8758.236834	-1.725353	0.1101
K	-0.000010	0.000006	-1.558928	0.1450
L	0.011803	0.003329	3.545838	0.0040
S	-2008.884365	1152.930350	-1.742416	0.1070
W	-163.372340	374.072566	-0.436740	0.6701
C	-404723.852242	141602.275173	-2.858173	0.0144

For Poland;

The CointEq(-1) coefficient in the short-term balance model represents the error correction coefficient with a value of -0.286957. The probe value of this coefficient is expected to be less than 0.05. The value of the coefficient is negative and the probe value appears to be negative. This shows that the error correction mechanism is working. It can be said that -0.286957 of the error in the model will be eliminated at the end of a period.

When the effects of the variables are controlled in the short term, it appears that the variables H, H(-1) and W are significant and all other variables are insignificant. It is seen that the W variable is both significant and the coefficient of the variable is quite high. It can be said that W and H variables have the highest impact on GDP in the short term, respectively.

When we control for the long-term effects of the independent variables, only the independent variables CO2, E and L appear to be insignificant. Other independent variables are significant. In particular, the coefficients of the independent variables K and L are negative.

The fact that the value of the H variable is significantly greater than 1 indicates that the effect of the H variable is strong.

The fact that the K variable is negative and less than 1 shows that the effect of this variable on the GDP dependent variable is not large.

It seems that the W variable is again significantly larger than 1. It has a high long-term impact on GDP.

Table 2

Long Run Coefficients for Romania

Long Run Coefficients				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
CO2	551.853127	2369.681186	0.232881	0.8188
E	0.003823	0.013651	0.280016	0.7831
H	2615.628089	1010.149017	2.589349	0.0198
K	-0.000004	0.000002	-2.153199	0.0469
L	-0.001398	0.000967	-1.446672	0.1673
W	2910.129377	1161.000102	2.506571	0.0234
C	-27712.940638	23304.716054	-1.189156	0.2517

4.4. EVALUATION

It seems that the effects of the Renewable Energy usage amounts of the England which are considered as Developed Countries, on the GDP amounts have a long-term effect. It seems that the correction coefficient of the Vector Error Correction Model in the GDP model of England is negative and significant. This shows that increasing the use of Renewable Energy has a positive impact on GDP in the long term.

It seems that the effects of Renewable Energy usage amounts on the GDP amounts of Romania which are considered as developing countries, have a long-term effect. It seems that the correction coefficient of the Vector Error Correction Model in the GDP model of Romania is negative and significant. This shows that increasing the use of Renewable Energy has a positive impact on GDP in the long term. It appears that the ARDL hypothesis was rejected in countries. It seems obvious that Renewable Energies have an impact on GDP.

The effect of renewable energy production in the England and Romania economies has been examined with ARDL, Causality and VECM models.

Boundary tests were performed for ARDL models established to explain the GDP per capita variable in both countries and the existence of cointegration was demonstrated. According to this result, it has been shown that even if the data are not stationary, they act co-holistic together in the long run. Again, ARDL models established in both countries can successfully pass all assumption tests.

When the long-term coefficients explaining the Italy GDP per capita variable are examined, it is seen that the Capital and Libor variables do not have a long-term effect on the GDP, but Solar and Wind energy production from renewable energy sources is relatively effective.

For the model established to identify the determinants of gross domestic product, when the ARDL limit test results, which passed some diagnostic tests, are examined, the variables. The hypothesis that there is a long-run relationship between variables.

Considering the results of Cusum of Squares and Cusum tests, which investigated whether there was a structural break or not, the hypothesis that there was no structural break between the 1990-2020 periods in the variables in the model is accepted.

5. RESULT

When the developed countries and developing countries selected as examples are checked, it is seen that the effects of renewable energy use on GDP are generally positive. In other words, if the amount of renewable energy usage increases, it will provide a positive increase in the GDP of the countries. Especially the fact that the coefficients of the CO2 type have high and significant coefficients in almost all samples shows that CO2 is an important variable. Although there is no clear distinction between developed countries and developing countries, it can be said that the results of the countries are generally in direct proportion to each other. Considering the effects of the amount of each country's own investments, it is seen that the GDP effects of the variables vary among themselves. However, when controlled at level, it can be said that the effects are generally positive.

In order to understand the effect of renewable energy sources on economic growth in Italy, the stationarity of the data was first investigated in order to avoid the possibility of producing spurious regressions in the simple linear regression approach. It was observed that all data were stationary at 1st difference, except for the wind variable. First of all, it was tried to prove the existence of cointegration in non-stationary data, since the difference equations eliminate long-term trend relationships and highlight short-term relationships. In this way, regression can be established with the normal state of the data by avoiding the phenomenon of spurious regression. The existence of cointegration was demonstrated by the Johansen approach in the tests performed. Finally, traditional econometric tests were performed on the reduced models and the 1-period lags of the residuals were included in the model as a variable for autocorrelation correction.

In the final model that meets the econometric assumptions, the Capital variable and the Solar variable entered the model significantly. Since the variable coefficients are interpreted, a 1% unit increase in the Solar variable (as the model variable is ln(solar)) leads to an increase of 0.03 units on economic growth.

When the data in Romania is examined, the data are not static, as in England. And all except Solar are stationary at 1 differences. Co-integration test was performed before going to the difference equations, but unlike the ARDL performed in the 1st section, a cointegration test could not be detected with the Johansen test. Therefore, in order to avoid the phenomenon of spurious regression, the model was established with the 1st order differences of the data. Appropriate and meaningful regression model was investigated with the backward method of difference equations and unlike the ARDL approach made in the first chapter, no significant variable could be found that could show the effect of renewable energy sources on economic growth. The main reason for this situation may be the low number of observations in the sample data and the investments made in renewable energy sources in Romania accelerated much later than in England.

SOURCES

1. Altinay, G., & Karagol, E. (2005). Electricity consumption and economic growth: evidence from Turkey. Energy economics, 27(6), 849-856.
2. Chien, T., & Hu, J. L. (2007). Renewable energy and macroeconomic efficiency of OECD and non-OECD economies. Energy Policy, 35(7), 3606-3615.
3. Chontanawat, J., Hunt, L. C., & Pierse, R. (2008). Does energy consumption cause economic growth?: Evidence from a systematic study of over 100 countries. Journal of policy modeling, 30(2), 209-220.
4. Apergis, N., & Payne, J. E. (2010). Renewable energy consumption and growth in Eurasia. Energy economics, 32(6), 1392-1397.
5. Menyah, K., & Wolde-Rufael, Y. (2010). Energy consumption, pollutant emissions and economic growth in South Africa. Energy economics, 32(6), 1374-1382.
6. Bayraktutan, Y., Yılgör, M., & Uçak, S. (2011). Renewable electricity generation and economic growth: Panel-data analysis for OECD members.
7. Menegaki, A. N. (2011). Growth and renewable energy in Europe: A random effect model with evidence for neutrality hypothesis. Energy economics, 33(2), 257-263.
8. Al-Mulali, U., Fereidouni, H. G., Lee, J. Y., & Sab, C. N. B. C. (2013). Examining the bi-directional long run relationship between renewable energy consumption and GDP growth. Renewable and sustainable energy reviews, 22, 209-222.

9. Pempetzoglou, M. (2014). Electricity consumption and economic growth: A linear and nonlinear causality investigation for Turkey. International Journal of Energy Economics and Policy, 4(2), 263-273.
10. Sebri, M. (2015). Use renewables to be cleaner: Meta-analysis of the renewable energy consumption–economic growth nexus. Renewable and Sustainable Energy Reviews, 42, 657-665.
11. Shahbaz, M., Loganathan, N., Zeshan, M., & Zaman, K. (2015). Does renewable energy consumption add in economic growth? An application of auto-regressive distributed lag model in Pakistan. Renewable and Sustainable Energy Reviews, 44, 576-585.
12. Alper, A., & Oguz, O. (2016). The role of renewable energy consumption in economic growth: Evidence from asymmetric causality. Renewable and Sustainable Energy Reviews, 60, 953-959.
13. Dai, H., Xie, X., Xie, Y., Liu, J., & Masui, T. (2016). Green growth: The economic impacts of large-scale renewable energy development in China. Applied energy, 162, 435-449.
14. Zaman, K., bin Abdullah, A., Khan, A., bin Mohd Nasir, M. R., Hamzah, T. A. A. T., & Hussain, S. (2016). Dynamic linkages among energy consumption, environment, health and wealth in BRICS countries: green growth key to sustainable development. Renewable and Sustainable Energy Reviews, 56, 1263-1271.
15. Koçak, E., & Şarkgüneşi, A. (2017). The renewable energy and economic growth nexus in Black Sea and Balkan countries. Energy Policy, 100, 51-57.
16. Rafindadi, A. A., & Ozturk, I. (2017). Impacts of renewable energy consumption on the German economic growth: Evidence from combined cointegration test. Renewable and Sustainable Energy Reviews, 75, 1130-1141.
17. Halicioglu, F., & Ketenci, N. (2018). Output, renewable and non-renewable energy production, and international trade: Evidence from EU-15 countries. Energy, 159, 995-1002.
18. Ohlan, R. (2018). The relationship between electricity consumption, trade openness and economic growth in India. OPEC Energy Review, 42(4), 331-354.
19. Sohag, K., Taşkın, F. D., & Malik, M. N. (2019). Green economic growth, cleaner energy and militarization: Evidence from Turkey. Resources Policy, 63, 101407.
20. Dogan, E., Altinoz, B., Madaleno, M., & Taskin, D. (2020). The impact of renewable energy consumption to economic growth: a replication and extension of. Energy Economics, 90, 104866.
21. Munir, Q., Lean, H. H., & Smyth, R. (2020). CO2 emissions, energy consumption and economic growth in the ASEAN-5 countries: a cross-sectional dependence approach. Energy Economics, 85, 104571.
22. Okumus, I., Guzel, A. E., & Destek, M. A. (2021). Renewable, non-renewable energy consumption and economic growth nexus in G7: fresh evidence from CS-ARDL. Environmental Science and Pollution Research, 28(40), 56595-56605.
23. Salari, M., Kelly, I., Doytch, N., & Javid, R. J. (2021). Economic growth and renewable and non-renewable energy consumption: Evidence from the US states. Renewable Energy, 178, 50-65.
24. Alataş, S. (2022). Green Economıc Growth and Renewable Energy Consumption: Empirical Evidence From Emerging Countries. Uluslararası Yönetim İktisat ve İşletme Dergisi, 18(1), 1-14.
25. Wang, Q., Wang, L., & Li, R. (2022). Renewable energy and economic growth revisited: The dual roles of resource dependence and anticorruption regulation. Journal of Cleaner Production, 130514.
26. Apergis, N., & Payne, J. E. (2012). Renewable and non-renewable energy consumption-growth nexus: Evidence from a panel error correction model. Energy economics, 34(3), 733-738.
27. Inglesi-Lotz, R. (2016). The impact of renewable energy consumption to economic growth: A panel data application. Energy economics, 53, 58-63.

28. Altinay, G., Karagol, E., 2004. Structural break, unit root, and the causality between energy consumption and GDP in Turkey. Energy Economics 26, 985–994.
29. Abbasi, K. R., Shahbaz, M., Zhang, J., Irfan, M., & Alvarado, R. (2022). Analyze the environmental sustainability factors of China: The role of fossil fuel energy and renewable energy. Renewable Energy, 187, 390-402.
30. Bekun, F. V., Alola, A. A., & Sarkodie, S. A. (2019). Toward a sustainable environment: Nexus between CO2 emissions, resource rent, renewable and nonrenewable energy in 16-EU countries. Science of the Total Environment, 657, 1023-1029.
31. Pata, U. K., & Caglar, A. E. (2021). Investigating the EKC hypothesis with renewable energy consumption, human capital, globalization and trade openness for China: evidence from augmented ARDL approach with a structural break. Energy, 216, 119220.
32. Ecevit, E., Çetin, M., & Yücel, A. G. Türkiye'de Yenilenebilir Enerji ve Sağlık: Eşbütünleşme ve Nedensellik Analizi. Erciyes Akademi, 36(1), 138-156.
33. Ali, Q., Yaseen, M. R., Anwar, S., Makhdum, M. S. A., & Khan, M. T. I. (2021). The impact of tourism, renewable energy, and economic growth on ecological footprint and natural resources: A panel data analysis. Resources Policy, 74, 102365.
34. Bulut, U. (2021). Environmental sustainability in Turkey: an environmental Kuznets curve estimation for ecological footprint. International Journal of Sustainable Development & World Ecology, 28(3), 227-237.
35. Oguzturk, B. S., & Özbay, F. (2022). The Relationship between Green Innovation, CO2 Emissions, Gross Domestic Product, and Renewable Energy Supply: A Panel Data Analysis for BRICS Countries and Turkey. Istanbul Business Research, 51(1).
36. Fatih, O. K. U. R., & Yılmaz, H. An Investigation of The Relationship Between Individual Energy Consumption And Economic Growth: The Future Perspective By Using The ANN Method. JOEEP: Journal of Emerging Economies and Policy, 7(1), 137-148.
37. Oğuz, Ö. C. A. L., & Volkan, H. A. N. (2022). How does Financial Development and Economic Growth affect Energy Consumption; The Panel VAR Analysis of 5 Turk Countries. Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi, 23(1), 385-402.
38. Koçak, E., & Okyay, U. Ç. A. N. Yenilenebilir Enerji ile İstihdam Arasındaki İlişki. Niğde Ömer Halisdemir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 3(1), 99-112.
39. Özeş Özgür, Ü. R., & Çağatay, S. (2022). Yenilenebilir enerji kullanımı ve büyüme-su tüketimi-sera gazı salımı ilişkisi: sektörel bir analiz. International Journal of Management Economics & Business/Uluslararasi Yönetim Iktisat ve Isletme Dergisi, 18(1).
40. Khajehpour, H., Miremadi, I., Saboohi, Y., & Tsatsaronis, G. (2020). A novel approach for analyzing the effectiveness of the R&D capital for resource conservation: Comparative study on Germany and UK electricity sectors. Energy Policy, 147, 111792.
41. Miao, Y., Razzaq, A., Adebayo, T. S., & Awosusi, A. A. (2022). Do renewable energy consumption and financial globalisation contribute to ecological sustainability in newly industrialized countries?. Renewable Energy, 187, 688-697.
42. Ullah, A., Ahmed, M., Raza, S. A., & Ali, S. (2021). A threshold approach to sustainable development: Nonlinear relationship between renewable energy consumption, natural resource rent, and ecological footprint. Journal of Environmental Management, 295, 113073.
43. Wen, J., Okolo, C. V., Ugwuoke, I. C., & Kolani, K. (2022). Research on influencing factors of renewable energy, energy efficiency, on technological innovation. Does trade, investment and human capital development matter?. Energy Policy, 160, 112718.
44. Yasmeen, R., Tao, R., Jie, W., Padda, I. U. H., & Shah, W. U. H. (2022). The repercussions of business cycles on renewable & non-renewable energy consumption structure: Evidence from OECD countries. Renewable Energy, 190, 572-583.

45. Türkmen, A., Yarbaşı, İ. Y., & Emsen, Ö. S. Mekânsal Panel Veri Analizleri Vasıtasıyla, Enerji Tüketiminde Yakınsamanın İl Düzeyinde Tespiti: Türkiye Örneği. MANAS Sosyal Araştırmalar Dergisi, 11(2), 572-587.
46. Bouyghrissi, S., Berjaoui, A., & Khanniba, M. (2021). The nexus between renewable energy consumption and economic growth in Morocco. Environmental Science and Pollution Research, 28(5), 5693-5703.
47. Bakirtaş, İ., & Çetin, M. (2016). Yenilenebilir enerji tüketimi ile ekonomik büyüme arasındaki ilişki: G-20 ülkeleri. Sosyoekonomi, 24(28), 131-146.
48. Durğun, B., & Durğun, F. (2018). Yenilenebilir enerji tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi: türkiye örneği. International Review of Economics and Management, 6(1), 1-27.
49. Mukhtarov, S. (2022). The relationship between renewable energy consumption and economic growth in Azerbaijan. International Journal of Energy Economics and Policy, 12(1), 416-419.
50. Basri, R., Ferdous, J., Ali, M. R., & Basri, R. (2021). Renewable Energy Use, Real GDP, and Human Development Index in Bangladesh: Evidence from Simultaneous Equation Model.
51. Darvishi, H., & Varedi, S. (2018). Assessment of the Contemporaneous Impacts of Gross Domestic Product and Renewable Energy Consumption, Applying the Dynamic Panel Data: Evidence from Developed Countries. International Journal of Energy Economics and Policy, 8(1), 159-166.
52. Cvijović, J., Obradović, T., & Knežević, S. (2020). A literature survey on relationship between renewable energy consumption and economic growth. Економика пољопривреде, 67(3), 991-1010.
53. Busu, M. (2020). Analyzing the impact of the renewable energy sources on economic growth at the EU level using an ARDL model. Mathematics, 8(8), 1367.
54. Chen, C., Pinar, M., & Stengos, T. (2020). Renewable energy consumption and economic growth nexus: Evidence from a threshold model. Energy Policy, 139, 111295.
55. Brożyna, J., Mentel, G., & Szetela, B. (2017). Renevable energy and economic development in the European Union. Acta Polytechnica Hungarica, 14(7), 11-34.
56. Neagu, O., Haiduc, C., & Anghelina, A. (2021). Does Renewable Energy Matter for Economic Growth in Central and Eastern European Countries? Empirical Evidence from Heterogeneous Panel Cointegration Analysis. Studia Universitatis Vasile Goldiș Arad, Seria Științe Economice, 31(1), 34-59.
57. Li, R., & Leung, G. C. (2021). The relationship between energy prices, economic growth and renewable energy consumption: Evidence from Europe. Energy Reports, 7, 1712-1719.
58. Zhou, A., & Li, J. (2019). Heterogeneous role of renewable energy consumption in economic growth and emissions reduction: evidence from a panel quantile regression. Environmental Science and Pollution Research, 26(22), 22575-22595.
59. Sohag, K., Husain, S., Hammoudeh, S., & Omar, N. (2021). Innovation, militarization, and renewable energy and green growth in OECD countries. Environmental Science and Pollution Research, 28(27), 36004-36017.
60. Ben Jebli, M., & Ben Youssef, S. (2015). Economic growth, combustible renewables and waste consumption, and CO2 emissions in North Africa. Environmental Science and Pollution Research, 22(20), 16022-16030.
61. Recepoğlu, M., & Doğanay, M. A. (2022). Renewable Energy Consumption, CO2 Emissions and Economic Growth: A Comparative Analysis on G7 and BRICS-T Countries. Current Debates on Sustainable Development, 273.
62. Singh, N., Nyuur, R., & Richmond, B. (2019). Renewable energy development as a driver of economic growth: Evidence from multivariate panel data analysis. Sustainability, 11(8), 2418.

63. Šimelytė, A., & Dudzevičiūtė, G. (2017). Consumption of renewable energy and economic growth. In Contemporary issues in business, management and education'2017: 5th international scientific conference, 11-12 May 2017, Vilnius Gediminas Technical University: conference proceedings (pp. 1-10). VGTU Press.
64. Wu, Z., Hou, G., & Xin, B. (2020). The causality between participation in GVCs, renewable energy consumption and CO2 emissions. Sustainability, 12(3), 1237.
65. Cengiz, O., & Manga, M. The causal lınkages between renewable energy consumptıon, economıc growth, oıl prıces and co2 emıssıons in selected oecd countrıes. Verimlilik Dergisi, (3), 165-183.
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HISTORY OF TOLERANCE: STEP-BY-STEP DEVELOPMENT

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Abstract. This article presents the content of the phenomenon of tolerance, the stages of historical and gradual development. The relevance of tolerance and factors related to this relevance and its necessity from the point of view of pedagogy are justified. In this regard, the research carried out was analyzed, the theoretical and methodological foundations of the study were presented. Tolerance is classified from an ethnopsychological perspective through several approaches that involve humanistic, diversifying, personal, communicative, proactive approaches. In relation to the concept of tolerance, it is given to interpret and explain the system of intercontextual relations from various scientific points of view. The research carried out on the topic is based on the fact that it made it possible to identify general and specific aspects of the concept of tolerance and, on this basis, reveal its essence as a pedagogical and psychological process. In accordance with the historical approach, historical factors affecting the emergence of tolerance are analyzed. The stages of historical development are reflected in a systematic chronological order. In the classification of tolerance in accordance with the socio-philosophical approach, in connection with the concept of mutual adaptation in the system of relations in the unification of Man and nature, the influence of tolerance competence on the processes of socio-psychological adaptation of the individual is presented.

Key words: interethnic harmony, tolerance, solidarity, sociality, religion, culture, language, ethnic tolerance, ethnopedagogy, multicultural environment, ethnopsychology, humanitarianism, diversification, interpersonal relations, communicativeness, interactions, principles of tolerance, historical stages

Entrance. On the development of tolerance in Uzbekistan, a decision was made “On the establishment of public councils for ensuring international harmony, tolerance and solidarity”, the main issue in which is to deepen democratic reforms in the country, to establish an effective communication between the state and society, and the development of strong mechanisms for implementation of public control [1]. In recent years, the study of many problems related to sociality and socialization has become relevant, and it has strengthened its position as a category of relations between the individual and society, individual and individual, individual and nature, and as a component of philosophy. The concepts of loyalty, tolerance, and tolerance are supported as a category that provides transparency in issues of various levels, where many problems related to the development of cooperation, joint production, organization, creativity, traditional agreement, non-violent cooperation need to be solved.

Tolerance has become a political and legislative demand of states, peoples and individuals, the need to form ethnic tolerance among young people is increasing, affecting the development of ethnopedagogy. Respecting a person regardless of his nationality and religion, understanding the characteristics of the culture of other nations serves the moral and spiritual quality of the learner.

Relevance and necessity of the topic. Despite the growing interest of researchers in ethnic tolerance and revealing its various aspects in the context of pedagogy, there is still no general methodology for the solution of ethnopedagogy. Many researchers, including G. U. Soldatova, G.

V. Palatkina and others, present similar hypotheses about the socio-cultural relevance of the development of this direction. In the spiritual values of young people, tolerant attitude towards other ethnic groups, non-allowance of national discrimination is considered a condition for maintaining balance in inter-ethnic relations in a multicultural environment.

The relevance of the problem of tolerance is increasing due to a number of factors:

firstly, while the processes of globalization are developing, the flow of problems are accelerating and increasing, and this is determined by the fact that humanity is not able to solve such problems alone;

secondly, the prevention and elimination of inter-civilizational, inter-ethnic and religious conflicts in social confrontations led to the development of global convergence processes, and tolerance became one of the main cores.

The following problems related to tolerance determined its relevance in the context of pedagogy:

lack of clear classifications of tolerance in the context of pedagogy;

lack of development of tolerance criteria;

the need for purposeful education of ethnic tolerance among students and insufficient implementation of educational work in this direction;

awareness of the ethnic identity of the individual based on the extiyo of mutual cultures in the relations of the educational subjects in the multicultural environment;

the need for ethno-tolerant attitude in a society with representatives of many nationalities and cultures, and the need for pedagogical conditions that improve ethnic tolerance in higher education institutions;

Pedagogical conditions for the development of tolerance in the context of pedagogy are manifested in the following:

use of folk pedagogy based on universal human values and multicultural educational values in the educational process;

development of social activity in intercultural interactions of students, its provision, preparation for tolerant attitude through self-determination in a multicultural environment;

organization of educational programs and activities of groups that serve as a psychological-pedagogical service in the formation of ethnic tolerance among students of higher educational institutions;

comprehensive use of educational tools specific to different cultures in pedagogical methods and forms aimed at developing tolerance, integration of introduced modern pedagogical technologies with ethnic cultural traditions and values;

If such pedagogical-psychological conditions are met, students will successfully develop universal competence based on tolerance.

Literature analysis and research methodology on the topic. The word “tolerance” was mentioned for the first time in 1361, this phenomenon appeared in the 16th century, and the word “tolerance” whose roots are considered to exist in the 15th century [2]. The concept of tolerance is expressed in the work of G.D. Dmitrev [3] as a justification of the differences between universal and intercultural characteristics, and as showing a positive image of representatives of another culture, it is reflected in the works of N.M. Lebedeva [4] and other scientists. In the research of A.G. Asmolov, G.U.Soldatova [5] we can see tolerance as compassion for others. V.Ya.Ershova, V.V.Makeeva, Z.A.Malkova, A.N.Djurinsky and other scientists showed the foundations of multicultural education, the methodology of universal competence in interethnic relations. The foundations of multicultural education are reflected in the works of A.N. Djurinsky [6], R.Basharuli, F.E. Uteulieva, and others [7], the methodology of cultural competence in interethnic relations, M.A. Absatova [8], the classification of multicultural individuals, Z.B. Qobilbekova, and others. The quality of a patriotic tolerant personality can be found in the works of A.B. Lukinov and others, A.A. Baychenko on the manifestation of ethnic identity as preparation in inter-ethnic

relations. The role of folk pedagogy in the educational system has a direct impact on tolerance, and this is justified in the works of T.I. Berezina, L. B. Ivanichenko and other scientists.

Basing the description of the above phenomenon of tolerance on the basis of its historical-philosophical evolution allows to analyze the views expressed on this concept from a period perspective**.**

The methodological basis of the topic research is based on V.A.Slastening's humanistic approach to tolerance, A.N.Djurinsky's multicultural approach, A.B.Mudrik's socialization approach, A.N.Leontev's activity approach, and the use of folk pedagogy by ethnopedagogues, ethnopsychologists, and cultural scientists in educating young people.

The theoretical basis of the work is the ideas and scientific views of E.M. Adzhieva, Farobiy, Sh.M. Arsaliev, V.N. Gurova, V.M. Zolotukhin, which reveal the methodology of psychological-pedagogical research on tolerance. L.S. Vygotsky, A.N. Leontev and others' research aimed at psychologically studying personality traits and its development, A.N. Djurinskyi, O.E. Kondratev, V.A. Sukhomolinskyi's theory of education and training about the laws of the integral pedagogical process and B.Z. Wolfov, B.L.Wolfson, M.S.Mirimanova's problem of education of ethnic tolerance is a theoretical justification.

Results and discussions. Looking at the etymological analysis of the concept of tolerance, this word comes from the Latin term “tolerantia” and is interpreted as a synonym of the word “tolerance”. Endurance means patience, stability, endurance, resistance to influences. The concept of tolerance is interpreted differently in different contexts, which of course depends on people's historical experience, culture, traditions and values. As the most important component of tolerance, we understand thoughts, morals, habits, values, feelings and other actions different from our own [9].

Definitions of tolerance depend on the context in which it is used, psychologists, doctors, politicians, philosophers, historians, pedagogues, etc. have studied tolerance and given it different descriptions. From a natural-biological point of view, tolerance is characterized as the immunological state of the body, the ability of the body to eliminate the negative effects of a certain environmental factor. And in mathematics, A. Shrader connects tolerance with equivalence, presenting it as “determining the same or mutual relations”[10].

Lectorsky cited tolerance by classifying it on the basis of four possible qualities of understanding: as compassion; as the impossibility of mutual understanding; as softness; as an extension of one's experience and as a critical dialogue [11].

Each culture, value, and cognitive system expands its own experience as it enters into conflict with the other system. At this point, analyzes of understanding tolerance are considered effective in the situations encountered in modern civilization and country-level specificities.

G. Soldatova considers that “tolerance is an integral description of a person that determines his ability in problematic and crisis situations, active communication with the external environment, restoration of his neuro-psychological balance, successful adaptation, avoidance of conflicts and development of mutually positive relations with the environment”[12].

Tolerance can also be classified from an ethnopsychological point of view through several approaches:

humanistic approach: tolerance is not a mechanical level of actions of any internal and external factors, true tolerance is a conscious and responsible choice of a person, a manifestation of his position and activity in establishing certain relations. According to the humanistic approach, any activity carried out arises from the recognition of the indispensable place of the individual. There is no denying the desire and ability of each individual to focus on his own priorities in his actions in relation to his goals and values. That is, no matter how difficult the “external sphere” of activity is, a person always has his own principles in its implementation, which ends with the ability to realize his goals despite the general nature of external requirements. In this, social norms, social ideals, ideological and professional requirements, etc. Can be taken into account.

diversification approach: the psychological content of tolerance cannot be reduced to a single characteristic, description, because it is complex, multifaceted, and as a phenomenon with different components, it is determined by several dimensions.
personal approach: the complex psychological foundations and main dimensions of tolerance are considered as a measure of a person's own personal values, respect, equality, opinions, personal relationships.
communication approach: among different types of tolerance, interpersonal tolerance as the basis of general human tolerance is considered as a special method of interaction and an interpersonal communication with others. The essence of interpersonal tolerance is determined by a person's readiness to leave his limited "world" (nationality, faith, social origin, age, etc., different from others) to the "world" of globalization (M. Gefter) [13]. In this dimension, the main condition of the "inner personal dimension" is the willingness to respect the differences between people, as well as the recognition of the rights and freedoms of each person, the ability to engage in non-violent interactions, that is, the readiness for mutual success, in relation to the naturalness and inevitability of such things.
active approach: the presence of a high level of tolerance is not only the result of activity in external influences, but also the effects on the formation of tolerance are taken into account, because these conditions serve as a basis for the development of tolerance.
L.M. Drobijeva [14], N.M. Lebedeva [15], V.P. Levkovich [16], G.U. Soldatova [17], T.G. Stefanenko, L.A. Shaygerova and others carried out research on issues of ethnic tolerance, and it is understood that at the root of ethnic tolerance is patience, tolerance, the absence of a negative attitude towards another ethnic culture, on the contrary, there is a positive and active attitude towards another culture while maintaining its own positive value perception. Ethnic tolerance is not the result of assimilation as the abandonment of one's own culture, but is a characteristic feature of inter-ethnic integration [18]. This concept in the perception of a social group is based on the natural acceptance of the existence of characteristics of all cultures, with a sufficient level of the value of ethnic cultures and in this regard, the advantages of one culture over another are not recognized separately [19].

References:

1. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On the organization of the activities of public councils to ensure international harmony, tolerance and harmony". No. 723. Tashkent. November 17, 2020.
2. Cambridge International Dictionary of English. Guides you to the meaning. Editor-in-chief Paul Procter. - Cambridge, University Press, 1995.
3. Дмитриев, Г.Д. Многокультурность образования / Г.Д. Дмитриев. М., 1999.
4. Лебедева, Н.М. Социально-психологическая аккультурация этнических групп: автореф. дис. д-ра психол. наук / Н.М. Лебедева. М., 1997.
5. Асломов А.Г. Слово о толерантности // Век толерантност. – 2001, № 1, -С. 2-5; Солдатова Г.У. Психология межэтнической напряженности. -М.: Смысл, 2008. – 396 с.
6. Джуринский, А.Н. Поликультурное воспитание: сущность и перспективы развития / А.Н. Джуринский // Педагогика. 2000. - № 10.
7. Джуринский, А.Н. Поликультурное воспитание: сущность и перспективы развития / А.Н. Джуринский // Педагогика. 2000. - № 10.;
8. Абсатова, М.А. Поликультурная компетентность старшеклассников: методология, теория, практика, формирование [Текст] / М.А. Абсатова. - Ал-маты: Изд-во "Дарын", 2008. - С. 7.
9. Клепцова Е.Ю. Психология и педагогика толерантности. - М.: Академический Проект, 2004. - 176 с.
а. Шрейдер Ю. А. Равенство, сходство, порядок — Глава III. Сходство и толерантность. — М.: Наука, 1971. 256 с.

10. Лекторский, В.А. О толерантности, плюрализме и критицизме. М., 1999. С. 284 - 292.
11. Солдатова Г.У., Психология межэтнической напряженности. -М.: Смысль, 1998, 398 с.
12. Гефтер М. Мир миров: российский зачин. 1994, Электронный ресурс / Режим доступа http://old.russ.ru/antolog/inoe/geft.htm
13. Дробижева Л. Российская идентичность и толерантносить межэтнических отношений: опыть 20 лет реформ // Россия и мусульманский мир. – 2012, - № 4. С. 32-48.
14. Лебедева Н.М. Социально-психологическая аккультурация этнических групп : автореф. дис. д-ра психол. наук / Н.М. Лебедева. М., 1997.
15. Левкович, В.П. Формирование этнического сознания подростков в семье / В.П. Левкович, Л.Д. Кузмицкайте // Психология. 1992. - № 6.
16. Солдатова Г.У. Психология межэтнической напряженности. -М.: Смысл, 2008. 396 с.
17. Солдатова Г. У., Шайгерова Л. А., Шарова О. Д. Жить в мире с собой и другими: Тренинг толерантности для подростков. — 2-е издание, стереотипное. — М.: Генезис, 2001. — 112 с.
18. Садовникова Н.О., Веденяпина Е.А. Особенности этнической толерантности молодежи малого города // Международный студенческий научный вестник. – 2017. – № 5.
19. Татарко А.Н., Лебедева Н.М. Социальный капитал: теория и психологические исследования: Монография. - М.:РУДН, 2009. 233 с.

ÜÇÜNCÜ DÜNYA SAVAŞI TEMALI KARİKATÜRLERİN GÖSTERGEBİLİMSEL ANALİZİ

SEMIOTIC ANALYSIS OF THIRD WORLD WAR THEMED CARTOONS

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Özet

Üçüncü Dünya Savaşı, uluslararası ilişkiler bağlamında son yıllarda sıklıkla tartışılan konulardan biridir. Siyasi gerilimler, ekonomik krizler ve ideolojik çekişmeler, bu savaşın yakın gelecekte yaşanacağı ve tüm dünyayı etkileyeceği senaryolarını sürekli gündemde tutmaktadır. Medya kuruluşları da bu savaş senaryoları hakkında haberler yaparak ve çeşitli içerikler oluşturarak konunun kamuoyu nezdinde tartışılmasına katkıda bulunmaktadır. Üçüncü Dünya Savaşı'nın medyada nasıl temsil edildiği, bu temsillerle hangi mesajların verildiği önemli bir konudur. Fakat yapılan literatür araştırmasında, konu hakkında herhangi bir araştırmaya ulaşılamamıştır. Bu nedenle, çalışma mevcut literatürdeki boşluğun giderilmesi açısından önemlidir. Bu düşüncelerden hareketle çalışmanın amacı, dijital medyada yer alan Üçüncü Dünya Savaşı temalı karikatürlerde konu hakkında hangi mesajların verildiğini ortaya koymaktır. Bu amaç doğrultusunda çalışmada "Üçüncü Dünya Savaşı karikatürlerde nasıl temsil edilmektedir?", "Bu temsillerle hangi mesajlar verilmektedir?" şeklindeki soruların yanıtı aranmıştır. Çalışmanın örneklemi, çeşitli internet sitelerinde Üçüncü Dünya Savaşı'yla ilgili olan altı farklı karikatür ile sınırlandırılmıştır. Amaçlı örneklemle seçilen karikatürler, Ferdinand de Saussure'ün gösterge, gösteren ve gösterilen unsurlarından oluşan "Göstergeler Modeli" kullanılarak analiz edilmiştir. Çalışma sonucunda, karikatürlerin Üçüncü Dünya Savaşı'yla ilgili ideolojik ve politik yönler taşıdığı, insanlık için yıkım getiren temsiller sunduğu ve çok yönlü, kapsamlı mesajlar içerdiği belirlenmiştir.

Anahtar Kelimeler: Üçüncü Dünya Savaşı, Ferdinand de Saussure, Göstergebilimsel Analiz, Karikatür, Medya.

Abstract

Third World War has been one of the most discussed topics in international relations in recent years. Political tensions, economic crises and ideological conflicts keep the scenarios of this war taking place soon and affecting the whole world on the agenda. Media organizations also contribute to the public debate by reporting on these war scenarios and creating different content. How the Third World War is represented in the media and what messages are conveyed through these representations is an important issue. However, no research on this topic was found in the literature review. Therefore, this study is important to fill the gap in the existing literature. Based on these considerations, the study aims to determine the messages conveyed in cartoons about the

Third World War in digital media. In line with this purpose, the study sought to answer the questions ‘How is the Third World War represented in cartoons?’ and ‘What messages are conveyed through these representations? The study sample was limited to six different cartoons about the Third World War on different websites. The cartoons selected by purposive sampling were analyzed using Ferdinand de Saussure’s ‘sign model,’ which consists of a sign, signifier, and signified elements. As a result of the study, it was found that the cartoons have ideological and political aspects related to the Third World War. These present representations bring destruction to humanity and contain multifaceted and comprehensive messages.

Keywords: Third World War, Ferdinand de Saussure, Semiotic Analysis, Cartoon, Media.

ECOLOGICAL SAFE IRRIGATION WITH AN INNOVATIVE IRRIGATION SYSTEM

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Abstract
With a view to enhancing agriculture in Georgia's mountainous and foothill regions, the paper presents the organization of irrigation systems equipped with sprinkling machines, ruling out irrigational erosion and the risk of occurrence of freshets. Analysis is made of erosional conditions at sprinkling irrigation works, which directly depend on water infiltration in the soil during freshet processes. The greater the infiltration, the lesser is the possibility of accumulation of surface water. On the basis of the studies carried out, values of permissible intensity of sprinkling are obtained for slopes of various inclinations, according to soil type.

Keywords: freshet, irrigation erosion, sprinkling machines, soil.

The basis of enhancing agriculture in Georgia's mountain and foothill regions is arrangement of irrigation systems equipped with such sprinkling machines that rule out irrigational erosion, the hazard of the rise of freshets and ensures ecological safety of the environment (1).
As shown by world practice artificial sprinkling is the most perfect of all techniques of irrigation. It meets the demands of most principal indicators of irrigation (including: humidification of the air and economic use of water, sprinkling to combat salivation and erosion), thereby drastically differing from other ways of irrigation.
Despite definite successes, many questions in the sphere of sprinkling have not been studied sufficiently and need profound scientific study. This entirely refers to the principles of arranging a sprinkling system and the basic propositions, the sprinkling equipment and technology.
An analysis of the causes of irrigational erosion (3) shows that during sprinkling irrigation the conditions of Erosional processes directly depend on the absorption of water by the-soil. The greater it is the less is the possibility of a stream appearing on the soil surface. The latter is highly hazardous at sprinkling mountainous places, where the area to be watered has more inclination.
Modern sprinkling hardware appreciably differs from its predecessors by productivity, it covers a large irrigation area, ensures automation of the irrigation processes, although the majority of these machines are hardly applicable to Georgia's conditions due to their design and other specificities. The basic reason ·of this is that they fail to meet the ecological requirements of the environment. In this respect the sprinkling machine is a significant soil-protective element: correspondence between the intensity of rain of the machines and the absorption of water by the soil at supplying the norms of watering. If a surface stream originates at this time (which causes irrigation erosion) the sprinkling hardware is useless for the given zone (4).
As is known, the process of absorption of water by the soil in sprinkling is divided into two stages: the first is without pressure or free stage, when there is no whole gravitational layer of water on the soil surface, and second, with pressure. At the beginning of the pressure stage the gravitation layer moves according to the slope of the micro relief and it forms pools at depressed places, causing the formation of pools on the soil surface, and of a surface stream on the slopes.
The available empirical dependences enable determination of the absorption of water by the soil and of the respective rain intensity during sprinkling only for concrete conditions.

To carry out quality watering during sprinkling the intensity of sprinkling should not exceed the absorption of water by the soil. Otherwise, the pools and surface streams cause disintegration of soil structure, its uneven humidification, erosion, etc. Therefore, comparison of the absorption of water by the soil and various intensities of rain allows determination of erosion ally permissible rain intensity.
The data available on the permissible intensity of artificial rain cannot be considered to be the basic material for designing and constructing sprinkling systems in Georgia, for they fail to take account of the specific conditions of the country.
Hence extensive scientific studies were carried out at the Georgian Institute of Water Management. For field experimental investigations use was made of sprinkling machines of serial production with a large range of determination of rain intensity. The magnitude of the latter is changed by the action of the sprinkling machine on the sector and change of pressure. Observation is made of the origin of water layers on the surface of the soil, which accumulate at depressed places of the micro relief in the shape of pools, and the observation ends as soon as the first signs of the movement of the water layer appear. The intensity of rain was determined by the duration of the experiment and by the amount of water in the rain gauge, which was adopted as permissible at a definite sector of sprinkling, in conditions of supply of the necessary norm of watering.
On the basis of experimental studies and using the well-known expression (2) of Acad. A. Kostyakov, a calculation dependence of permissible intensity has been obtained according to various soil conditions and inclination of the irrigation area:

$$K_t = \frac{K_0\left(1-\mathrm{tg}\frac{\beta}{2}\right)^{\gamma}}{t^{\alpha}} K_p \qquad (1)$$

where: K_t - is the rate of absorption that corresponds to the intensity of rain and the duration of t sprinkling without a stream being formed;
K_p - is the coefficient that envisages the impact of the rain intensity on the absorption process and $K_p = 0,9 \div 1,2$;
K_0 - is the rate of water absorption at the end of the first minute;
γ and α – are indices of quality, determined experimentally;
β – is the inclination of the irrigation area in degrees.

Table 1

To

Facilities where experiments were conducted	Type of soil	Soil humidity before sprinkle-ling started,%	K_0	α	γ
Ingiri tie farm	Medium loam	80	8,4	0,76	0,51
Chuburkhinji tie farm	Heavy loam	80	8,1	0,72	0,53
Malkhazis tsveri irrigation system	Light loam	75	10,5	0,71	0,48

specify the impact of the value of the intensity of sprinkling use was made of data that are adopted in investigating the magnitude of intensity.
Graphs of the change of rain intensity were drawn according to the findings of the study (Fig. 1), on the basis of the duration of sprinkling, without formation of surface streams (unbroken line) for various inclinations. The same graphs present the variability of rates of water absorption without streams (broken line).
A comparison of the unbroken and broken lines shows that the difference between them is small. At the same time it is noticeable that under great intensity the permissible intensity of rain increases 1.2 times on the average, while at small intensity it decreases 0.9 times.

The studies carried out demonstrate that under great inclinations the duration of sprinkling without surface runoff diminishes to such an extent that in most cases it is impossible to supply the norm of irrigation water. In order to ensure the supply of irrigation norm in these conditions sprinkling may be carried out by regulating the intensity of rain, with intervals or by small intensity of rain.

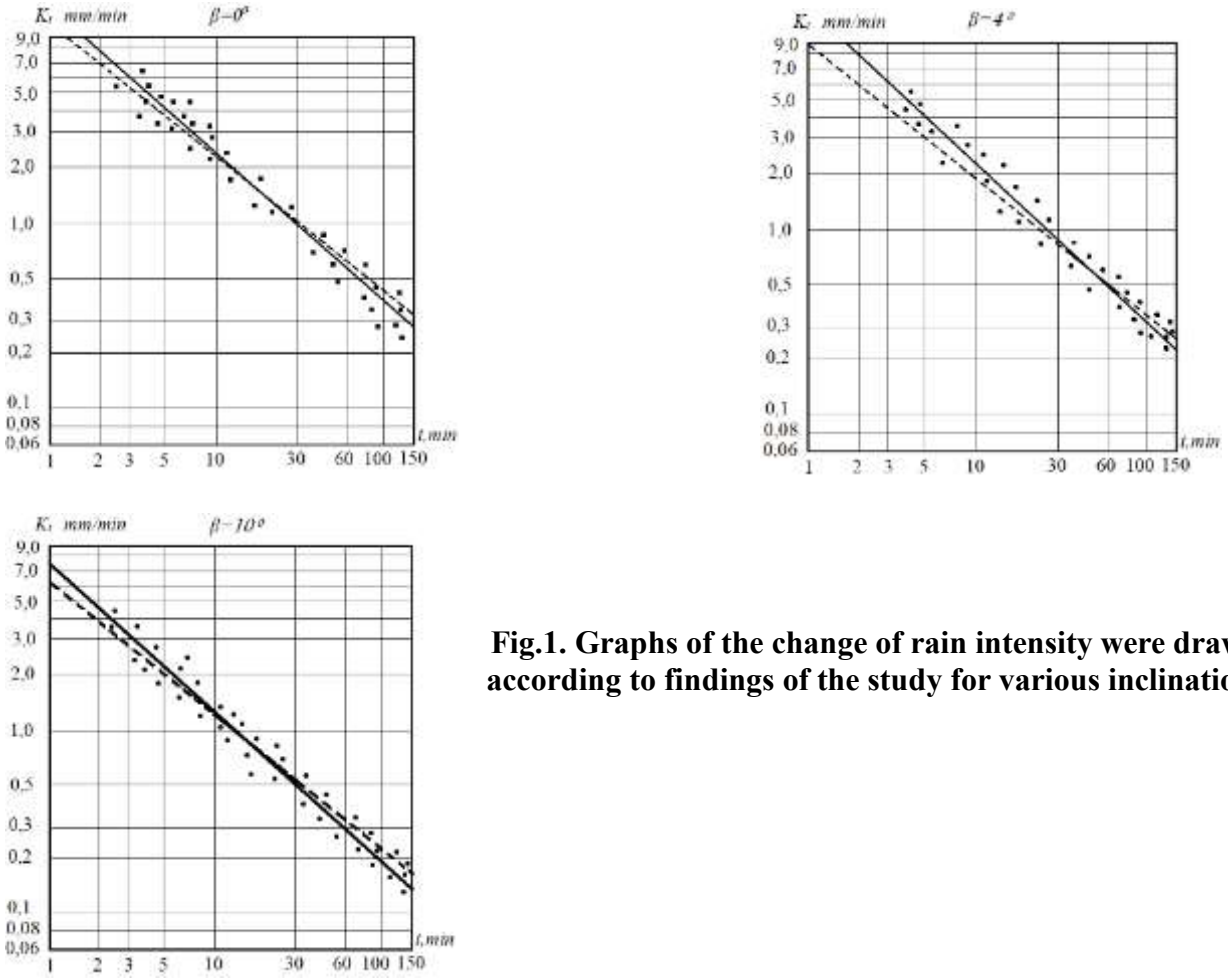


Fig.1. Graphs of the change of rain intensity were drawn according to findings of the study for various inclinations

Thus, on the basis of an analysis of the results of the studies, we come to the conclusion that in order to raise the technical-economic indices and efficiency of sprinkling machines it is advisable to equip them with devices that will enable us to regulate the intensity of artificial sprinkling in the process of sprinkling.

Besides regulation, determination of the concrete values of permissible rain intensity through experiments allows to carry out frequent irrigation (intermittently) with high rain intensity, but in small norms. The essence of sprinkling of this type envisages movement of the precipitation received by the upper layer of the soil to the lower layers during the intervals.

In the former case regulation of artificial rain in the course of sprinkling is hardly feasible because regulation of rain will cause change of the sprinkling device, as well as water discharge and irrigation area, and of power. In other words, regulation should be attended by regulation of the characteristics just cited during sprinkling, which is rather difficult.

As to intermittent sprinkling, it is hard to carry out, both from technical and exploitation standpoints.

A better version of solving the problem is to carry out sprinkling at such small intensity at which surface streams and pools do not form at the end of sprinkling (ensuring the supply of the norm of sprinkling). On the basis of studies carried out at Georgia's main irrigation facilities values of

permissible intensities of artificial rain have been obtained for slopes of various inclinations according to soil type. The data are given in Table 2.

Table 2

Average values of permissible intensities of sprinkling for slopes of 0-10° and 10-20° inclinations, according to soil type

Soil type	Permissible intensity of sprinkling, mm/sec	
	0-10°	10-20°
Light loam	0,26-0,22	0,22-0,16
Medium loam	0,28-0,23	0,23-0,17
Heavy loam	0.26-0,21	0,21-0,14
	0,20-0,18	0,18-0,13

Thus, taking into consideration the permissible intensity of sprinkling, the proposed approach to the estimation of the quality of irrigation and development of irrigation machines based on it allows reduction of the erosional processes to minimum at sprinkling irrigation.

REFERENCES

1. O. Nanitashvili, V. Nanitashvili (2000). Technology of anti-erosion sprinkling irrigation. Bull. Georg. National Acad. Sc. 173, N1, pp. 108-109.
2. A. Kostyakov (1960). Foundations of Reclamation. Sixth ed. Supplemented and revised. State Publ. House of Agric. Lit Moscow, 624 p.
3. Ts. Mirtskhoulava (2000). Water Erosion of Soils, Tbilisi, Metsniereba, 423 p.
4. O. Nanitashvili, M. Vartanov, V. Nanitashvili (2008), Ecologically safe sprinkling of tea and citrus plantations in mountain conditions. //Ecol. Systems and Devices, Moscow, Publ. Nauchtekhlitizdat, No. 6, pp. 55-56.

AN ADAPTIVE MAC PROTOCOL (DQ-MAC) FOR EFFICIENT DYNAMIC SPECTRUM ACCESS IN COGNITIVE RADIO NETWORKS

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ABSTRACT

Cognitive Radio Networks (CRNs) require dynamic spectrum access as a way to maximize the use of inadequate spectrum resources with minimal interference from licensed primary users. MAC protocols of a traditional nature frequently fail to respond effectively in real-time to changing channel availability, resulting in poor spectrum utilization and high rates of collisions. This work presents a new Deep Q-Network (DQN)-based MAC protocol that learns and adapts to the shifting spectrum environment, allowing secondary users to make insightful, instantaneous channel access choices. The development and assessment of the protocol occurred across different environments—urban, rural, and indoor—representing unique ranges of spectrum availability and interference issues.

The simulations ran on MATLAB, utilizing actual user mobility, Rayleigh fading, interference, and noise conditions in the real world. Results show that the DQN-based MAC protocol markedly outperforms traditional random channel selection across major performance assessments, realizing up to 71% higher throughput, 58% less collisions, and improved equity within user interactions. In addition, the protocol augments transmission quality by increasing Signal-to-Interference-plus-Noise Ratio (SINR) values, necessary for guaranteeing reliable transmission in high traffic environments.

In advancing the field, this research proposes a solution based on reinforcement learning for management of the spectrum in Cognitive Radio Networks (CRNs), illustrating the scalability and adaptability of Deep Q-Networks (DQNs) in Cognitive Radio Networks. The results indicate that protocols driven by machine learning have the ability to revolutionize forthcoming wireless networks, by improving spectrum efficiency and user performance in real time. Upcoming studies will underscore practical application, improving energy efficiency, and including security practices to further improve the protocol's usefulness and reliability.

Keywords: Cognitive Radio Networks, Dynamic Spectrum Access, DQN, Reinforcement Learning, MAC Protocol, Spectrum Management, Spectrum Utilization.

WATER FOOTPRINT ASSESSMENT OF TOMATO PRODUCTION IN TÜRKİYE

TÜRKİYE'DE DOMATES ÜRETİMİNDE SU AYAK İZİ DEĞERLENDİRMESİ

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ABSTRACT
The concept of water footprint appears as an important tool for the sustainable management of water resources in recent years. In this study, the water footprint of tomato production was theoretically calculated and assessed on provincial basis using the volumetric approach method for blue, green, and total water footprints in Türkiye. Two different effective rainfall calculation methods were used in the calculation of water footprint. A total of 705.67 hm^3 of water was used for the total tomato production of Türkiye in 2022. It means using 88.7 liters of water on average for 1 kg of tomato production. Provinces with the highest water footprint are Antalya (121.45 hm^3), Mersin (44.37 hm^3), Muğla (37.97 hm^3), and Çanakkale (32.68 hm^3). The provinces that consume the most water to produce 1 kg of tomato in Türkiye are Siirt (451 liters) and Mardin (375 liters). In contrast, the provinces that consume the least water are Afyon (45 liters), Antalya (48 liters), and Mersin (52 liters). In light of these findings, it was assessed that it would be beneficial in environmental, social, and economic terms to identify areas where agricultural products can be produced with a lower water footprint and to create policies to encourage production in these areas.

Keywords: Water footprint; Blue water; Green water; Tomato, Effective rainfall, Crop water use

ÖZET
Su kaynaklarının sürdürülebilir yönetimi konusunda su ayak izi kavramı son yıllarda önemli bir araç olarak karşımıza çıkmaktadır. Bu çalışmada, Türkiye'de domates üretiminin hacimsel yaklaşım metodu ile iller bazında teorik olarak mavi, yeşil ve toplam su ayak izi hesaplanmış ve bulgular değerlendirilmiştir. Su ayak izinin hesaplanmasında iki farklı etkili yağış hesaplama yöntemi kullanılmıştır. 2022 yılında Türkiye'de üretilen toplam domates için 705,67 hm^3 su kullanılmıştır. Bu ortalama olarak 1 kg domates üretimi için 88,7 litre su kullanımı anlamına gelmektedir. İller bazında incelendiğinde en fazla su ayak izine sahip olan iller Antalya (121,45 hm^3), Mersin (44,37 hm^3), Muğla (37,97 hm^3), Çanakkale (32,68 hm^3)'dir. Türkiye'de 1kg domates yetiştirmek için en fazla su kullanan iller Siirt (451 litre) ve Mardin (375 litre) illeri iken, en az su kullanan iller Afyon (45 litre), Antalya (48 litre) ve Mersin (52 litre) illeridir. Bu bulgular ışığında daha düşük su ayak izi ile tarımsal ürünlerin üretilebileceği alanların belirlenmesi ve bu

alanlarda üretimin teşvik edilmesine yönelik politikalar oluşturulması çevresel, sosyal ve ekonomik açıdan yararlı olacağı değerlendirilmiştir.

Anahtar kelimeler: Su ayak izi, Mavi su, Yeşil su, Domates, Etkili yağış, Bitki su kullanımı

INTRODUCTION

As a precursor to the concept of water footprint, the term virtual water was defined by Allan (1997) as the water embedded in water-intensive commodities in the global trading system. In the literature, the term 'water footprint' was first used by Hoekstra and Hung (2002) as an analogy with the term 'ecological footprint' in their study to measure the volume of virtual water trade between countries.

The water footprint of a product was defined by Hoekstra et al. (2009) as the total volume of freshwater utilized throughout its entire supply chain for production.

The concept of water footprint, being relatively new and encompassing numerous potentials, has garnered the attention of academics, businesses, and public authorities in a short time. Much research has been carried out on water footprint, marketing strategies have been developed and much data have been provided for decision-makers.

In this study, blue, green, and total water footprint of table tomato production in 2022 were theoretically calculated at the NUTS[54] 3 Level (Province) in Türkiye using the volumetric approach method introduced by Hoekstra et al. (2009) and Hoekstra et al. (2011).

Several factors played a role in the selection of table tomato plants in the study: the widespread production across the country enabling provincial comparisons; the availability of sufficient data to calculate crop water requirements; and Türkiye's significant role in global tomato production and trade.

RESEARCHES AND FINDINGS

Cultivation area and production of table tomato by provinces in Türkiye

In the study, Turkish Statistical Institute (TUIK) - Crop Production Statistics database was used for the data on cultivation area and production of table tomatoes by provinces in 2022 (Türkiye İstatistik Kurumu, n.d.). Using these data, tomato yield values were calculated for each province. The total cultivation area of table tomato is 98 439 hectares and the total table tomato production is 7 954 856 tons in Türkiye. The average tomato yield is 80.81 tons/hectares in Türkiye. Figure 1 illustrates the distribution density of table tomato production across the provinces of Türkiye. Tomato production is concentrated in the south and western parts of the country.

[54] NUTS: Nomenclature of Territorial Units for Statistics (French: **N**omenclature des **U**nités **T**erritoriales **S**tatistiques)



Figure 1: Density map of tomato-producing provinces in Türkiye (tons)

Table 1 presents the cultivation area, production quantity, and calculated yield values for the provinces. Accordingly, the province with the highest tomato production is Antalya, which has 17.24% of the total tomato cultivated area and 31.96% of the country's production. Following Antalya, the provinces of Mersin, Çanakkale, and Muğla have significant tomato cultivation areas with 7 396 hectares, 4 688 hectares, and 4 506 hectares, respectively. Collectively, these four provinces contributed to 54.39% of Türkiye's total tomato production in 2022.

In Türkiye, the provinces with the highest tomato yields are Antalya (149.82 tons/hectares), Afyonkarahisar (143.28 tons/ha), and Burdur (134.36 tons/hectares). On the other hand, the provinces with the lowest yields are Giresun (18.53 tons/hectares), Siirt (19.14 tons/hectares), and Gümüşhane (20.30 tons/hectares).

Table 1: Cultivation area, production, and yield amounts of table tomato by provinces in Türkiye–2022

Province	Cultivation Area (hectares) a	Production (tonnes) b	Yield (t/ha) c=b/a.10
Erzincan	719	73550	102,3
Afyonkarahisar	895	128260	143,3
Balıkesir	1029	68736	66,8
Amasya	1098	113500	103,4
Karaman	1186	73500	62,0
Aydın	1194	65368	54,8
Çorum	1299	50482	38,9
Bilecik	1307	91437	70,0
Kütahya	1348	55255	41,0
Elazığ	1383	50860	36,8
Eskişehir	1574	102365	65,0
Kahramanmaraş	1660	75275	45,4
İzmir	1751	119600	68,3
Burdur	1847	248151	134,4
Diyarbakır	2076	76740	37,0
Denizli	2080	102588	49,3
Aksaray	2134	81732	38,3
Adana	2214	123974	56,0
Şanlıurfa	2355	140241	59,6
Tokat	2442	196030	80,3
Manisa	2459	137525	55,9
Bursa	2573	165567	64,3
Bitlis	2665	213361	80,1
Konya	2771	136637	49,3
Ankara	2967	127224	42,9
Muğla	4506	552505	122,6
Çanakkale	4688	377460	80,5
Mersin	7396	854465	115,5
Antalya	16969	2542322	149,8
Other Provinces	19854	810146	40,8
TÜRKİYE TOTAL	98439	7954856	80,8

Calculation of the rainfall amount during the table tomato production period

In Türkiye, The General Directorate of Meteorology (MGM) provides the general meteorological statistical data for the provinces. The average monthly total rainfall (mm) data for the years 1927-2022 were used in the calculation of the rainfall amount (Meteoroloji Genel Müdürlüğü, n.d.).

Total rainfall was calculated by converting monthly data into daily averages during the production period for each province according to the planting and harvest dates of table tomatoes:

i. Determination of the planting and harvest dates for table tomatoes in each province (see Table 2): Planting and harvest dates can vary based on regional climatic conditions and agricultural practices. In the study, it was assumed that the planting and harvest dates of tomato farmers in each province were the same.

ii. Calculation of the number of days in the production period: The production period is defined as the duration between the planting and harvest dates.

Table 2: Average monthly total precipitation (mm) (measurement period (1927 - 2022))

Province	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
ADANA	113,60	89,00	65,50	51,00	48,10	22,10	10,20	9,30	19,30	42,80	71,50	126,40	668,80
ADIYAMAN	140,50	107,10	87,30	61,70	45,20	9,40	1,90	2,50	9,20	48,60	74,10	142,00	729,5
AFYONKARAHİSAR	46,90	38,40	44,60	47,00	50,10	41,50	21,80	18,00	23,60	40,30	32,40	46,80	451,4
AĞRI	36,40	39,50	49,30	75,10	76,40	42,80	22,60	13,70	20,90	51,50	41,80	42,90	512,9
AKSARAY	40,7	35,1	40,	45,	43,	29,	7,1	5,4	12,2	23,4	31,5	46,2	360,

	0	0	90	20	60	30	0	0	0	0	0	0	6
AMASYA	46,20	36,70	50,20	51,90	61,30	41,00	12,90	12,90	21,30	36,40	44,60	53,80	469,2
ANKARA	40,30	35,20	39,30	41,70	50,90	36,10	14,20	12,70	17,80	27,30	31,20	44,40	391,1
ANTALYA	210,60	112,70	94,50	63,10	37,00	10,10	4,00	5,00	22,00	76,60	152,20	262,20	1050
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
YOZGAT	68,60	59,70	68,40	57,80	66,10	45,70	12,60	11,40	18,30	33,30	53,40	75,70	571
ZONGULDAK	140,40	99,40	98,10	64,40	54,70	74,60	68,90	83,20	103,40	145,30	139,40	153,80	1225,6

iii. Conversion of monthly rainfall data to daily averages by dividing the total monthly rainfall by the number of days in that month.

$$R_i = \frac{R_{total,i}}{N_i} \qquad (1)$$

where;
(R_i) represents the daily average rainfall for month (i), mm
($R_{total,i}$) represents the total monthly rainfall for a month (i), mm
(N_i) represents the number of days in that month (i)

iv. Summation of daily averages over the production period: The total rainfall during the production period is obtained by summing the daily average rainfall values over the entire production period. This is calculated by:

$$T = \sum_{i=1}^{n} (R_i \times D_i) \qquad (2)$$

where;
(T) represents the total rainfall during the production period, mm
(D_i) represents the number of days in the production period within a month (i)
(n) represents the number of months in the production period.

In the provinces where tomatoes are cultivated, the total rainfall amount during the production period was determined by multiplying the production area by the rainfall data from the selected meteorological station, assuming homogeneous precipitation across the region.

$$T_{Province,j} = A \times T \qquad (3)$$

where;
($T_{province,i}$) represents the total rainfall amount during the production period for the province (j), m^3
(A) represents the total area where tomatoes are cultivated in the province, decare

Calculation of effective rainfall

The effective rainfall during the table tomato production period in each province was calculated using two distinct methodologies outlined below:

- According to Dastane (1974), 80% of the total rainfall was taken using the rainfall rate method.
- Calculated based on the methodologies of Chapagain and Hoekstra (2011) using the USDA SCS[55] method, as per formulas (4) and (5) provided below:

(P_{eff}) represents the effective rainfall
(P_{total}) represents the total rainfall in the relevant period

$$P_{eff} = \frac{P_{total}}{125} \times (125 - 0{,}2 \times P_{total}) \qquad P_{total} \leq 250 \text{ mm} \qquad (4)$$

$$P_{eff} = (125 + 0{,}1 \times P_{total}) \qquad P_{total} \geq 250 \text{ mm} \qquad (5)$$

[55] United States Department of Agriculture Soil Conservation Service

Table 3 presents the total rainfall and effective rainfall calculated above-mentioned methods during the tomato production period by province.

Table 3: Effective rainfall during the tomato production period by province

Province	Total Rainfall (mm)	Effective Rainfall (by Chapagain ve Hoekstra (2011) method) (mm)	Effective Rainfall (by Dastane (1974)) (mm)
ADANA	136,20	106,52	108,96
ADIYAMAN	53,62	49,02	42,90
AFYONKARA HİSAR	141,44	109,43	113,15
AĞRI	0,00	0,00	0,00
AKSARAY	85,05	73,47	68,04
AMASYA	131,97	104,11	105,58
ANKARA	117,04	95,12	93,63
ANTALYA	116,78	94,96	93,42
⋮	⋮	⋮	⋮
VAN	70,06	62,21	56,05
YALOVA	189,17	131,91	151,33
YOZGAT	133,85	105,19	107,08
ZONGULDAK	390,59	164,06	312,47

Calculation of plant water consumption of table tomatoes by provinces

The General Directorate of Agricultural Research and Policies (TAGEM) and the General Directorate of State Hydraulic Works (DSİ), in cooperation with universities, prepared a guidance document titled "Plant Water Consumption of Irrigated Crops in Türkiye" in 2017 as a result of a four-year study (Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü ve Devlet Su İşleri Genel Müdürlüğü, 2017).

Crop evapotranspiration (ET_c) for tomato plants for each tomato-producing province was calculated using the following steps with the online TAGEM-SuET Irrigation Management and Plant Water Consumption application (Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü, n.d.).

i. Meteorological stations were selected for each tomato-producing province. There are a total of 259 meteorological stations in Türkiye, which have been operational in various years. Firstly, the oldest of these stations (having the same name as the provinces) was selected. In some cases, the district meteorological station of that province was selected for the tomato plant.

ii. Reference evapotranspiration (ET_0) in millimeters per day was determined for each province by using the ASCE[56] Standardized Penman-Monteith method. Consequently, the reference evapotranspiration for Türkiye was estimated on a provincial basis.

iii. Crop evapotranspiration (ET_c) in millimeters per day was calculated for each province by using crop coefficient (Kc), planting, and harvest dates based on the data from selected meteorological stations. ET_0, tomato planting-harvest dates, production period and ET_c values of the first 29 provinces with the highest tomato production are given in Table 4. Figure 2 illustrates the crop evapotranspiration (ET_c) of tomatoes by provinces.

[56] ASCE: American Society of Civil Engineers

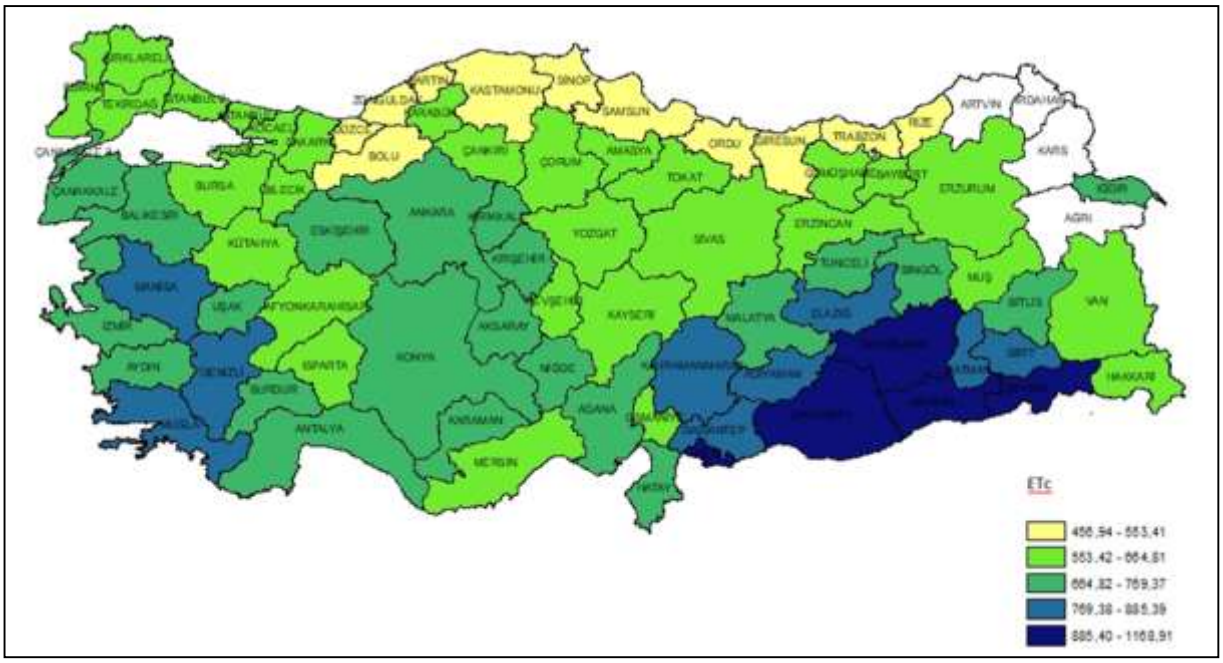


Figure 2: Crop evapotranspiration of table tomato by province in Türkiye (ETc, mm)

Table 4: ET_0, ET_C, planting and harvest dates and production period of table tomato-producing provinces with the highest tomato production

Province	ET_0 (mm)	Planting Date	Harvest Date	ET_C (mm)	Production Period (Day)
Antalya	1372,23	1.04.2022	16.08.2022	715,75	137
Mersin	1225,11	1.04.2022	16.08.2022	599,85	137
Muğla	1201,08	11.04.2022	17.09.2022	842,61	159
Çanakkale	1060,8	21.04.2022	20.09.2022	697,13	152
Burdur	1163,34	21.04.2022	12.09.2022	731,67	144
Bitlis	1065,05	11.05.2022	29.09.2022	674,84	141
Tokat	1043,41	11.05.2022	2.10.2022	619,44	144
Bursa	1015,38	21.04.2022	20.09.2022	651,9	152
Şanlıurfa	1363,28	21.04.2022	27.09.2022	972,89	159
Manisa	1232,6	11.04.2022	17.09.2022	873,18	159
Konya	1109,58	11.05.2022	2.10.2022	705,09	144
Afyonkarahisar	1056,85	11.05.2022	2.10.2022	646,94	144
Ankara	1092,16	11.05.2022	2.10.2022	703,49	144
Adana	1337,56	1.04.2022	16.08.2022	749,61	137
İzmir	1361,65	1.04.2022	16.08.2022	769,37	137
Amasya	1070,71	11.05.2022	2.10.2022	652,7	144
Denizli	1146,24	11.04.2022	17.09.2022	792,4	159
Eskişehir	1097,58	11.05.2022	2.10.2022	688,11	144
Bilecik	1009,49	21.04.2022	20.09.2022	660,47	152
Aksaray	1201,72	11.05.2022	2.10.2022	757,42	144
Diyarbakır	1391,08	21.04.2022	24.09.2022	1069,18	156
Kahramanmaraş	1270,85	21.04.2022	17.09.2022	864,83	149
Erzincan	1019,33	11.05.2022	21.09.2022	607,55	133
Karaman	1182,61	11.05.2022	2.10.2022	738,32	144
Balıkesir	1018,63	21.04.2022	20.09.2022	674,02	152
Aydın	1229,67	1.04.2022	16.08.2022	702,59	137
Kütahya	1004,53	21.04.2022	20.09.2022	654,16	152
Elazığ	1263,4	11.05.2022	30.09.2022	832,96	142
Çorum	960,39	11.05.2022	2.10.2022	609,77	144

Calculation of the water footprint for table tomato

The following methodology developed by Hoekstra et al. (2009) and Hoekstra et al. (2011) was used for water footprint calculations. In this context, the blue, green, and total water footprint of

the tomato plant by province and the unit water footprint required for tomato production per kg were calculated using the formulas listed below.

In the calculation of the water footprint, it was assumed that the tomato planting and harvest dates were the same in each farm in the provinces and that the crop water requirement was fully met throughout the growing period.

The blue evapotranspiration value (ET_{blue}) is the difference between the crop evapotranspiration value (ET_c) and the effective rainfall value (P_{eff}) and is calculated by the formula (6) below. This value cannot be less than zero.

$$ET_{blue} = \max(0, ET_c - P_{eff}) \quad (6)$$

The green evapotranspiration value (ET_{green}) is the smaller of the crop evapotranspiration value (ET_c) and effective rainfall (P_{eff}) and is calculated by the formula (7) below.

$$ET_{green} = \min(ET_c, P_{eff}) \quad (7)$$

If the crop evapotranspiration value (ET_c) is greater than or equal to the effective rainfall value (P_{eff}), the blue evapotranspiration value (ET_{blue}) is the difference between the crop evapotranspiration value (ET_c) and the effective rainfall value (P_{eff}) and is calculated by the formula (8) given below.

$$ET_c \geq P_{eff} \rightarrow ET_{blue} = (ET_c - P_{eff}) \quad (8)$$

If the crop evapotranspiration value (ET_c) is less than the effective rainfall (P_{eff}) value, the blue evapotranspiration value (ET_{blue}) is equal to zero.

$$ET_c < P_{eff} \rightarrow ET_{blue} = 0 \quad (9)$$

If the crop evapotranspiration value (ET_c) is greater than or equal to the effective rainfall value (P_{eff}), the green evapotranspiration value (ET_{green}) is equal to the effective rainfall value (P_{eff}).

$$ET_c \geq P_{eff} \rightarrow ET_{green} = P_{eff} \quad (10)$$

If the crop evapotranspiration value (ET_c) is less than the effective rainfall (P_{eff}) value, the green evapotranspiration value (ET_{green}) is equal to the crop evapotranspiration value (ET_c).

$$ET_c < P_{eff} \rightarrow ET_{green} = ET_c \quad (11)$$

Blue and green crop water use (CWU, m^3/ha) is calculated as the sum of daily evapotranspiration (ET, mm/day) values during the growing period according to equations (12) and (13) below. The coefficient 10 in the formula is due to the conversion of water height in mm to the volume of water on the land surface in m^3/hectares. "d" represents the number of days starting from the 1st day of planting and 'lgp' represents the number of days until the day of harvest.

$$CWU_{blue}\ (m^3/ha) = 10 \times \sum_{d=1}^{lgp} ET_{blue} \quad (12)$$

$$CWU_{green}\ (m^3/ha) = 10 \times \sum_{d=1}^{lgp} ET_{green} \quad (13)$$

Green water footprint ($WF_{proc.green}$ (m^3/tons) is calculated by dividing green crop water use (CWU, m^3/ha) by crop yield (γ, tons/hectares) using formula (14) below. Blue water footprint ($WF_{proc.blue}$) is similarly calculated by formula (15).

$$WF_{proc.green} = \frac{CWU_{green}}{Y} \quad (14)$$

$$WF_{proc.blue} = \frac{CWU_{blue}}{Y} \quad (15)$$

Total water footprint (WF_{proc}) is the sum of blue ($WF_{proc.blue}$), green ($WF_{proc.green}$) and gray ($WF_{proc.gray}$) water footprint. The gray water footprint is not considered in this study.

$$WF_{proc} = WF_{proc.green} + WF_{proc.blue} + WF_{proc.grey} \quad (16)$$

Assessment of the total water footprint of tomato production in Türkiye

In 2022, Türkiye utilized a total of 705 668 672.29 cubic meters (705.67 hm^3) of water for the production of 7 954 856 tons of tomatoes. This equates to an average water usage of 0.0887 cubic meters, or 88.7 liters, per kilogram of tomatoes produced. The distribution of this water usage into blue and green water components varies depending on the method used to calculate effective rainfall. The average values for Türkiye are presented in Table 5 and Figure 3.

When applying the proportional precipitation method as described by Dastane (1974), which considers 80% of the total precipitation during the production period as effective rainfall, the blue

water footprint is calculated to be 610.20 hm³, and the green water footprint is 95.47 hm³. Conversely, using the method proposed by Chapagain and Hoekstra (2011), the blue water footprint is slightly higher at 612.67 hm³, while the green water footprint is lower at 93.00 hm³. Notably, the green water footprint value calculated using the Chapagain and Hoekstra (2011) method is 2.47 hm³ less than that obtained using the proportional rainfall method.

Table 5: Total water footprint of tomato production in Türkiye according to effective rainfall calculation method

Effective rainfall calculation method	**Green Water footprint**	**Blue Water footprint**	**Total Water footprint**
Chapagain and Hoekstra (2011)	92 998 895.9 m^3 93.00 hm^3	612 669 776.37 m^3 612.67 hm^3	705 668 672.3 m^3 705.67hm^3
Dastane (1974)	95 471 204.3 m^3 95.47 hm^3	610 197 468.04 m^3 610.20 hm^3	705 668 672.3 m^3 705.67hm^3

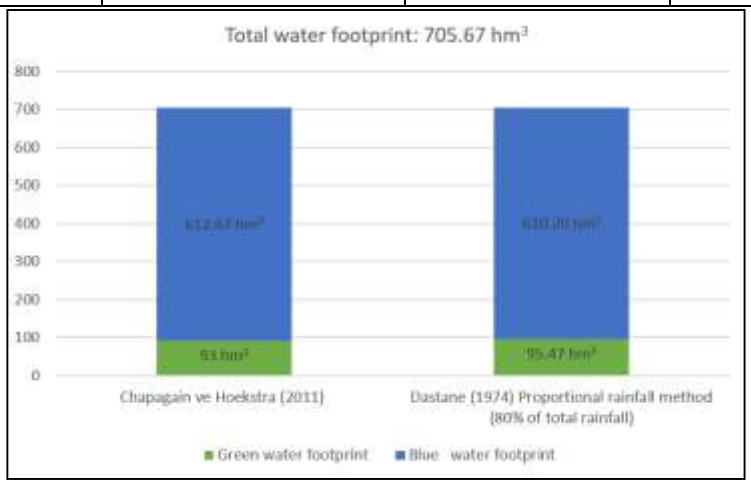


Figure 3: Türkiye's water footprint for tomato production in 2022 - hm^3

Assessment of water footprint of 1 kg of tomato in Türkiye

For the year 2022, the amount of blue and green water and the total amount of water used in tomato production per kg were determined according to different effective rainfall calculation methods, and the average values for Türkiye are given in Figure 4.

Accordingly, the utilization of 0.0767 cubic meters per kilogram (m^3/kg) of blue water and 0.012 m^3/kg of green water was calculated for the production of 1 kilogram of tomato, based on the proportional rainfall method outlined by Dastane (1974), which considers 80% of the total precipitation during the production period. Alternatively, when applying the effective rainfall method proposed by Chapagain and Hoekstra (2011), it was calculated to be 0.077 m^3/kg of blue water and 0.0117 m^3/kg of green water.

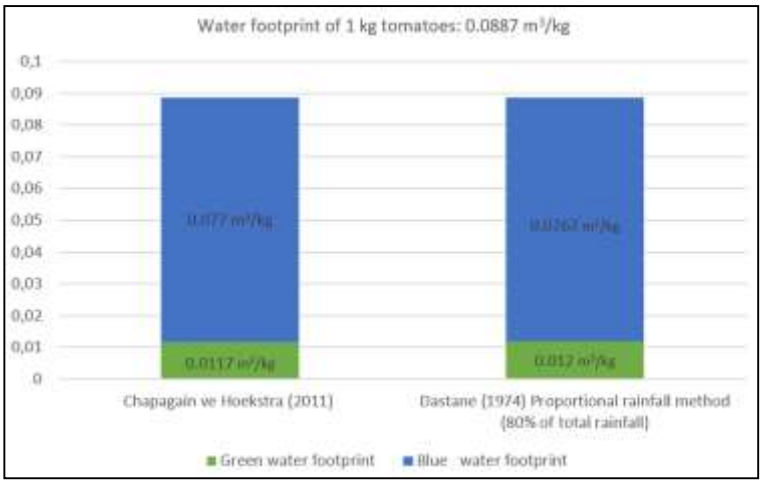


Figure 4: The amount of blue and green water required for 1 kg of tomato production in Türkiye

The average water requirement for the production of 1 kilogram of tomato in Türkiye is 88.7 liters per kilogram (or m³/ton). When this value is compared with findings from other studies on tomato footprint, it is assessed that Türkiye is relatively in a good position for consuming less water on tomato production.

- Hoekstra (2008) reported a global average water footprint of 180 liters per kilogram for tomato production.
- Evangelou et al. (2016) determined the water footprint of tomato production to be 67 m³/ton on average in a 6000-hectare area of industrial tomato production in the Pinios river basin, located in central Greece.
- Chico et al. (2010) found that the total water footprint for 1 kilogram of tomato produced in Spain ranged from 216 to 306 liters per kilogram, with a national average of 236 liters per kilogram.
- Chapagain and Orr (2009) estimated the blue water footprint to be 60.5 m³/ton and the green water footprint to be 13.6 m³/ton for Spanish tomatoes, by dividing the volume of blue and green water usage by the gross national production.
- Hossain Hossain et al. (2021) identified that the tomato plant has the lowest water footprint in Australia, with a value of 212.24 m³/ton.

Water footprint of tomato production in Türkiye by province

Figure 5 illustrates the water footprint of tomato production across various provinces in Türkiye. The map indicates that provinces with high tomato production also have a high water footprint.

The provinces with the highest water footprint in Türkiye are Antalya (121.45 hm³), Mersin (44.37 hm³), Muğla (37.97 hm³), Çanakkale (32.68 hm³), Şanlıurfa (22.91 hm³), Diyarbakır (22.19 hm³), Manisa (21.47 hm³), Ankara (20.87 hm³), Konya (19.54 hm³), and Bitlis (17.98 hm³). Notably, the first four provinces are also the leading regions in tomato production. Collectively, these ten provinces contribute to 51.5% of Türkiye's total water footprint of tomato production.



Figure 5: Water footprint of tomato production by province in Türkiye for 2022 (hm^3)

Figure 6 illustrates the blue and green water footprint map of tomato production in Türkiye by province, based on the effective rainfall calculated according to the method proposed by Chapagain and Hoekstra (2011). Each footprint depicted on the map corresponds to a value of 2.5 hm^3. The provinces of Antalya, Mersin, and Muğla have a high density of water footprints.

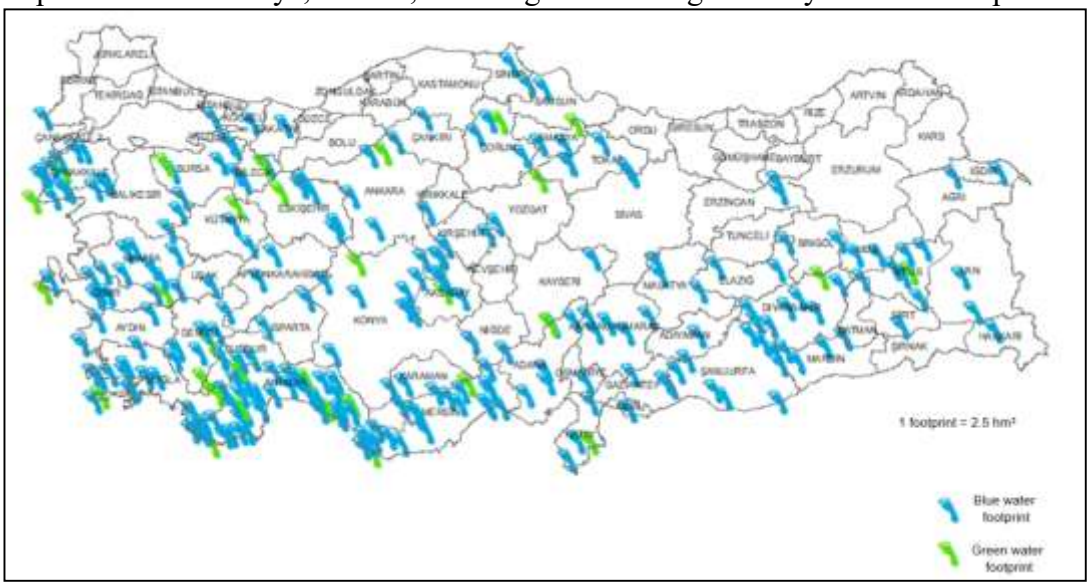


Figure 6: Blue and green water footprint of tomato production in Türkiye by provinces

Figure 7 and Figure 8 illustrate the water footprint map (hm^3) based on the effective rainfall method proposed by Chapagain and Hoekstra (2011) and Dastane (1974) respectively. In the northern provinces of Türkiye, the proportion of the green water footprint in the total water footprint is higher compared to other regions. Conversely, in the southeastern provinces, the blue water footprint constitutes a larger share of the total water footprint for tomato production. This indicates that a greater amount of blue water is utilized for tomato cultivation in these southeastern provinces.

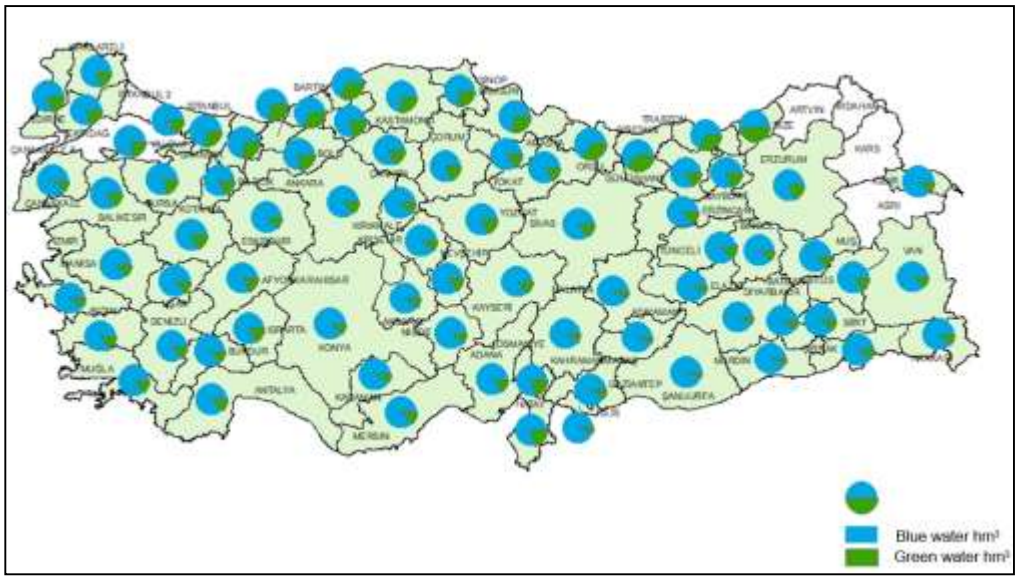


Figure 7: Blue and green water footprint of tomato production by province in 2022 (Effective rainfall calculated using Chapagain and Hoekstra (2011) method)

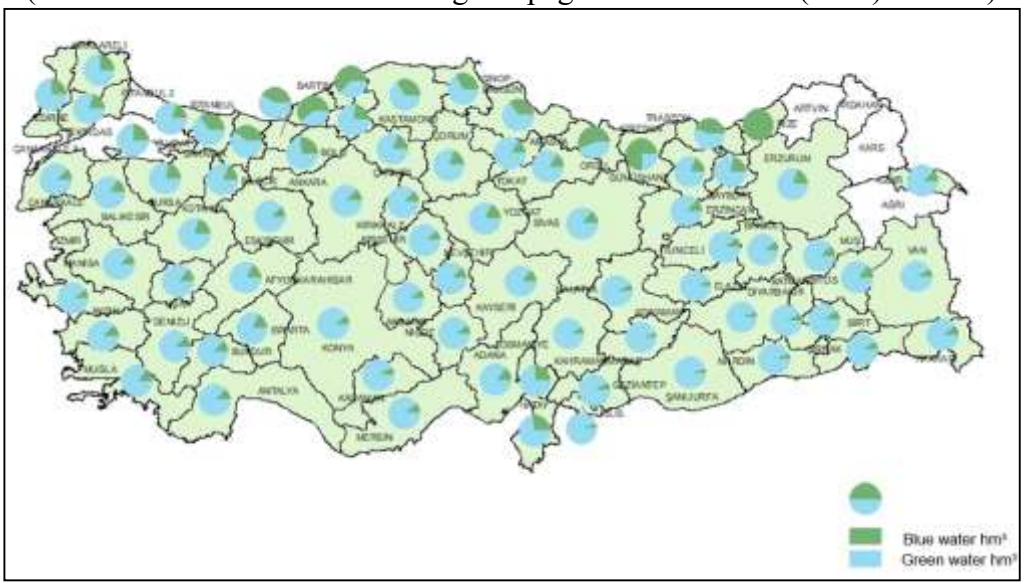


Figure 8: Blue and green water footprint of tomato production by province in 2022 (Effective rainfall calculated using Dastane (1974) method)

Water footprint of tomato production per kg in Türkiye by province

Table 6 presents the provinces in Türkiye that utilize the most and the least amount of water for the production of 1 kg of tomato, while Figure 9 illustrates the water usage across all provinces. According to the data, Siirt and Mardin provinces have the highest water consumption for tomato production, with 451 liters and 375 liters per kilogram, respectively. Conversely, Afyon, Antalya, and Mersin are the provinces with the lowest water usage, requiring 45 liters, 48 liters, and 52 liters per kilogram of tomato, respectively. The lower water usage per kilogram in provinces with higher production volumes suggests efficient water utilization.

Table 6: Provinces in Türkiye that use the most and least water to grow 1 kg of tomato

Provinces with the highest water footprint	**Production Quantity (tons)**	**Water footprint per kg (m^3)**
Siirt	8 382	0.4512
Mardin	31 276	0.3755
Şırnak	2 498	0.3631
Adıyaman	5 532	0.3536
Gümüşhane	2 125	0.3097
Diyarbakır	76 740	0.2892
Provinces with the lowest water footprint	**Production Quantity (tons)**	**Water footprint per kg (m^3)**
Afyonkarahisar	128 260	0.0452
Antalya	2 542 322	0.0478
Mersin	854 465	0.0519
Burdur	248 151	0.0545
Erzincan	73 550	0.0594

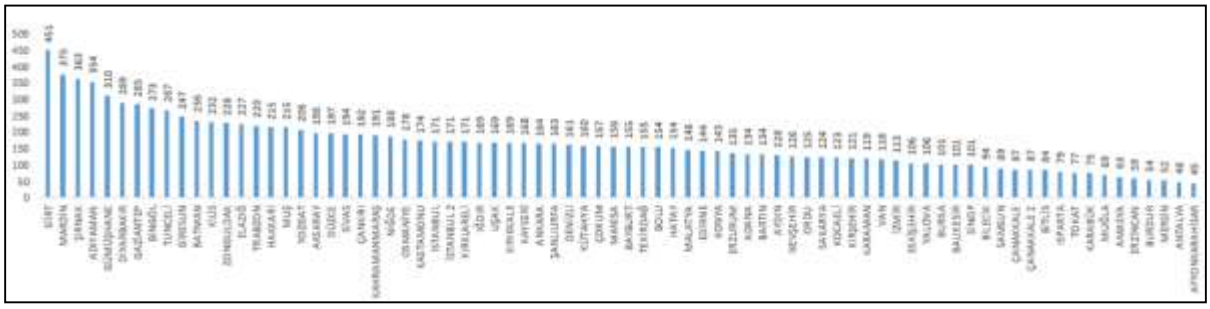


Figure 9: Amount of water footprint for 1 kg of tomato by province in Türkiye (liters)

Figure 10 illustrates the blue and green water footprints for the production of 1 kilogram of tomatoes across various provinces in Türkiye for the year 2022. Each footprint on the map represents a water usage of 34 liters. The calculation of these footprints is based on the proportional rainfall method, which considers 80% of total rainfall as effective rainfall, as proposed by Dastane (1974).

The map reveals regional variations in water resource utilization. The northern part of the country shows a higher density of green water footprints, indicating a greater reliance on rainwater for tomato production. In contrast, the southeastern part has a higher density of blue water footprints, signifying a greater dependence on irrigation water for tomato cultivation.

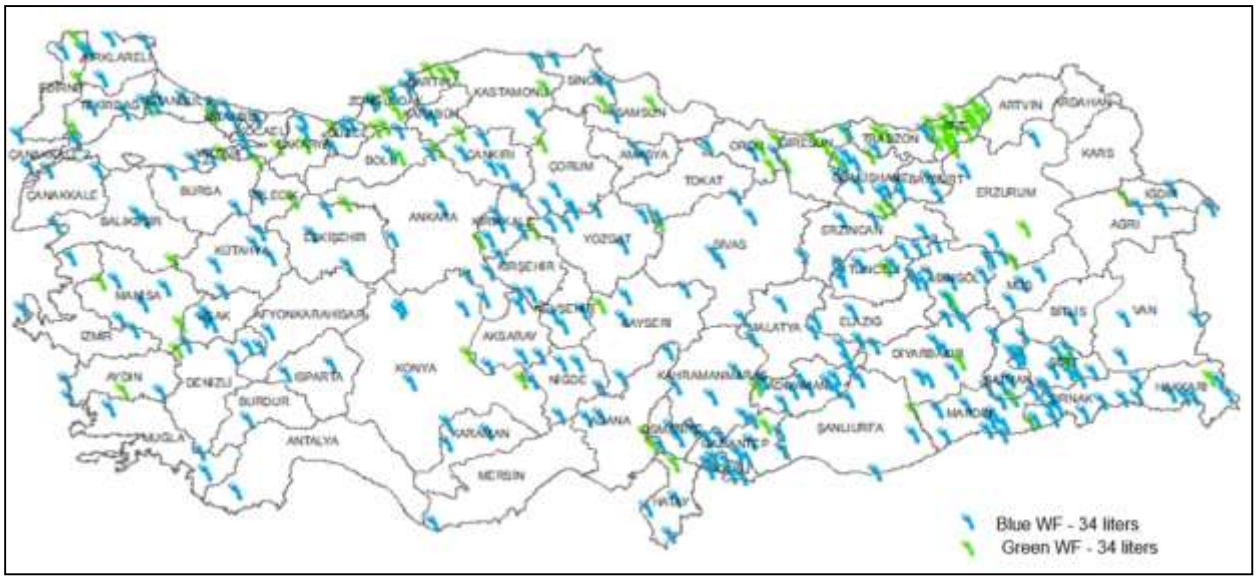


Figure 10: Blue and green water footprint (liters/per kg) for 1 kg of tomato production by province, based on effective rainfall calculated according to Dastane (1974)

RESULTS

The water footprint serves as a crucial indicator for the efficient utilization of public resources, enhanced planning, and informed decision-making. By monitoring the water footprint of specific products, sectors, or geographical regions using standardized methods and projecting future trends, significant social, economic, and environmental benefits can be achieved.

The analysis of the water footprint for tomato production across various provinces reveals notable disparities. Provinces such as Afyon, Antalya, and Mersin demonstrate remarkable water efficiency, utilizing only 45, 48, and 52 liters of water per kilogram of tomato, respectively. Conversely, provinces like Siirt and Mardin have significantly higher water consumption, requiring 451 and 375 liters per kilogram, respectively. These findings emphasize the importance of rational water using for agricultural production.

Mapping the water footprint of key agricultural products is an instrument for developing new varieties that yield higher outputs with reduced water consumption (Singh et al., 2023). This study highlights the importance of identifying regions where agricultural products can be produced with a lower water footprint and formulating policies to encourage production in these areas. Within this framework, agricultural products with a low water footprint may receive greater agricultural support, or it may become mandatory to meet specific water footprint criteria to qualify for such support.

REFERENCES

Allan, J. A. (1997). 'Virtual water': a long term solution for water short Middle Eastern economies? (Vol. 5145). School of Oriental and African Studies, University of London London, UK.

Chapagain, A., & Orr, S. (2009). An improved water footprint methodology linking global consumption to local water resources: A case of Spanish tomatoes. Journal of environmental management, 90(2), 1219-1228.

Chapagain, A. K., & Hoekstra, A. Y. (2011). The blue, green and grey water footprint of rice from production and consumption perspectives. Ecological economics, 70(4), 749-758.

Chico, D., Salmoral, G., Llamas, M., Garrido, A., & Martinez-Aldaya, M. (2010). The water footprint and virtual water exports of Spanish tomatoes. Fundación Marcelino Botín.

Dastane, N. (1974). Effective rainfall in irrigated agriculture. Food and Agriculture Organization of the United Nations. Irrigation and Drainage Paper 25.
Evangelou, E., Tsadilas, C., Tserlikakis, N., Tsitouras, A., & Kyritsis, A. (2016). Water footprint of industrial tomato cultivations in the Pinios river basin: Soil properties interactions. Water, 8(11), 515.
Hoekstra, A. Y. (2008). The water footprint of food. In J. Förare (Ed.), Water for food. The Swedisch Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas). http://www.waterfootprint.org/Reports/Hoekstra-2008-WaterfootprintFood.pdf
Hoekstra, A., Chapagain, A., Aldaya, M., & Mekonnen, M. (2011). The Water Footprint Assessment Manual. https://doi.org/10.4324/9781849775526
Hoekstra, A. Y., Chapagain, A., Martinez-Aldaya, M., & Mekonnen, M. (2009). Water footprint manual: State of the art 2009.
Hoekstra, A. Y., & Hung, P. Q. (2002). Virtual water trade: A quantification of virtual water flows between nations in relation to international crop trade. Proceedings of the International Expert Meeting on Virtual Water Trade 12, Delft.
Hossain, I., Imteaz, M. A., & Khastagir, A. (2021). Water footprint: applying the water footprint assessment method to Australian agriculture. Journal of the Science of Food and Agriculture, 101(10), 4090-4098.
Meteoroloji Genel Müdürlüğü (n.d). *Resmi istatistikler*. T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı. https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx
Singh, V. K., Singh, V. K., Kumar, M., & Mishra, P. K. (2023). Agricultural Water Footprint Studies for Sustainable Agricultural Water Management-A Review. Int. J. Environ. Clim. Change, 13(9), 238-250.
Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü (n.d.). *Sulama yönetimi ve bitki su tüketimi TAGEM suET*. T.C. Tarım ve Orman Bakanlığı. https://tagemsuet.tarimorman.gov.tr/pages/login
Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü ve Devlet Su İşleri Genel Müdürlüğü (2017). *Türkiye'de sulanan bitkilerin bitki su tüketimleri*. T.C. Tarım ve Orman Bakanlığı
Türkiye İstatistik Kurumu (n.d.). *İstatistik veri portalı.*
https://data.tuik.gov.tr/Kategori/GetKategori?p=Tarim-111

YABANCILARA TÜRKÇE ÖĞRETİMİNDE KULLANILABİLECEK YAPAY ZEKÂ UYGULAMALARI

ARTIFICIAL INTELLIGENCE APPLICATIONS THAT CAN BE USED IN TEACHING TURKISH TO FOREIGNERS

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Özet
Teknolojinin hızlı gelişimiyle, bilhassa eğitim alanında, yapay zekâ uygulamalarının kullanımı her geçen gün katlanarak artmaktadır. Yapay zekâ uygulamaları gerek okul ortamında gerekse dışında, öğretmen ve öğrencilere birçok avantaj sunmaktadır. Avantajlarının yanı sıra beraberinde değişimler ve yenilikler meydana getiren yapay zekâ uygulamaları, gerçek zamanlı geribildirim imkânı da sunmaktadır. Gün geçtikçe Türkçenin yabancı dil olarak öğrenimine olan ilginin artması, zaman ve mekân ihtiyacı duyulmadan kullanılan yapay zekâ uygulamalarına olan talebin artmasını sağlamaktadır. Kaya ve Demirel'in (2023) yaptığı araştırmaya göre, 200 milyonu aşan Türkçe konuşur sayısı olduğu da göz önüne alındığında, konunun önemi daha da anlaşılacaktır. İfade edilenler doğrultusunda bu araştırmadaki amaç, "Yabancılara Türkçe Öğretiminde Kullanılabilecek Yapay Zekâ Uygulamaları" ile ilgili araştırma yapmak ve araştırmada elde edilen bulgular sayesinde, Türkçenin yabancı dil olarak öğretimine (yapay zekâ destekli uygulamaları muhteva eden) önemli bir kaynak sağlamaktır.

Anahtar Kelimeler: Yabancılara Türkçe Öğretimi, Yapay Zekâ Uygulamaları.

Abstract
With the rapid development of technology, especially in the field of education, the use of artificial intelligence applications is increasing exponentially every day. Artificial intelligence applications offer many advantages to teachers and students both in and out of the school environment. In addition to its advantages, artificial intelligence applications, which bring about changes and innovations, also offer real-time feedback. The increasing interest in learning Turkish as a foreign language increases the demand for artificial intelligence applications that are used without the need for time and space. According to the research conducted by Kaya and Demirel (2023), the importance of the issue will be understood even more when it is taken into consideration that there are more than 200 million Turkish speakers. In line with the aforementioned, the aim of this study is to conduct research on "Artificial Intelligence Applications that can be used in Teaching Turkish to Foreigners" and to provide an important resource for teaching Turkish as a foreign language (including artificial intelligence-supported applications) thanks to the findings obtained in the research.

Keywords: Teaching Turkish to Foreigners, Artificial Intelligence Applications.

İZNİK GÖLÜ SEDİMANLARININ RADYOLOJİK DEĞERLENDİRİLMESİ

RADIOLOGICAL EVALUATION OF IZNIK LAKE SEDIMENTS

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ÖZET
Çalışma alanını oluşturan İznik Gölü Marmara Denizi'nin güneyinde Bursa ilinin İznik ilçesinde bulunmaktadır. Türkiye'nin beşinci büyük doğal gölüdür. İznik, tektonik olarak oluşmuş bir tatlı su gölüdür. Bu çalışmada İznik Gölü sedimanlarının radyolojik analizleri yapılmıştır ve çıkan sonuçlar uluslararası değerler ile karşılaştırılmıştır. Ayrıca elde edilen sonuçlardan radyolojik risk indeksleri hesaplanmıştır. Çalışma alanından analizler için altı adet sediman numunesi alınmıştır. Numuneler körfezin tamamını temsil edecek şekilde toplanmıştır ve derinlikleri 5-25 m arası değişmektedir. Numuneler alınırken core box yöntemi kullanılmıştır. Numuneler laboratuvar ortamına getirildikten sonra sediment örnekleri toz haline getirilip yüksek saflıkta germanyum (HPGe) dedektörü ile radyoaktivite analizleri yapılmıştır. Analizlerde ^{226}Ra, ^{232}Th, ^{40}K konsantrasyonları tespit edilmiştir. Radyolojik değerlendirme yapabilmek için Radyum eş değer radyoaktivitesi (Ra_{eq}) ve Dış tehlike indeksi (Hex) hesaplanmıştır. Analiz sonuçları incelendiğinde ^{40}K radyoizotopunun diğer radyoizotoplara göre çok daha fazla miktarda izlendiği belirlenmiştir. SK1/3 ve SK2/2 lokasyonları hariç ^{40}K değerleri diğer lokasyonlarda uluslararası sınır değerinin (400 Bq/kg) altında kalmıştır. Yapay bir radyonükleid olan ^{137}Cs değerleri tüm lokasyonlarda ölçüm limitlerinin altında kalmıştır. Bu sonuç bölgede nükleer faaliyetler sonucu bir kirliliğin olmadığını göstermektedir. ^{226}Ra değerleri tüm lokasyonlarda uluslararası sınır değerinin altında (35 Bq/kg) kalmıştır. ^{232} Th değerleri ise SK1/3, SK2/2 ve SK2/3 haricindeki lokasyonlarda sınır değerlerinin altında kalmıştır. Raeq için radyolojik sağlık güvenliği değerlendirmesi açısından izin verilen en yüksek değer 370 Bq/kg'dır. Bu değer dikkate alındığında tüm lokasyonlarda elde edilen Ra_{eq} değerleri belirlenen limit değerlerin altında kalmıştır. H_{ex} için izin verilen en yüksek değer 1'dir. Hesaplanan H_{ex} değerlerine bakıldığında tüm lokasyonlar limit değerin altında kalmıştır. Elde edilen sonuçlar ışığında, incelenen göl sediman örneklerinin radyolojik açıdan bir zarar teşkil etmediği söylenebilir.

Anahtar kelimeler: İznik Gölü, Sediman, Radyoaktivite, Ra_{eq}, H_{ex}

ABSTRACT
Iznik Lake is located in the Iznik district of Bursa, south of the Marmara Sea. It is the fifth largest natural lake in Turkey. Iznik is a tectonically formed freshwater lake. In this study, radiological analyses of Iznik Lake sediments were carried out and the results were compared with international values. Additionally, radiological risk indices were calculated from the obtained results. Six sediment samples were taken for analysis. Samples were collected to represent the

entire bay. Sample depths ranged from 5 to 25 m. The core box method was used. After the samples were brought to the laboratory environment, the sediment samples were pulverized. Radioactivity analyses were performed with a high purity germanium (HPGe) detector. In the analysis, ^{226}Ra, ^{232}Th, ^{40}K concentrations were detected. For radiological evaluation, Radium equivalent radioactivity (Raeq) and External hazard index (Hex) were calculated. When the analysis results were examined, it was determined that ^{40}K radioisotope was observed in much higher amounts than other radioisotopes. Except for BH1/3 and BH2/2, ^{40}K values remained below the international limit (400 Bq/kg) in others. Values of ^{137}Cs, an artificial radionuclide, remained below the measurement limits at all locations. This result shows that there is no pollution as a result of nuclear activities in the region. ^{226}Ra values remained below the international limit value (35 Bq/kg) in all locations. ^{232} Th values remained below the limit values at locations other than BH1/3, BH2/2 and BH2/3. The highest value allowed for Ra_{eq} in terms of radiological health safety is 370 Bq/kg. Considering this value, Ra_{eq} values obtained at all locations remained below the determined limit values. The highest value allowed for the H_{ex} is 1. When the H_{ex} are examined, all locations are below the limit. According to the results obtained, it can be said that the lake sediment samples do not pose any radiological harm.

Keywords: Iznik Lake, Sediment, Radioactivity, Ra_{eq}, H_{ex}

INTRODUCTION

Seas, lakes and rivers have been the most important natural resources for humankind throughout history. Seas, lakes and rivers are used for needs such as transportation, nutrition, cleaning, recreation, tourism, agriculture, etc. When determining settlement areas, people preferred waterfronts. Today, %80 of the world's population lives on the seashore. The rapid increase in population and the majority settling in narrow coastal strips and around other water sources threatens water resources [1]. In addition to inorganic and organic pollutants, radioactive pollution is the most important pollutant parameter that has threatened countries in recent years. Radioactive contamination is classified into two groups: natural and artificial. Artificial sources of radioactivity include phosphate fertilizers, fossil fuel consumption, detergents, extraction of uranium from the earth's surface, nuclear bomb tests, nuclear medicine activities, and waste from nuclear power plants. Radioactive elements that have been present in soil, water and air since the formation of the world constitute natural resources. The most important sources of natural radionuclides are phosphate deposits, volcanic rocks and granite rocks [1,2]. These radionuclides are found in lower concentrations in sedimentary rocks such as limestone. Since naturally occurring radioactive elements and their isotopes are present in the composition of rocks, the distribution of these elements may vary regionally. Uranium, Thorium, Potassium elements are natural radioactive elements. And they are abundant in nature. Radionuclides of the elements Uranium and Thorium show similar geochemical properties. The $^{+}4$ valence structure of thorium can easily dissolve in water and can be quickly adsorbed or precipitated. This property increases the mobility of thorium in aquatic environments and could potentially cause it to spread to larger areas. ^{40}K is the most common radionuclide of the element potassium in the environment. It constitutes %0.01119 of the total potassium in the environment [2,3]. The most abundant element in the country's soil is potassium. Therefore, a significant portion of the total radioactivity to which living things are exposed comes from the ^{40}K radionuclide. Information about the types and abundances of naturally occurring radionuclides is important for evaluating the effects of radiation dose on ecosystems. Natural radionuclides are distributed more homogeneously in seas and oceans than in terrestrial ecosystems. ^{137}Cs, which is in the artificial radionuclide group, is widely found in nature. It reaches the recipient environments especially through fallout from nuclear weapons tests. With a half-life of 30 years, ^{137}Cs does not easily disappear in nature. That's why it's widely

used in environmental analysis. A total of 528 nuclear weapons tests were conducted between 1945 and 1980. Many countries, including our country, have been affected by these trials. The sea most affected by the Chernobyl accident was the Black Sea. Radionuclides accumulated in the Black Sea passed to other seas (Aegean and Mediterranean via Marmara) via the Bosphorus [3,4]. Since nuclear tests were mostly carried out in the northern hemisphere, approximately %76 of the global radioactive fallout accumulated in the northern hemisphere and %24 in the southern hemisphere. In recent years, radiological risk parameters (H_{ex} and Ra_{eq}) have been calculated to interpret radiological analyses. The most studied materials in revealing marine radioactive pollution are sediments, the main accumulators of the marine environment [3,4,5].

MATERIAL METHOD

Lake Iznik, which constitutes the study area, is the fifth largest natural lake in Turkey and was formed tectonically. It is located in the İznik district of Bursa province, south of the Marmara Sea. The depth increases rapidly as you move away from the shores of the lake. The lake constitutes an important water source for agricultural and industrial activities in the basin. It also has an important location for water sports and holiday facilities. Lake sediments are an archive of the formation, geological and hydrological structure of the lake. There are three lake levels that affect this sediment structure. The first is related to the Last Glacial Maximum and the second is related to the Early Dryas period, which also led to the formation of an iron sulfide layer in the sediment [5,6]. The third low lake level occurred at the same time as ash level AP2 (3.5 cal ky today) transported from the middle of Lake Iznik to the lower basin. Six sediment samples were taken from the study area for analysis. The samples were collected to represent the entire bay. Sample depths vary between 5-25 m. The core box method was used when taking samples. After the samples were brought to the laboratory environment, the sediment samples were pulverized and radioactivity analyses were performed with a high purity germanium (HPGe) detector [5, 6,18]. The system has a relative efficiency of 70%. Soil and sediment samples were counted for 86400 s. Samples were sealed in 250 mL polyethylene storage containers to prevent air exposure. Samples were kept for approximately 4-5 weeks prior to measurement to ensure radioactive equilibrium between ^{226}Ra and short-lived decay products. Samples were kept for approximately 4-5 weeks prior to measurement to ensure radioactive equilibrium between ^{226}Ra and short-lived decay products [7,14,15,17]. Results are expressed in activity units (Bq/kg). In the results obtained, the error percentage of the device is also stated additionally, and the aim is to obtain the most accurate results. Figure 1 shows the location and sample location map.



Figüre 1. Location map of the study area [8].

In order to perform radiological evaluation, Radium equivalent radioactivity (Ra_{eq}) and External hazard index (H_{ex}) were calculated using ^{238}U, ^{232}Th, ^{40}K concentrations. Due to the uneven distribution of radium, thorium and potassium in soil, the actual activity levels in samples can be determined using a common radiological index expressed in Ra_{eq}. This index is widely used in assessing radiation risks and is expressed by the following equation:

$Ra_{eq} = C_{Ra} + 1.43C_{Th} + 0.077\ C_K$ (Equation 1)[9,10,11,12].

In this equation;

Raeq : radium equivalent activity in Bq/kg,

C_{Th} : ^{232}Th activity concentration in Bq/kg,

C_{Ra} : ^{226}Ra activity concentration in Bq/kg,

C_K : ^{40}K activity concentration in Bq/kg. [9,10,11,16].

The External Hazard Index (H_{ex}) is a radiological parameter used to assess the potential radiation hazard to individuals from external exposure to gamma radiation emitted by natural radionuclides in the environment. H_{ex} quantifies the contribution of exposure to external gamma radiation to the overall radiation hazard. It takes into account the gamma dose rate near a particular location and helps estimate potential health risks associated with exposure to external radiation.

Hex is calculated with the following formula:

$$Hex = \frac{CTh}{259} + \frac{CRa}{370} + \frac{CK}{4810}$$ (Equation 2) [9,10,11,12].

In this equation;

C_{Ra} : ^{226}Ra activity concentration in Bq/kg,

C_K : ^{40}K activity concentration in Bq/kg,

C_{Th} : ^{232}Th activity concentration in Bq/kg. dir [9,10,11,12,15].

FINDINGS

The analysis results of the samples taken from the study area are given in Table 1. International average values of radionuclides are given in Table 2. Radium equivalent activity calculated from analysis results (Ra_{eq}) and External danger index (H_{ex}) are given in Table 3.

Table 1. Analysis results in Study area

Sample Location	^{226}Ra (Bq/kg)	^{232}Th (Bq/kg)	^{40}K (Bq/kg)	^{137}Cs (Bq/kg)
BH-1/1 (Boyalıca)	30.55±5.50	18.55±4.30	181±13.45	Background
BH-1/2 (Boyalıca)	14.99±3.87	27.93±5.28	323±17.97	Background
BH-1/3 (Boyalıca)	22.67±3.85	39.36±6.27	402±20.04	Background
BH-2/1	13.92±3.72	38.30±6.16	339±18.41	Background
BH-2/2	29.94±5.46	50.00±2.47	505±22.47	Background
BH-2/3	19.34±4.36	30.34±5.47	364±19.07	Background

Table 2. International average values (UNSCEAR) [12]

Radionuclides	International Average Limit Values
^{232}Th	30 Bq kg $^{-1}$
^{226}Ra	35 Bq kg $^{-1}$
^{40}K	400 Bq kg $^{-1}$

Table 3. Radium equivalent activity calculated from analysis results (Ra_{eq}) and External danger index (H_{ex})

Sample Location	Radium equivalent activity (Bq/kg) (Ra_{eq})	External hazard index (H_{ex})
BH-1/1 (Boyalıca)	71.017	0.192
BH-1/2 (Boyalıca)	79.201	0.216
BH-1/3 (Boyalıca)	109.904	0.297
BH-2/1	94.792	0.256
BH-2/2	140.325	0.379
BH-2/3	90.748	0.245

DISCUSSION AND CONCLUSION

When the analysis results were examined, it was determined that the ^{40}K radioisotope was observed in much higher amounts than other radioisotopes. Except for BH1/3 and BH2/2 locations, ^{40}K values remained below the international limit value (400 Bq/kg) in other locations. Values of ^{137}Cs, an artificial radionuclide, remained below the measurement limits at all locations. This result shows that there is no pollution as a result of nuclear activities in the region. ^{226}Ra values remained below the international limit value (35 Bq/kg) at all locations. ^{232} Th values remained below the limit values in locations other than BH1/3, BH2/2 and BH2/3. According to these results, there is no unnatural radioactivity in the study area. The highest allowable value for Ra_{eq} in terms of radiological health safety assessment is 370 Bq/kg. Considering this value, the Ra_{eq} values obtained at all locations remained below the determined limit values, as seen in Table 3. The highest allowed value for the H_{ex} value is 1. When we look at the calculated H_{ex} values, all locations are below the limit value. In the light of the results obtained, it can be said that the examples of lake sediment examined do not constitute a radiological damage. The absence of Cs radionuclide in lake sediments indicates that there is no artificial radioactivity source in the region. But in light of these results, radioactivity monitoring studies should continue in the region.

REFERENCES

[1] Liu X, Lin W (2018). Natural radioactivity in the beach sand and soil along the coastline of Guangxi Province, China. Mar Pollut Bull 135:446–450.
[2] Yümün, Z.Ü., Kam, E., Dinçer, A.R., Önce, M., Yümün, S. (2021). The investigation of toxic element pollution and radioactivity analyses of marine sediments in the Gulf of Gemlik (Bursa, Turkey), Applied ecology and environmental research. 19(2), 881-900.
[3] Kayakökü H, Doğru M (2017) Radioactivity analysis of soil samples taken from the western and northern shores of Lake Van, Turkiye. Appl Radiat Isot 128:231–236.
[4] Ergül, H.A. Topçuoğlu, S. Ölmez, E. Kırbaşoğlu, Ç., (2006), Radionuclides in a sediment trap and bottom sediment samples from the Eastern Turkish coast of the Black Sea. Journal of Radioanalaytical and Nuclear Chemistry. 268, (1), 133-136.
[5] Cukrov N., Mlakar M., Cuculic V., Barisic D. (2009). Origin and transport of 238U and ^{226}Ra in riverine, estuarine and marine sediments of the Krka River, Croatia. Journal of Environmental Radioactivity. 100(6), 497-504.
[6] Angjeleska, E., Dimitrieska-Stojkovic, Z., Hajrulai-Musliu R. (2020) Natural radioactivity levels and estimation of radiation exposure in agricultural soils from Skopje city region. Maced J Chem Chem Eng 39(1):77–87.

[7] Voung, V. B., Hai, Son P., Chien, N. V., Thanh, T. D., Dac Ve N., Nghi D., T., Sieu L. N., Luu T., M., Chien H., T., Hue N., T., Nhon D., H. (2024). Radioactivity concentration and risk indices in intertidal sediments of the Red River Delta, Vietnam. Environmental Earth Sciences. 83,74.
[8] Yümün, Z.Ü. and Kam, E. (2019). Ecological analysis of heavy metal and radioactivity potential of Holocene sediments in Iznik Lake. Nukleonika. 64(3). 103-109.
[9] Günay, O., Özden, S., Pehlivanoğlu, Aközcan S. (2024). The current status of natural and artificial radiation in İstanbul 36 years after chernobyl, preceding a potential nuclear threat. Journal of Radioanalytical and Nuclear Chemistry.
[10] Günay, O., Yalçın, C., Güray, R. T., Karakurt Avcı D., Tantoğlu E., Başdemir S. (2024). 37 years after the chernobyl: the current radiation status in Kocaeli, Turkey. Journal of Radioanalytical and Nuclear Chemistry.
[11] Özden, S. (2024) Radioactivity of ^{226}Ra, ^{232}Th and ^{40}K in soil in Northwest part of Turkey: assessment of radiological impacts. Radiochim Acta 112(2):117–126.
[12] Günoğlu, K. (2018). Evaluation of natural radioactivity levels and radiological hazard indices in Ağlayankaya beach sands. European Journal of Science and Technology. 13, 118-123.
[13] UNSCEAR, (2000). United Nations. Sources and Effects of Ionizing Radiation. Volume I: United Nations Scientific Committee on the Effects of Atomic Radiation, Report to the General Assembly, with scientific annexes. – United Nations Sales Publication E.00.IX.3 and E.00.IX.3. United Nations, New York.
[14] Yümün, Z. Ü., Kam, E., (2017). Effects of Radionuclides on the Recent Foraminifera From the Clastic Sediments of the Çanakkale StraitTurkey", Journal of African Earth Sciences, 131:179-182.
[15] Sarı S.and Dizman S., (2020). Investigation of Radioactivity and Radiological Effects in Soil Samples Taken from the Surroundings of Ovit Dağbaşı Lake, ElCezeri, 7(3), ss. 1122-1130.
[16] Yümün, Z.Ü. and Kam, E. (2020). Radionuclide Potential of Holocene Sediments in the West of Marmara Sea (Turkey). Journal of the Turkish Chemical Society Section A: Chemistry. 7(2), 517-524.
[17] Özden, S. and Aközcan, S. (2024). Assessment of Radioactivity Levels and Associated Health Hazards in Sediments and Soils along the Coastline of the Tunca River (Edirne-Türkiye). Journal of the Institute of Science and Technology. 14(1), 231-243.
[18] Guazzelli, M.A., Medina, N.H. & Aguiar, V.A.P. (2021).Natural radioactivity and external hazard index in Brazilian sands. J Radioanal Nucl Chem 328, 903–910.

CRITICISM OF RELIGIOUS COMMERCE IN DIVAN POET NÂ'İLÎ

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Abstract
In Turkish literature, there is a perception that starts from secondary education, but consciously or unconsciously, that the only concern of Divan literature is to talk about subjects such as love, beloved, wine, etc., and that it has no other concerns. This perception has taken such an effective place in the minds as if it was written with an indelible pen that it seems quite difficult to change this perception. The biggest deficiency that is ignored here is the fact that we disregard human psychology and the sociology of a society and interpret Divan literature by purifying it from these disciplines. A human is a complex being, and while he was laughing an hour or even a few minutes ago, he can cry a few minutes or all at once. This is related to the variability of human psychology and is an inevitable and natural result of being human. If a human is so variable, thinking that he could have spent a lifetime writing poems about his beloved's eyebrows, eyes; mouth, nose, height; waist, skin is to fail to understand both human psychology and the sociology of the society he was born into. For a long time, I have been trying to show the social life in Divan literature, the stance of Divan poets against social issues, their criticisms with the poems I have selected from their Divans, which should be considered the most concrete references, to hold a candle to this very lacking aspect in Turkish literature, to show the psychic variability of Divan poets, and how they addressed social issues in their poems without ignoring society. Religion has been considered the soft underbelly of almost many societies, has played an active role in many stages of life, and has been taken as the basic basis for the construction of the sociological structures of societies. For this reason, religion has often emerged as a subject open to exploitation and has also caused many negative consequences in the lives of societies. The main aim of this study, in which I have addressed the criticisms of Nâ'ilî, one of the Divan poets, against people who exploit religion, is to reveal the critical and solution-producing roles of the Divan poets in the face of social problems and to show that the Divan poets were not only interested in the subjects of love, lovers and wine as it is told from secondary education onwards, but how they used these situations in their poems in the face of social problems, how they criticized the issues that needed to be criticized and that they were not indifferent to these issues.

Keywords: Nâ'ilî, social issues, religion, abuse.

INTRODUCTION

Especially in the academy, the subjects handled in Divan poetry are mostly similar subjects: "Flower in Divan Poetry", "Precious Stone in Divan Poetry", "Love in Divan Poetry", etc. However, there is a society to which this poetry belongs and a set of values that construct every society, religious, social, economic; customs, traditions. This aspect, that is, the interaction between the society and the poet who constructs that poem, is a side that is usually ignored. This neglect is a structural problem that stems from the lack of sufficient awareness of the interaction of Divan poetry with other disciplines. My relevant study is a study that will serve this aspect that is ignored and is often not even thought to exist.

The dress that was chosen for Divan poets was tight, but it did not touch the ground, did not match the realities of life, was incompatible with human psychology and sociality, and was buttoned up based on a completely wrongly formed perception. Since the first button of this dress was buttoned up wrongly, wrong gave birth to wrong, and like a ball of wrongs, it became an avalanche and covered up its reality.

The perception that Divan literature moves in the triangle of love-wine-woman is the most prevalent perception in all academia, including high school. When the perception is established in this way, it is not even felt necessary to look into whether there are other issues in Divan literature, and even beyond this, there are academics who call this poem "weak poetry".

This perception, first of all, does not coincide with the natural structure of being human. Although every person is different, every moment of every person shows differences according to the dynamics of the society and inner world they live in, and man has always been able to blow and roar differently in different times and places. Sometimes he has become a cloud in the constricting darkness of sadness, and has become a mercy for his heart that has become burned with the fire of love by becoming rain, sometimes he has caused lightning to strike his brain with fits of anger and has become a dam to the existing order, sometimes he has landed on flower after flower like butterflies, sometimes he has heard the footsteps of those that ordinary people cannot see from far away with his constant anxiety structure and has become a light in front of the people.

If Divan poetry is analyzed in the light of today's modern sciences, it will be seen how skillfully subjects such as alienation, loneliness, othering, and social criticism are handled. In the article titled "Non-Classical Subjects in Classical Turkish Poetry", the characteristics of Albert Einstein's "Theory of Relativity" centuries before the "Theory of Relativity" are handled in a couplet belonging to Divan poetry, and here, it is valuable in terms of an attempt at interdisciplinary transition by pointing out aspects such as philosophy, geography, astronomy, medicine, psychology, science (theory of relativity due to the relativity of its time). What is important is to be able to look at such poems from a different perspective. In this study, the explanation of how Divan poetry interacts with religion, one of the fundamental shaping elements of society, is shown through Nâ'ilî's poems.

Nâ'ilî, one of the 17th century poets, was born and raised in Istanbul, far from the countryside/center, and although he was leavened with the yeast of the culture he was born into, he took an x-ray of the Ottoman social life, witnessed social deteriorations, and did not refrain from dealing with the negativities and social issues in his Divan poetry, which was thought not to be the subject of these issues, and like almost all Divan poets, Nâ'ilî did not remain indifferent to social issues.

RESEARCH AND FINDINGS

1. The Limitation of the Ascetic Type and the Expanse of Life in Nâ'ilî

Nâ'ilî, who evaluates the ambitious person type based on the understanding of religion that is valid in that society, criticizes the fact that the religion one is affiliated with places more value on the world than it has assigned to it, and he does this by placing religion at the center and does not understand the fact that the world is given more value than it should be, and does not see sincerity in the commitment to the religion one is affiliated with by the fact that the world is given more value than it should be, and accuses this person type of being hypocritical.

People do not really accept that they are ambitious and try to justify each of their passions and make them reasonable enough to be accepted by society, which is a natural result of human psychology. Although a person knows very clearly what they want and do not want, instead of accepting them directly, they try to soften them in the crucible of social rules and values and make them compatible with reason and conscience.

Nâ'ilî, who considers living according to the requirements of one's beliefs as an intelligent behavior, criticizes the type of person who, although he says he is a believer, is unhappy because

of his passions, for not living according to the requirements of his beliefs, and he does not reconcile such ambitious attitudes with reason and finds them unwise.

Religion plays an important role in the formation of value judgments in every society. Religious values have a great influence on the formation of social rules, customs and traditions. In terms of the number of affiliations, there is an understanding of the afterlife in all three major religions, and if there is an afterlife, it is not considered very wise to give a value much higher than it should be to this world, and it did not seem sincere in terms of belief to Nâ'ilî, like many other Divan poets.

This approach of Nâ'ilî, who thought that people would be unhappy in proportion to the abundance of their passions, is an indication that he could analyze human psychology in a very objective way and in line with science.

Since the duration of stay in the world is limited to the average lifespan of a human being, the idea of staying forever in a place whose beginning and end are encompassed is incomprehensible. The place called the world is a place where even the number of breaths taken and given is limited, determined at the beginning, there is no breath that will last forever, and when the time comes, the breath taken cannot be given again or the breath given cannot be taken again.

Whether people are sincere or not is a situation that can be seen very easily in their human relations with other people. Whether someone is sincere or not is a situation that can be understood from both the body language and words of that person. While every person takes a stand for sincerity and sincerity, they also stand against insincere situations. Another issue that the Divan poets particularly focused on was whether people were sincere or not. Naturally, the Divan poets always idealized the sincere type of person.

The representative of hypocrisy in Divan poetry is the "ascetic and devout" type. Because the "ascetic" type is the person who claims to be very close to God, therefore constantly worships, and does these worships in a way that people can see and appreciate him. In this respect, the "ascetic" is the person who is sincere and who gives even the greetings he gives to people with material concerns.

Nâ'ilî sees the "ascetic and devout" type as being of the same value as the most uneducated and ignorant ordinary people. Because the "ascetic type" who constantly acts with the calculation of small things in his mind appears as a simple human type. The fact that the "ascetic" who aims at simple calculations and simple goals, says that he contains divine feelings that can be called sublime is nothing but his hypocrisy.

The "ascetic" is a type of person who is very devoid of the capacity to aspire to the sublime. Nâ'ilî describes this incapacitated aspect of the "ascetic" through the metaphor of a river. Nâ'ilî compares the capacity of the "ascetic" to a small vessel and the sublime ones to a river. Just as it is impossible to fit the water of a river with a very high flow rate and constantly flowing into a small vessel, he says that it is also impossible for the "ascetic" to understand the inner face of the universe. Moreover, a river is not static but dynamic and has continuity. In contrast, the water in a small vessel is static and since this water cannot be renewed with new water that is constantly flowing, the water in that small vessel starts to rot and rot after a while. The "ascetic" is also a fixed-minded person and the things in his mind are rotten, obsessive ideas that harm and disturb the surroundings and people. Since there is no circulation in the mind of the "ascetic" who is incapable of renewing himself, he is against all kinds of development, change, renewal, and Renaissance. The "ascetic" who claims to be generous with the fixed ideas in his mind, this claim and the attitudes and actions he shows based on this claim are nothing but his hypocrisy. The "ascetic" only claims to be generous, and this claim can never go beyond the level of claim and be proven by the "ascetic".

While there is a life outside/in the world that is like a roaring river with a very high flow, it is impossible for an "ascetic" to keep up with such a roaring life. An "ascetic" cannot do this even if he wanted to. Because the contents of an "ascetic's" head are like a small container, while the life in front of him is a river with a high flow. The mixing of water in a small container with such a

river destroys the distinct identity of that water and transforms it into itself. For this reason, an "ascetic" holds on tightly to what is in him so that what is in him does not disappear and appear as "nothing" and defends it fiercely even if what is in him has no logical aspect. Doing this knowingly, stubbornly defending what is wrong and posing as magnanimous is nothing but pretense and hypocrisy.

Sincerity is a feeling that has never even touched the shores of the "ascetic". Sincerity is a situation that the "ascetic" has never encountered in his life, and is a stranger to the feeling of sincerity. Because the life of the "ascetic" is like a spider's nest built on hypocrisy. Therefore, even with the slightest wind, the "ascetic's" ideas that resemble the spider's nest are likely to scatter and be blown away by the wind. Knowing this, the "ascetic" has always appeared before us as a type that feeds his hypocrisy by constantly displaying a personality that is not himself, that does not reflect himself, his true self.

Nâ'ilî, although a Sufi poet, is against this attitude of the "ascetic" who reduces religion to a set of formal rituals and appears to be religious. Nâ'ilî accuses the "ascetic" type of not understanding or interpreting religion. Moreover, the biggest obstacle to the "ascetic" interpreting religion correctly is that he is an incapable person. Nâ'ilî compares this incapacitated situation of the "ascetic" type with a comparison of water that has been waiting in a small container and has started to rot and stink, to a river with a very high flow rate:

Riyâ-yı mahzimiş ey Nâ'ilî ibâdet-i halk
Zülâl-i feyz birîg-i vuzûya sığmazimiş

(Oh Naili, while the worship of the people is pure hypocrisy, the abundant flowing, clean water cannot fit into a small, visible vessel.)

Nâ'ilî Ghazal 183, 7th couplet

2. Abuse of Religion and Lust in Nâ'ilî

The main subject of social psychology is the social attitudes and behaviors acquired by individuals under the influence of sociocultural and socioeconomic products, namely material and non-material concepts, value judgments and objects created by people. Cultural and social products arise from interactions and relationships between people. After the cultural products and social value judgments arising from human relations are established in society, this time they begin to shape and direct human relations and interactions. It is the person who creates culture, but that culture shapes the person and provides the person with experiences. Motives and experiences create the person's behaviors. A person is not born as a lord or a pasha, rich or poor, religious or irreligious. Individuals acquire social attitudes and behaviors in line with the social values of the cultural environment they are in (Güler, 2007, p.29). However, the tendency of those who have made religion a source of benefit and livelihood to see themselves as very special and different in society has caused criticism.

The logic behind fasting in many ancient beliefs and especially in the acts of performing austerities in the hermitages of Islamic Sufism is to be able to restrain the pleasures and desires of the body, to prioritize the use of the mind and to keep everything related to pleasure under control and to prevent being swayed to the right and left in the flow of life. In the era when Naili, a poet from Istanbul, lived, being able to restrain the soul was seen as a source of pride and encouraged, those who lived in this manner were seen as role models, and this state was also appreciated in the general belief system. Those who did not live in this manner were reprimanded, and it was believed that their philosophy of life and their beliefs contradicted each other, and that they were not sincere in their beliefs, and they were included in human profiles.

The evaluation of almost all areas of life in the context of belief can be explained by the religion-centered sociology of life of the Ottoman social structure. This perspective is also a perspective taken as a basis by Nâ'ilî. Nâ'ilî, who developed a perspective based on religious references regarding the control of human will, considered the control of will very important and evaluated and criticized an uncontrolled life again from the perspective of belief.

Nâ'ilî, acting on the grounds that the flaws of a religious figure in a leading position who is likely to be taken as an example in society can have a greater impact when compared to the flaws of an ordinary citizen, says that those who highlight and make their religious side visible should be more careful.

For the Divan poet, faith and the foundation of everything is love. In this context, faith should also be with love, faith should not be lived with the logic of a merchant for a heavenly reward. The ascetic/devout/preacher type, who was thought to worship only in return for heaven, was criticized by almost all the Divan poets, so much so that the office of Sheikh al-Islam, one of the highest positions in the Ottoman Empire, could not escape the criticism of this ascetic/devout/preacher type, who was perceived as a merchant of religion.

Hırka vü tâc ile zâhid kerem et sıkleti ko
Âdeme cübbe vü destâr kerâmet mi verir

(Oh ascetic, since you are a person who has squeezed belief into the mould of form and has missed the essence of belief, do yourself a favour and get rid of the weight of that form. For the miracle is neither in the robe nor in the turban; the miracle is, at most, in the essence.)

Şeyhülislâm Yahyâ Ghazal 108-5th couplet

The fact that this couplet was said by a sheikh al-Islam is also important in terms of showing that the ascetic/devout/preacher type did not conflict with the other Divan poets who were included in the Ottoman intellectual class. Because most of the Divan poets were members of the intellectual class who knew several foreign languages well enough to write poems in those languages and had a high level of intellectual accumulation. The fact that every intellectual, regardless of their duties in society, had the same reaction to a social flaw is contrary to the way Divan poetry is interpreted today, as it shows that they were concerned not only with their being intellectuals but also with the troubles of the society they lived in.

According to Aristotle's definition of the three souls (Aristotle, 2001, pp.63-64), the third soul, which includes eating and drinking and lust, is the soul that rules the entire life of the ascetic/devout/preacher, and lust, as well as eating and drinking, is the indispensable meaning of life for this type. The preacher, who is stuck in this dimension of life and cannot reach the sublimity of the spirit of reason, is a type who, although he gives speeches and sermons about the necessity of avoiding forbidden things, tries not to miss opportunities such as flirtatiousness when he finds the right environment and opportunity, and whose words and actions constantly contradict each other.

The ascetic/devout/preacher type does not have a healthy state of mind. Because when a person suppresses and distances himself from many things related to life that contradict his nature, he tries to break the pressure of these suppressed feelings by lying to himself at a level that his conscience can accept as reasonable. For this reason, the preacher who constantly desires even heaven due to his materialistic tendencies, acts as a healer due to his weaknesses towards the material, and the preacher who also lacks a healthy spiritual development, tends to be alone with the children in solitude, without distinguishing between girls and boys. Nâ'ilî rebels against the fact that the people respect such a type of person, that the people do not see the real face of this type of person and place this type of person in a respectable place.

Nâ'ilî does not find it right for those who cannot control their physical desires and who perform their religious duties while looking forward to heaven, which they think of as a means to fulfill their physical desires, to dishonor the sublime ones:

Girsen de cennete yine şehvet zebûnusun
Dildâde-i tena'um-ı bâğ-ı na'îm isen

(O ascetic, even if you entered the garden of the Paradise of Delight as a person in love with the blessings in that garden, you are still a weak and powerless person because of the weakness of lust.)

Nâ'ilî Ghazal 214, 4th couplet

CONCLUSION

When the Divan poets criticized the religious people, they did not criticize those who lived their religion and fulfilled their religious obligations, but those who used religion as a stepping stone to their petty interests. Otherwise, most of the poets who made these criticisms were people who were devoted to their religion and fulfilled their religious obligations. What they were angry about were the types of people who said they were religious but continued to behave ignorantly, who perceived religion as a set of formal rules, who were poor in understanding and tolerance, who were rude, unpolished, destructive, and inflexible.

The divan poet Nâ'ilî did not write his poems with an aesthetic concern just to make art. In this work, Nâ'ilî's mentioning of some types that corrupt society instead of just making art in his poems brought his poems to a social area and caused him to wander in the world of sociology.

Wrongs are as much for humans as right ones, and making mistakes and making mistakes is a process that has been going on since the first human being, and it is a widely accepted view that one cannot be flawless. What is important is to learn from mistakes and to turn back from them. Sometimes, it is as important to turn back from mistakes as how long and at what age one turns back from them. Because a regret originating from the necessary loss of power brought on by old age and the necessary limited mobility of the weakness that develops is seen as inferior in terms of degree, while the regret in the youthful ages at the peak of power is considered acceptable. Nâ'ilî, who works on the religious motif of "repentance", expressing regret for mistakes and promising not to make that mistake again, draws the image of a sage who gives advice from time to time.

The fact that the weaknesses of the preacher type, which we have introduced through the poems of Nâ'ilî, a 17th century Istanbul Divan poet, in matters such as lust and ambition, were mentioned in a Divan poem labeled as "far from the people; imprisoned in the triangle of love-wine-woman" is one of the most important indicators of how little Divan poetry is understood or how much it is misunderstood.

Nâ'ilî tried to show treatment methods like a social physician for the problems he identified and tried to draw attention to, and aimed to heal the society by getting rid of its basic problems. In every society, there are behaviors that are accepted or considered unpleasant and social norms that regulate these behaviors. In every society, social norms make the distinction between beauty and ugliness, and Nâ'ilî aims to raise the awareness of the society and increase its awareness while drawing attention to social issues.

When we look at Nâ'ilî's poems in general, we see that subjects such as a person not speaking the truth, lying, constantly whining without being grateful for their situation, dissatisfaction, insincerity, bad habits, trying to expose other people's flaws, opportunism, boasting about themselves, being lazy, etc. are frequently discussed. If the subject of criticism in these criticisms were any person like Ahmet or Ayşe, it would be satire. However, in Nâ'ilî's poems, the subject of criticism is general and these criticisms are social criticisms and these criticisms have a sociological aspect.

Nâ'ilî clearly states that the ascetic/devout/preacher, who gushes out advice and advice to communities with lower levels of knowledge and offers Kawthar from the hands of houris to communities sweating under the frightening heat of the heavenly pomegranate, has no chance of maturing on the path of becoming a perfect human being, and that he knows that he cannot take any steps on the path of becoming a man, has no chance of development.

REFERENCES

Alatlı, A. (2010). Texts That Shape the West, Cilt 2. Cappadocia Vocational School Publications.
Alver, K. (2004). Literary Sociology Studies, Hece Publications.
Alver, K. (2006). Sociology of Literature. Hece Publications.
Aristoteles, (2001). On the Soul, (Translator: Assoc. Prof. Dr. Z. Özcan), Alfa Publishing House, 2nd Edition Istanbul.
Aydın, E. (1999). Turkish Literature in View of Literary Sociology. Gaziantep, Literature and Society Symposium.
Bilgiseven, Â. K. (1992). Islam and Islamic concepts from a sociological perspective. Filiz Bookstore.
Bilgiseven, Â. K. (1985). Sociology of Religion. Filiz Bookstore.
Burkhardt, J. (1957). Renaissance Culture in Italy, (Translator: B. S. Baykal). Maarif Publications.
Copleston, F. (1993). A history of philosophy. Volume III: Late Medieval and Renaissance Philosophy. Image Books.
Dilthey, W. (1999). Hermeneutics and spiritual sciences, (Translator: Doğan Özlem), Paradigma Publications.
Eagleton, T. (2003). The Ideology of Aesthetics, (Translator: Bülent Gözkân, Hakkı Hünler, Banu Kıroğlu). Doruk Publications.
Eagleton, T. (2004). Literary theory, (Translator: Tuncay Birkan). Ayrıntı Publications.
Emil, B. (1971). Mizancı Murad Bey's views on literature and criticism, Istanbul University Faculty of Letters Turkish Language and Literature Journal, XIX, 119-143.
Ernst Bloch, E. (2002). Renaissance Philosophy, (Translator: H. Portakal). Cem Publishing House.
Ertem, R. (1995), Divan of Sheikhulislam Yahya, Akçağ Publications, Ankara.
Ertugrul, A. (1999). Turkish literature from the perspective of literary sociology. Gaziantep, Literature and Society Symposium.
Ertugrul, A. (2009). Sociological sources and criteria in the relationship between literature and sociology. Turkish Studies International Periodical For the Languages, Literature and History of Turkish or Turkic, 4(1-I), 357-370.
Fichter, J. (1994). What is sociology? (Translator: Nilgün Çelebi). Atilla Bookstore.
Güler Z. (2007). A view from Social Psychology to the Renowned Terkib Couplet of Bagdatlı Rûhî. E-J. New World Sci Acad.
Gökberk, M. (2000). History of Philosophy. Remzi Bookstore.
İnalcık, H. (2003). Poet and patron. East-West Publications.
İpekten, H. (1990). Nâ'ilî Dîvânı, Akçağ Publications.
Kılıç, Z. (2013). Non-Classical Issues in Classical Turkish Poetry. Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic, 8(9-II), 1833-1844.
Kılıç, Z. (2009) The Character who Consıder Materıal Thıngs Important in the Classıcal Ottoman Poetry, The Journal of International Social Research, 2(9-IV), s.230-236.
Koyre, A. (2010). The Birth of Modern Science, (Translator: K. Dinçer). (3rd Edition). Gündoğan Publishing House.
Köksal, A. (2004). Studies in Literary Sociology. Hece Publications.
Lanson, G. (1937). Method in sciences, history of literature, (Translator: Yusuf Şerif). Remzi Bookstore.
Libera, A. D. (2016). Medieval Philosophy, (Translator A. Meral). (2nd Edition). Litera Publishing House.
Michelet, J. (1998). Renaissance, (Translator: K. Berker). Çağdaş Publications.
Palmer, R. E. (2002). Hermeneutics, (Translator: İbrahim Görener). Anka Publications.
Pater, W. H. (2006). Renaissance, (Translator: A. Aydoğan). (2nd Edition). İz Publishing.
Russell, B. (2002). History of Western Philosophy, (Translator: M. Sencer). Say Publications.

Sezen, Y. (1990). Fundamental Information and Debates in Sociology and Sociology of Religion. İFAV.
Sezen, Y. (1991). According to Sociology, People, Nation, State. İSAV.
Taşkın, A., Becermen, M. (2013). History of Philosophy II: History of Renaissance, Modern and 19th Century Philosophy. Sentez Publications.
Topdemir, H. G., Unat, Y. (2012). History of Science. (5th Edition). Pegem Academy.
Weber, A. (1998). History of Philosophy, (Translator: H. V. Eralp). Social Publications.

KENDİNE ZARAR VEREN ERKEK HÜKÜMLÜ VE TUTUKLU BİREYLERİN ÇOCUKLUK ÇAĞI TRAVMALARININ İNTİHAR, KENDİNE ZARAR VERME, BEDEN ALGISI ÜZERİNDEKİ YORDAYICI ETKİSİ

THE PREDICTIVE EFFECT OF CHILDHOOD TRAUMAS ON SUICIDE, SELF-HARM, BODY PERCEPTION OF THE SELF-DESTRUCTIVE MALE CONVICTED AND IMPRISONED INDIVIDUALS

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Özet

Bu çalışmada kendine zarar veren erkek hükümlü ve tutuklu bireylerin çocukluk çağı travmalarının kendine zarar verme davranışı, intihar girişimi ve beden algısı arasındaki ilişkinin incelenmesi amacı ile gerçekleştirilmiştir. Bunun yanı sıra erkek hükümlü ve tutukluların çocukluk çağı travmalarının, kendine zarar verme ve intihar davranışını yordayıp yormadığı incelenmektedir.

Yapılan bu araştırma ilişkisel tarama modeli ile yürütülmüş olup evreni Türkiye'de ceza infaz kurumunda olan erkek bireylerden oluşmaktadır. Örneklem ise Tarsus 2 Nolu T Tipi Kapalı Ceza İnfaz Kurumunda hükümlü ve tutuklu bulunan 384 erkek bireyden oluşmaktadır. Araştırmanın örneklemi amaçsal örnekleme yöntemiyle seçilmiştir.

Araştırmanın sonucuna bakıldığında, eğitim durumuna göre beden algısı; yasa dışı madde kullanma durumu ve kullanma yaşına göre intihar davranışı, olumsuz çocukluk yaşantıları, kendine zarar verme ve bilinçli farkındalık düzeyi anlamlı biçimde farklılık göstermektedir. Olumsuz çocukluk yaşantısı ile intihar davranışı, kendine zarar verme ve beden algısı arasında pozitif yönde, bilinçli farkındalıkla arasında negatif yönde korelasyon vardır. Olumsuz çocukluk yaşantısı intiharı, kendine zarar vermeyi ve beden algısını yordamaktadır. Erkek hükümlü ve tutuklu bireylere yönelik psikososyal destek programları oluşturularak olumsuz çocukluk yaşantılarının sebep olabileceği intihar düşüncesi, kendine zarar verme ve olumsuz beden algısı belirtilerinin azaltılması sağlanabilir. Böylelikle tutuklu ve hükümlülerin iyi oluş düzeyleri artırılarak, yaşama uyum sağlaması kolaylaştırılabilir.

Anahtar kelimeler: çocukluk çağı travması, beden algısı, travma, kendine zarar verme, intihar.

Abstract

In this study, the relationship between childhood traumas of the men who hurt themselves are convicted and imprisoned and self-harming behavior, suicide attempt and body image is carried out. Also, it has been examined whether the childhood traumas of convicted and imprisoned men predicts self-harming and suicidal behavior or not.

This research has been conducted with the relational screening model. The population of this study consists of male individuals who are in the criminal execution institution in Turkey. The sample of the study was selected by purposive sampling method and comprised 384 male individuals convicted and imprisoned in Tarsus No. 2 T Type Closed Penitentiary Institution.

The obtained results in terms of education status have revealed that body perception, suicidal behavior, negative childhood experiences, self-harm and conscious awareness levels differ significantly according to illicit substance use status and age of use. There is a positive correlation between negative childhood experience and suicidal behavior, self-harm and body image, and a negative correlation with mindfulness. Negative childhood experience predicts suicide, self-harm and body image. By establishing psychosocial support programs for male convicts and prisoners, the symptoms of suicidal ideation, self-harm and negative body image that can be caused by negative childhood experiences can be reduced. In this way, the well-being of convicts and prisoners can be increased and their adaptation to life can be facilitated.

Keywords: trauma, self-harm, suicide, body image, childhood trauma.

BICHECTOMY: A STUDY OF BITE FORCE AND THE MORPHOLOGY OF THE MASSETER AND TEMPORALIS MUSCLES

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ABSTRACT

This longitudinal study, approved by the ethics committee of the School of Dentistry of Ribeirão Preto, University of São Paulo, Brazil (process # 10589419.0.0000.5419), examined bite force and the thickness of the masseter and temporalis muscles before, as well as 30 and 60 days after bichectomy. The sample included twenty women (mean ± SD: 31.1 ± 9.8 years) without temporomandibular dysfunction, normal occlusion, and all permanent teeth (excluding third molars). Maximum molar bite force (both right and left) was measured using a digital dynamometer. The thickness of the masseter and temporalis muscles was assessed under clinical conditions of rest and dental clenching during maximum voluntary contraction, utilizing a portable ultrasound device with a 13 MHz transducer. The collected data were tabulated and subjected to statistical analysis using the repeated measures test ($p < 0.05$). Significant differences were found in the bite force evaluation periods for both the right ($p = 0.01$) and left ($p = 0.05$) molars. A decrease in right molar bite force was observed at 30 days post-surgery, followed by an increase at 60 days, while the left molar bite force decreased throughout the post-surgical evaluation period. No significant differences were noted in the thickness of the masseter and temporalis muscles. These methodologies facilitated the collection of accurate and reliable data for evaluating the variables. The findings may contribute to understanding the effects of bichectomy on maximum molar bite force, highlighting the necessity of monitoring these parameters during the post-surgical period. It is important to note that although bite force was influenced, no significant changes were observed in the thickness of the masticatory muscles.

Keywords: Bichectomy, Masseter Muscle, Temporal Muscle, Bite Force, Muscle Thickness

EXPLORING THE DESIGN STAGES AND HEAT CALCULATIONS OF FRIGORIFIC VEHICLES FOR EFFECTIVE FOOD PRESERVATION

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ABSTRACT

The research provides a detailed examination of the design and function of refrigerated vehicles (frigorific vehicles), which are essential for maintaining the quality and safety of perishable goods. These vehicles are constructed with insulated walls, ceilings, floors, and doors to minimize heat transfer between the interior and exterior environments and are equipped with mechanical vapor compression refrigeration systems. The study systematically reviews the stages involved in designing a frigorific vehicle, from conceptualization to implementation, ensuring that it meets the necessary requirements for the safe transport of food products.

Additionally, the study includes a practical example of a heat calculation, illustrating the thermal dynamics involved in maintaining optimal storage conditions within the refrigerated vehicle. This example enhances the understanding of the thermal challenges faced during the design process.

Rather than simply offering a solution, the study focuses on a meticulous examination of each phase involved in the design process, providing insights into both theoretical and practical aspects. It also reviews the historical context, tracing the evolution of low-temperature storage since the early 20th century and the subsequent development of commercial refrigerated transport in the latter half of the century. The research contributes to a deeper understanding

of essential design considerations, emphasizing the importance of each stage in ensuring food preservation and safety.

Keywords: Frigorific vehicles, Heat transfer, Insulation Design

INTRODUCTION

Road transport plays a crucial role in global logistics, particularly in the distribution of perishable goods. Among the various transport modes, road transport stands out for its flexibility, lower initial investment costs, and the ability to handle diverse types of cargo Current Research in Engineering.[1,2]. However, specialized vehicles, such as refrigerated or frigorific vehicles, are indispensable for the transport of temperature-sensitive products like food, pharmaceuticals, and chemicals. These vehicles form the backbone of the cold chain, a system designed to maintain product quality by preserving optimal temperatures from production to retail outlets [3].

Refrigerated road vehicles are vital in sustaining the shelf life of fresh and frozen goods worldwide. Recent data indicate that over 400,000 refrigerated transport systems are currently in operation globally, with thousands more used to distribute chilled and frozen products [4]. However, the rising demand for these vehicles has led to growing concerns about their environmental impact, primarily due to high energy consumption and reliance on fossil fuels [5]. As global road freight transport is projected to grow by 2.5% annually by 2030, the associated energy demands and carbon emissions will likely intensify unless proactive measures are taken [6-8].

To mitigate these impacts, advancements in insulation technology are critical. Frigorific vehicles are designed with insulated panels that help minimize heat infiltration, thereby reducing the thermal load and energy required to maintain safe temperatures. These panels typically consist of polystyrene insulation sandwiched between thin layers of aluminum [6]. Despite these advancements, there remains a need for further research into optimizing insulation materials and assessing the effects of external vehicle walls on energy consumption [9-11].

While the operational efficiency of frigorific vehicles is critical, temperature control plays an even more fundamental role in preventing food spoilage. This study delves into the critical impact of temperature on the biochemical and microbiological activities, as well as physiological changes, in perishable products like fruits, vegetables, and animal-based foods. Even slight deviations above room temperature can accelerate spoilage, making temperature regulation essential, especially in densely populated urban areas.

This research explores the stages of designing frigorific vehicles, from conceptualization to implementation, with a focus on maintaining optimal temperature conditions for perishable goods. The study also presents a practical example of heat calculation, illustrating the thermal dynamics involved in refrigeration and the challenges encountered during vehicle design. Beyond offering a solution, this study provides a meticulous examination of both theoretical

and practical aspects, contributing valuable insights into the evolution of refrigerated transport and the continuous advancement of low-temperature storage since the early 20th century.

MATERIAL AND METHOD

This section systematically outlines the manufacturing stages of the insulation structure for refrigerated vehicle bodies within a factory actively engaged in production. The insulation processes are critical for enhancing the energy efficiency and performance of refrigerated vehicles. The details of these processes are presented as follows:

Preperation

Material Preparation: Initially, Glass Reinforced Plastic (GRP) is prepared, as it is a preferred construction material due to its durability and lightweight properties. The characteristics of GRP significantly contribute to enhancing the overallperformanceand durability of the vehicle.



Figure 1. Visuals related to the GRP application stage

Foam Preparation: The foam material to be used between the GRP and the vehicle body plays a crucial role in ensuring thermal insulation. This foam minimizes heat transfer, aiding in maintaining the internal temperature of the vehicle. During this stage, the properties and density of the foam are carefully selected to maximize the effectiveness of the application.



Figure 2. Foam preparation

Beam Preparation: The preparation of beams that correspond to the dimensions of the vehicle body constitutes the foundation of the insulation application. These beams enhance

structural integrity and facilitate the proper placement of insulation materials. The beams design is optimized while considering the aerodynamic structure of the vehicle.



Figure 3. Beam preparation

Application of Foam and Particleboard: After the foam is placed between the prepared profiles, a particleboard is added on top of the foam. The addition of particleboard aims to minimize heat transfer, particularly from the shaft. This step not only enhances the effectiveness of thermal insulation but also ensures structural integrity.



Figure 4. Application of Foam and Particleboard

Heat Transfer Prevention: Given that heat transfer is expected to be significant at the vehicle's glass and door sections, fiberglass is incorporated, and GRP is applied on top. Fiberglass is known for its heat resistance, and this application contributes to improving the overall efficiency of insulation, thereby aiding in the preservation of the cold chain.



Figure 5. Application of fiberglass and GRP in doors and windows

Final Operations: Finally, after placing the particleboard, a layer of fiber material is added to the base, followed by a meticulous painting process. Painting not only provides an aesthetic appearance but also helps protect the materials from external factors. The choice of paint is made with an emphasis on long-lasting and environmentally friendly materials, thereby enhancing the sustainability of the vehicle.



Figure 6. Placement and painting of the fiber

These stages are essential for effectively constructing the insulation structure of refrigerated vehicles. Each phase plays a vital role in determining the overall quality of the production process and the performance of the final product. Consequently, the energy efficiency of refrigerated vehicles is ensured, enabling the safe transport of food and other temperature-sen sitive products.

Determination of the Cooling Load

- **Product:** Beef will be stored at -18 ˚C.
- **Location of transport:** The transport will take place intercity. It is assumed that the transport will occur during summer conditions. The average intercity temperature has been taken as 36 °C.
- **Method of product preservation:** Beef will be stored in a long-term frozen state.
- **Sizing of the container for the products:** Container volume:
  Length x Height x Width: 5m x 2.1m x 2.1m V = 22.05 m³
  To ensure air circulation within the chamber and to facilitate ease of movement in case of any malfunction or during loading and unloading of goods, 80% of the chamber volume will be utilized.

  Gross Volume = 22.05 x $\frac{80}{100}$ = 17.64 m^3
  transportation of 6262.2 kg of beef is planned.

Calculation of the Cooling Load

In the design of a refrigeration facility, the first step is to calculate the cooling loads (heat gains). The objective of calculating the cooling load is to accurately and economically select the components of the cooling system (compressor, condenser, evaporator, TXV, refrigerant piping, and other cooling elements). With the correct selection of cooling components, the system's efficiency can be ensured to meet expectations and operate without interruption for

many years. The heat gains that constitute the cooling load can be categorized into four groups:

- Heat gain through conduction and convection from the walls, floor, and ceiling surrounding the cooled volume (Transmission heat).
- Heat gain resulting from the entry of air with a higher heat capacity from outside into the cooled volume (Infiltration heat).
- The heat of the goods placed in the cooled volume (ripening heat also occurs in fruits and vegetables).
- Heat gain from lights, people, and motors within the cooled volume.

Transmission heat

- For transmission heat, it is essential first to determine the total heat transfer coefficient of the internal and external walls, as well as the floor and ceiling. Subsequently, the transmission heat is calculated using a table.



Figure 7. Container Structure

When calculating the heat transfer coefficients of the surfaces, it is necessary to compute the base separately. This is because the base consists of GRP on the outer surface, polyurethane on the interface, and plywood on the inner surface.

Table 1. Material properties

Material	Thickness (cm)	Thermal Conductivity (W/mK)
GRP	5	0.20
Polyurethane	80	0.024
Plywood	5	0.13

Base surface; $K = \frac{1}{\frac{0.05}{0.20}+\frac{0.8}{0.024}+\frac{0.05}{0.20}} = 0.029$ W/mK

Other surface; $K = \frac{1}{\frac{0.05}{0.20}+\frac{0.9}{0.024}+\frac{0.05}{0.13}} = 0.026$ W/mK

Calculation of Infiltration – Air Change Heat

Every time the cold room door is opened and closed, a certain amount of external warm air enters the cold room, creating an additional cooling load. The water vapor present in the external air also contributes to this cooling load. Accurately determining this load is possible

only by knowing the actual usage conditions, which often vary according to the heat capacity used. Therefore, it is challenging to calculate the infiltration heat precisely.

Infiltration Heat = Air Change x Net Room Volume x (h_d-h_i) h (kW)

where:

ρ_h: Density of the incoming air (kg/m³)

h_d: Enthalpy of the external air (kJ/kg)

h_i: Enthalpy of the internal air (kJ/kg)

Table 2. Air Change Due to Door Openings

Volume (m³)	Air exchange in 24 hours	
	Room temperature is above 0 °C	Room temperature is below 0 °C
5	50.1	38
10	31.1	24.2
15	25.3	19.6
20	21.2	16.9
25	18.7	14.9
30	16.7	13.5
40	14.3	11.7
50	12.8	10.2
75	10.1	8.0

Heat Gain from Products

The heat generated by different types of goods placed in the cold room to be preserved constitutes the most important and largest part of the cooling load from time to time. In addition, although the type of goods placed in the cold room is predetermined, the amount of movement per unit time may vary according to the needs and wishes of the user. For this reason, it is of great importance that the calculation of the cold room load and the selection of the cooling machine and accents accordingly are made in as close harmony as possible in the practical situation of the goods movement.

$$Q = \frac{m \; x \; C \; x \; (tfr - te)}{cooling \; time}$$

m : Amount of goods placed in the cold case (kg)

C : Heat of warming after freezing (kJ/kg.K)

t_{fr} : Freezing temperature of the product (°C)

t_e : End-freezing temperature of the product (°C)

Other Heat Gains

The heat released from people working in the cold room from time to time, electric motors, lighting, machines such as fork-lifts and snow melting (defrosting) processes should be taken into account. The power of lighting lamps, ventilator electric motors, fork-lift motors, if any, is directly taken into account in the form of heat gain in (W), taking into account the daily working time. Especially in large volume cold storage warehouses, forklifts, cranes, motorised battery powered trolleys etc. are introduced into the cooled volume. The heat load to be generated by them is calculated according to the type of this element and the remaining time in the cooled volume and added to the cooling load.

Cooling Load Calculation Table

After calculating the individual cooling loads, these values are transferred to the heat gains calculation table provided below. This ensures that the process is carried out systematically. In this way, both a comparison of the cooling loads can be made, and any overlooked cooling load can be avoided

Table 3. Cooling Load Calculation Table

Dimensionswithout insulation)(		Width [m]	2.1	height [m]	5	LOad [kg]	6000	Volume (V) [m³]		22.05
HEAT GAINS FROM CONDUCTION AND CONVECTION (Wall, Ceiling, Floor)										
	Direction	Width (m)	Height (m)	Surface (m^2)	Qty	Extracted Area (m^2)	Net Area(m^2)	K_u (W/m^2K)	Δt (*) (℃)	Heat Power (kW)
WW	K-G	2.1	5	10.5	2	-	21	0.029	54	32.886
WW	D-B	2.1	2.1	4.41	2	-	8.82	0.029	54	84.564
Ceiling	-	2.1	5	10.5	1	-	10.5	0.029	54	16.443
Flr.	-	2.1	5	10.5	1	-	10.5	0.026	54	14.742
										3567.24
II – HEAT GAIN FROM AIR EXCHANGE (Q_i)										
24h		15.9	External air enthalpy (h_d) [kJ/kg]		24					Heat Gain (kW)
Density (ρ) [kg/m^3]		1.2	Internal air enthalpy (h_i) [kJ/kg]		-4.43					
Volume(V): 22.05 [m^3] x 15.9 [defa hava değ./ 86400 s] x (h_d : 24 – h_i : -4.43) x ρ : 1.2 =										11960.889
III – Heat gains from goods (Q_m)										
Process	Type of Product	Weight (kg)	ΔT (℃)	Specific heat (kJ/kg.K) Freezing heat (kJ/kg) Respiration heat(W/kg)		Cooling time (Saat)		Product heat gain (kW)		
After freezing	Beef	6000	15	0.4		7		5142.857		
Total Heat Gain from Products [kW]										5142.857
IV – Other gains (Q_d)										Other heat gains (kW)
a) Person	1 (Person) x 335 (W) x 4 h/day									1340
b) Lighting	1 x 100 (W) x 4 h/day									400
c) Motor	1 x 1300 (W) x 24 h/day									31200
Other heat gains (kW)										32940
Total (Q_T) [kW]										53610.996
Total with safety factor (Q_{EM}=1.1 Q_T) [kW]										58972.095

CONCLUSIONS

The study underscores the vital role of effective insulation in minimizing heat transfer, which directly impacts the energy efficiency of refrigerated vehicles, emphasizing the need for advancements in insulation materials and technologies to mitigate energy consumption and reduce environmental footprints. It highlights the importance of maintaining optimal

temperatures within refrigerated vehicles to prevent spoilage and preserve the quality of perishable goods, stressing the necessity of meticulous heat load calculations that account for various heat gains, including conduction, infiltration, and product heat gains, to select appropriately sized and efficient refrigeration components. The systematic approach taken in this research provides a valuable framework for future development in refrigerated vehicle design by addressing both theoretical and practical aspects, fostering a deeper understanding of the complexities involved. Furthermore, the historical review presented emphasizes the evolution of refrigerated transport and the need for ongoing innovation as global demand for such transport rises, prioritizing advancements in energy efficiency, alternative refrigerants, and sustainable practices to mitigate environmental impacts. In conclusion, this research contributes to the knowledge base surrounding the design of refrigerated vehicles, offering insights that can guide future developments, and emphasizing the importance of ongoing research and innovation to enhance the efficiency and sustainability of refrigerated transport, ultimately ensuring the safety and quality of perishable goods in an increasingly demanding market.

REFERENCES

[1] Keven, A., & Cimşit, C., (2023). The Analysıs Of The Refrıgeratıon System Of Frıgorıfıc Vehıcles Used In Road Transport. *Current Research In Engıneerıng* (Pp.305-317), Gece Kitaplığı

[2] Ozceylan, A., (2021). Transportation in the Agri-Food Supply Chain, AgriFood Supply Chain Management with Interdisciplinary ApproachesFeatured Articles, Nobel Academic Scientific

[3] Tas, A., Gunduz, M., (2021). Analysıs Of Crıterıa Affectıng The Food Transportıon Industry, Journal of Erciyes University Faculty of Economics and Administrative Sciences, Issue: 58

[4] MEGEP, (2013). Installation Technology And Air Condıtıonıng, Selection Of Frigorific Vehicle.

[5] Daouas, N. (2011). A study on optimum insulation thickness in walls and energy savings in Tunisian buildings based on analytical calculation of cooling and heating transmission loads. *Applied Energy*, *88*(1), 156-164.

[6] Bahadori, A., & Vuthaluru, H. B. (2010). A simple method for the estimation of thermal insulation thickness. *Applied Energy*, *87*(2), 613-619.

[7] Pimentel, D., Williamson, S., Alexander, C. E., Gonzalez-Pagan, O., Kontak, C., & Mulkey, S. E. (2008). Reducing energy inputs in the US food system. *Human ecology*, *36*, 459-471

[8] Popescu, T., & Fistung, F. D. (2015). Freight Transports in Romania, between desires and achievements. Past, present and future. *Procedia Economics and Finance*, *22*, 304-312.

[9] Demir, E., Bektaş, T., & Laporte, G. (2014). A review of recent research on green road freight transportation. *European journal of operational research*, *237*(3), 775-793.

[10] Söylemez, M. S., & Ünsal, M. (1999). Optimum insulation thickness for refrigeration applications. *Energy Conversion and Management*, *40*(1), 13-21.

[11] Tseng, C. J., Yamaguchi, M., & Ohmori, T. (1997). Thermal conductivity of polyurethane foams from room temperature to 20 K. *Cryogenics*, *37*(6), 305-312.

RESEARCH AND DESIGN OF 3D SUITS FOR PARACHUTING

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Abstract

This scientific work focuses on designing documentation for suits intended for parachuting, based on research into such suits. The design process for parachuting suits includes important stages like the ergonomic requirements of clothing and the relationship between clothing and anthropometric points. Currently, one of the key priorities of state policy is supporting and developing sports. Designing reliable clothing that takes into account the characteristics and nature of the sports environment, as well as the intensity of energy expenditure during the athlete's dominant and unique movements, is an important task, especially in the growing popularity of extreme sports, including parachuting. The suits designed for parachuting must meet specific aesthetic, ergonomic, and aerodynamic standards to ensure the safety and performance quality of the athlete's flight. Given the need for import substitution, developing competitive, reliable, and safe parachuting suits is a critical task for domestic garment manufacturers.

Analyzing the current state of scientific issues in parachute suit design makes it possible to identify an objective approach to solving these challenges. Extreme sports, including parachuting, attract many people. The safety and quality of the flight depend on a set of performance characteristics like reliability, ergonomics, and aerodynamics of the special suit worn by the athlete. These suits are designed considering two main factors: first, the external extreme conditions in the air environment, and second, the combination of factors related to the physical and psychological state of the athlete.

There are two main types of parachutes. One is a fabric canopy that takes a shape ranging from a hemisphere to a cone; the canopy traps air inside its shell, creating a high-pressure area that slows movement against the incoming airflow. The other type is a rectangular paraglider, or a canopy consisting of tube-like cells. Paragliders, typically used by sport parachutists, act like wings, allowing the jumper to "fly" towards the target. Each type of parachute weighs less than 15 pounds (7 kg) and costs between $1,200 and $1,500.

In addition to the fabric canopy, a parachute system must include a harness worn by the user. The harness is attached to a container holding the canopy, often resembling a backpack but which can also be extended low enough for the user to sit on. A mechanism opens the container and releases the canopy for use.

The development of parachutes began in the 18th century. In 1783, French physicist Louis-Sébastien Lenormand jumped from a tree while holding two umbrellas. Two years later, another Frenchman, J.P. Blanchard, created the first unframed parachute made of silk. In 1901, Americans contributed to parachute development when Charles Broadwick designed a parachute pack attached with a cord. When the parachutist jumped, the cord, connected to the plane, would break, releasing the parachute. In 1912, U.S. Army Captain Albert Berry made the first parachute jump from a moving aircraft. Parachutes did not become standard

equipment for American military pilots until after World War I (German pilots used them in the final year of the war).

Kazakh parachuting athletes buy specialized suits from foreign manufacturers, whose functional characteristics do not always meet consumer needs, and prices are often monopolistically high. Therefore, developing and producing new competitive types of clothing, particularly domestic sportswear for parachuting, is a relevant issue today. The design stage allows for obtaining products with a high level of ergonomic compliance. During the study, polynomial dependencies of the dynamic effects of size indicators of parachutists' figures on the angular biomechanical parameters of movements at key joints were researched. The quality of the project solutions for the clothing and its relation to anthropometric points was evaluated through quantitative, qualitative, and comparative criteria. Three main movements performed by parachutists, based on the results of typical movements, were chosen from eleven proposed movements. These are: 1) the neutral head-up position; 2) the primary prone flight position; and 3) the secondary prone flight position. Based on these, seven main anthropometric points that are subject to change were considered. The displacement of anthropometric points was identified during these three movements. The functional-ergonomic features of special clothing designed to match the changes in anthropometric points during parachutists' movements in the air were analyzed. A full study of the parachuting suits and the fabrics used was conducted, and their physical and mechanical properties were investigated. The design and technical documentation for the parachuting suit was prepared, and a new model was developed.

Keywords: parachute, anthropometric points, air permeability, new model, movement.

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On behalf of the Organizing Committee

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