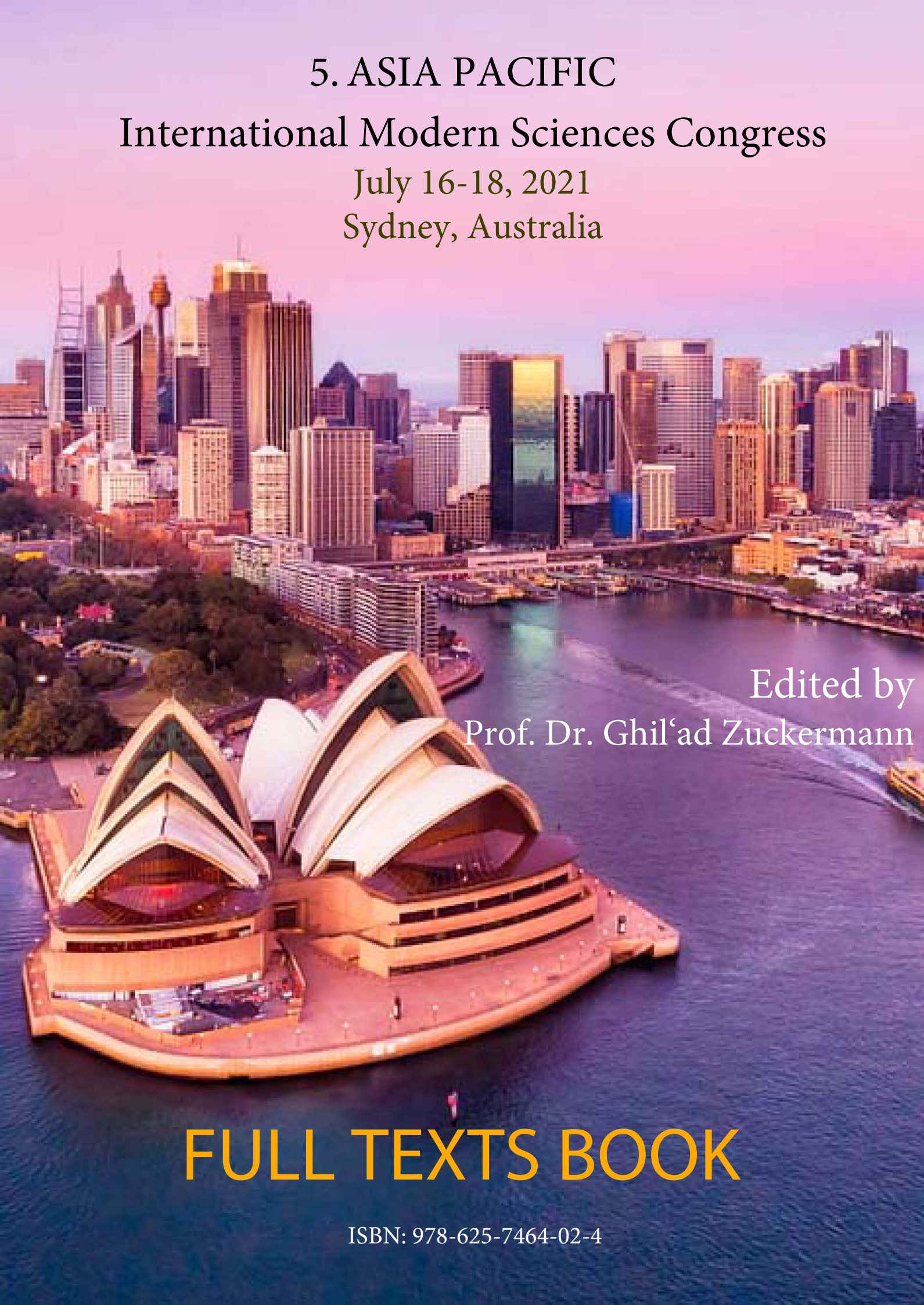
5. ASIA PACIFIC International Modern Sciences Congress

July 16-18, 2021

Sydney, Australia



Edited by

Prof. Dr. Ghil'ad Zuckermann

FULL TEXTS BOOK

ISBN: 978-625-7464-02-4

5.ASIA PACIFIC

International Modern Sciences Congress

July 16-18, 2021 / **Sydney, Australia**

FULL TEXTS BOOK

Edited by

Prof. Dr. Ghil'ad Zuckermann

by
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ISBN 978-625746402-4

CONGRESS ID

CONGRESS TITLE

5.ASIA PACIFIC
International Modern Sciences Congress

DATE and PLACE

July 16-18, 2021
Sydney, Australia

ORGANIZATION

IKSAD INTERNATIONAL
IKSAD GLOBAL PUBLISHING HOUSE

CONGRESS HEAD

Prof. Dr. Ghil'ad Zuckermann
Head of the Organizing Committee

COORDINATOR

SAMIRA KHADHRAOUI ONTUNÇ

NUMBER of ACCEPTED PAPERS

103

NUMBER of REJECTED PAPERS

28

TOTAL NUMBER OF INTERNATIONAL PAPERS

Australia(3), Morocco(5), Azerbaijan(8), India(4), Malaysia(3), Bulgaria(1), Ethiopia(1), Philippines(1), Iraq(2), Ukraine(1), Cyprus(1), Saudi Arabia(4), Pakistan(3), Greece(3), Nigeria(3), United Arab Emirates(1), Vietnam(4), Canada(1), Mexico(1), Brazil(1), Georgia(1), Republic of Moldova(1), Bangladesh(1), Slovakia(1), Algeria(1) Turkey(45)

PRESENTATION TYPE

Online presentation

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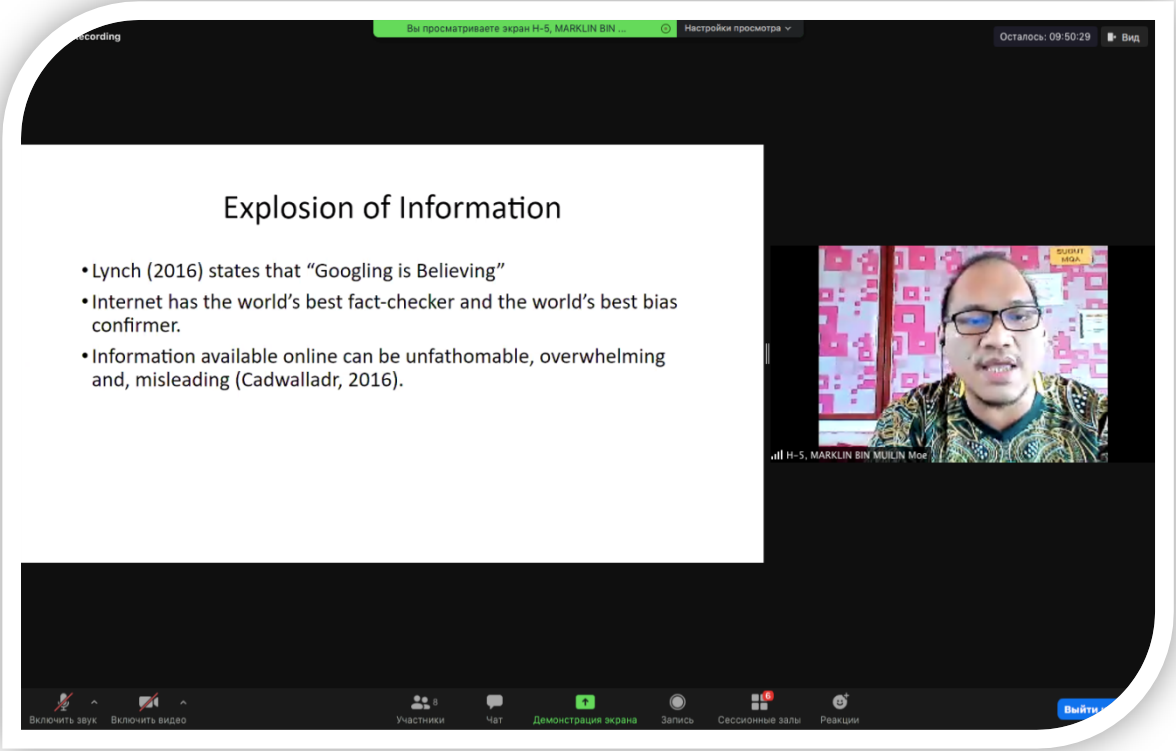
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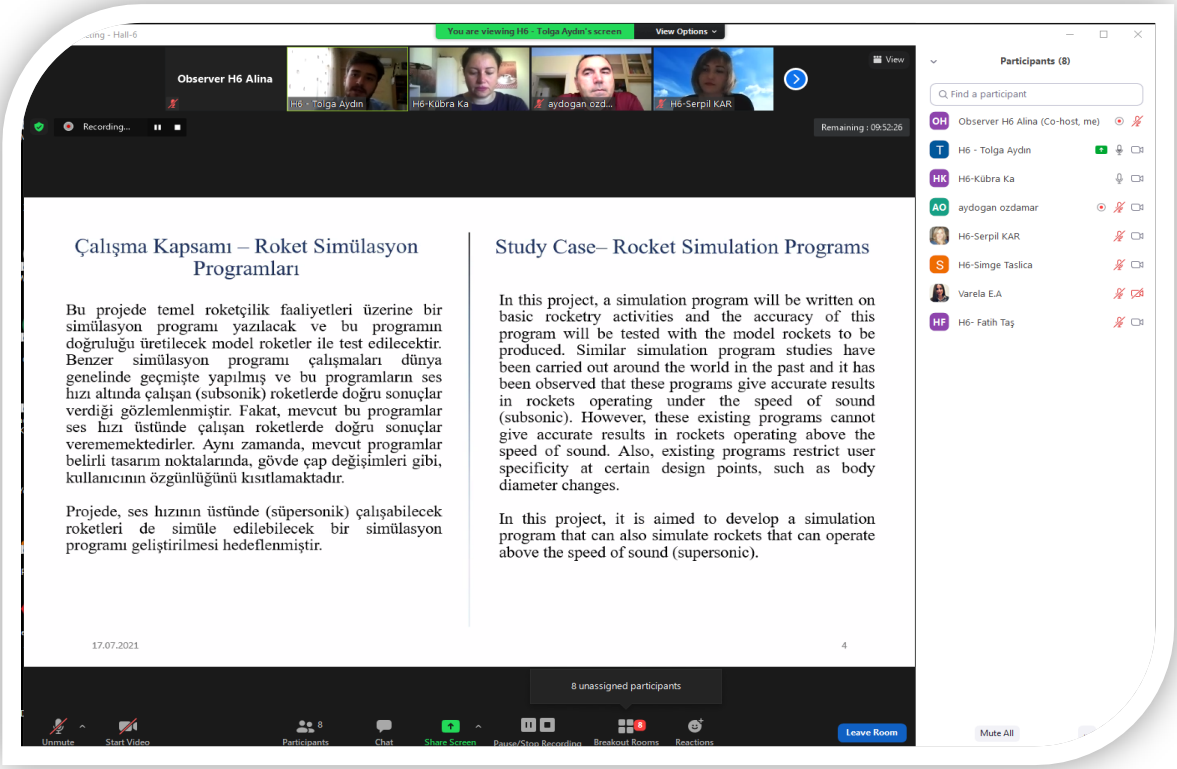
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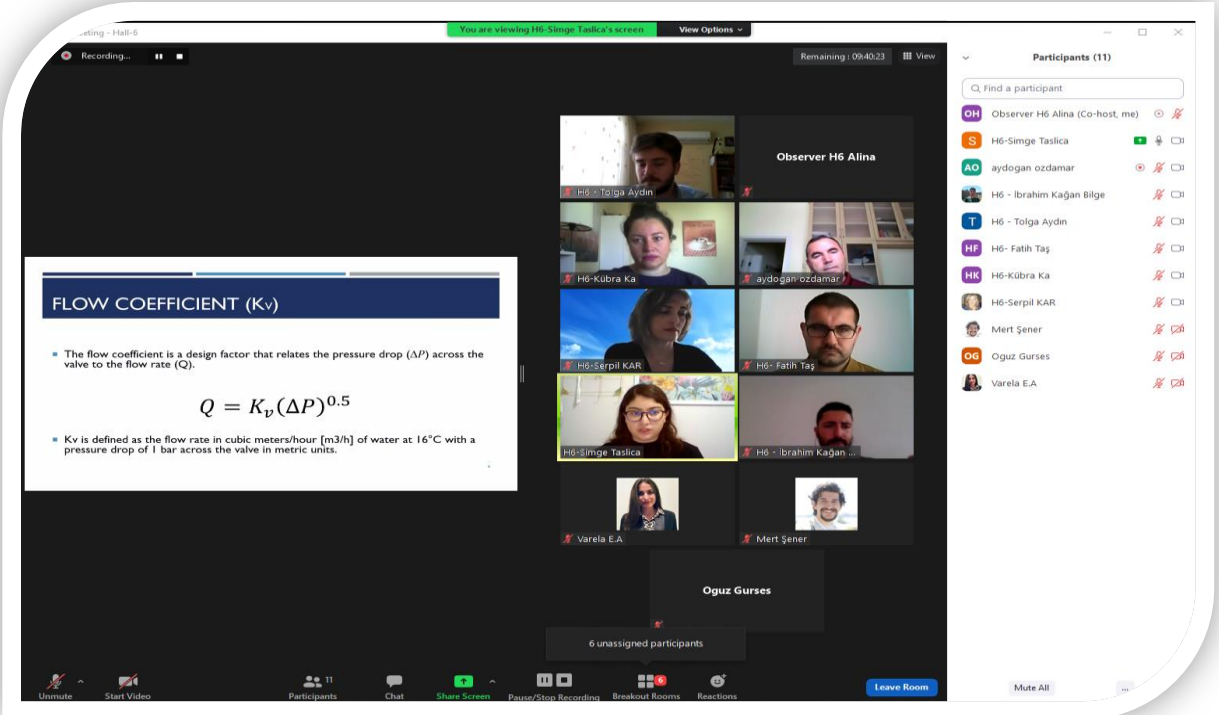
GALLERY


Introduction
From the ancient times women health related problems are considered not to be discussed.
Menstrual disorders are problems related menstrual cycle which can disrupt a woman's daily life.
Recently, with the effect of globalisation and quality of education, people started discussing and anlalysing these issues.
Hall-5 moderator Nimble O J

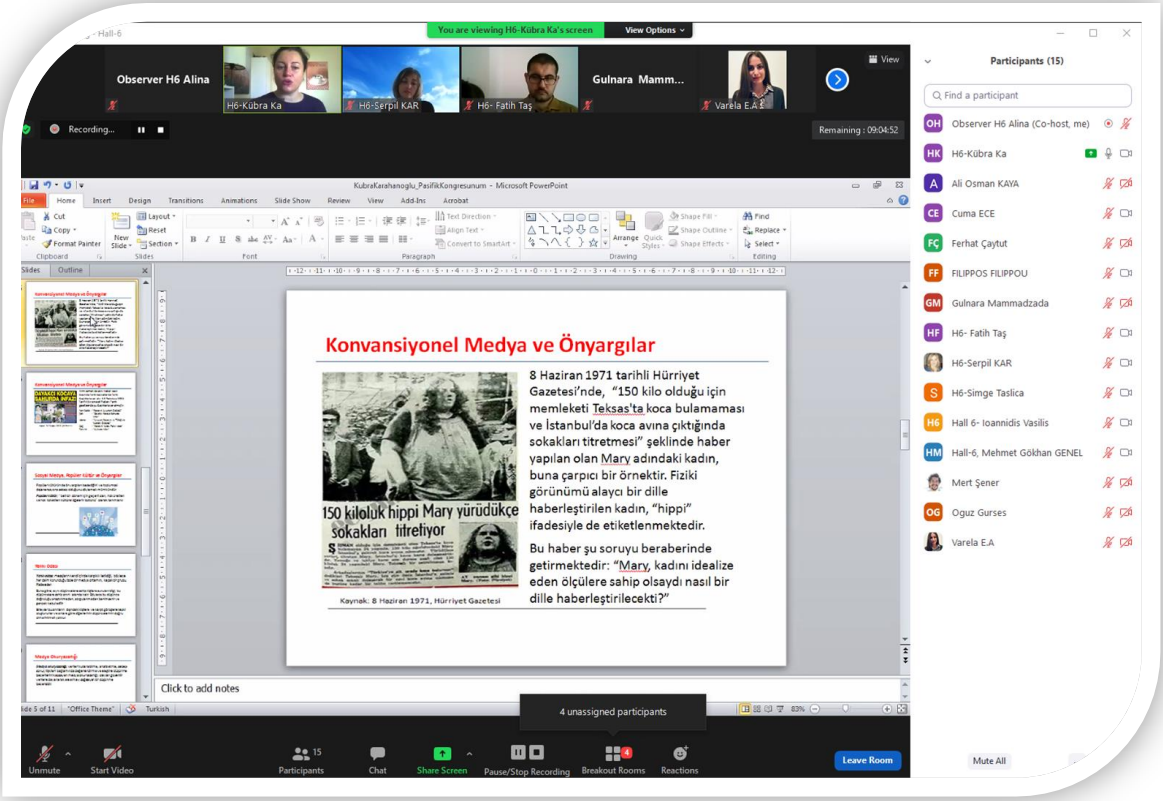

Explosion of Information
Lynch (2016) states that "Googling is Believing"
Internet has the world's best fact-checker and the world's best bias confirmer.
Information available online can be unfathomable, overwhelming and, misleading (Cadwalladr, 2016).
H-5, MARKLIN BIN MUILIN Moe

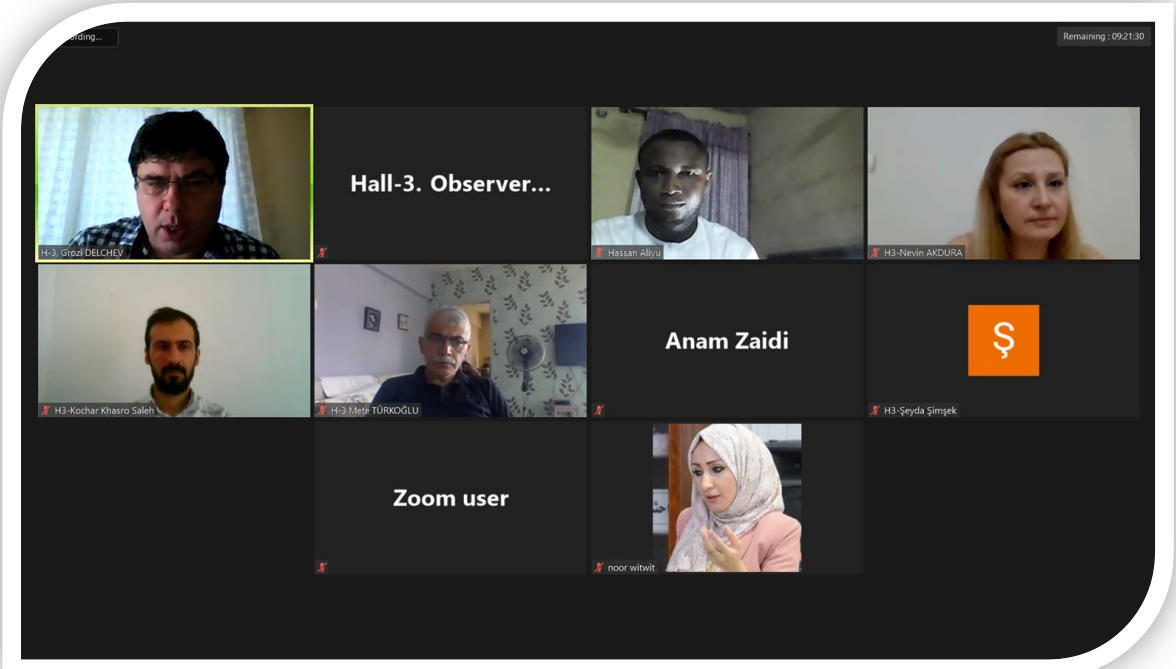
GALLERY


You are viewing H6 - Tolga Aydın's screen
View Options
Observer H6 Alina
H6 - Tolga Aydın
H6-Kübra Ka
aydogan ozd...
H6-Serpil KAR
Recording...
Remaining : 09:52:26
Participants (8)
Find a participant
Observer H6 Alina (Co-host, me)
H6 - Tolga Aydın
H6-Kübra Ka
aydogan ozdamar
H6-Serpil KAR
H6-Simge Taslica
Varela E.A
H6- Fatih Taş
Çalışma Kapsamı – Roket Simülasyon Programları
Bu projede temel roketçilik faaliyetleri üzerine bir simülasyon programı yazılacak ve bu programın doğruluğu üretilecek model roketler ile test edilecektir. Benzer simülasyon programı çalışmaları dünya genelinde geçmişte yapılmış ve bu programların ses hızı altında çalışan (subsonik) roketlerde doğru sonuçlar verdiği gözlemlenmiştir. Fakat, mevcut bu programlar ses hızı üstünde çalışan roketlerde doğru sonuçlar verememektedirler. Aynı zamanda, mevcut programlar belirli tasarım noktalarında, gövde çap değişimleri gibi, kullanıcının özgünlüğünü kısıtlamaktadır.
Projede, ses hızının üstünde (süpersonik) çalışabilecek roketleri de simüle edilebilecek bir simülasyon programı geliştirilmesi hedeflenmiştir.
Study Case– Rocket Simulation Programs
In this project, a simulation program will be written on basic rocketry activities and the accuracy of this program will be tested with the model rockets to be produced. Similar simulation program studies have been carried out around the world in the past and it has been observed that these programs give accurate results in rockets operating under the speed of sound (subsonic). However, these existing programs cannot give accurate results in rockets operating above the speed of sound. Also, existing programs restrict user specificity at certain design points, such as body diameter changes.
In this project, it is aimed to develop a simulation program that can also simulate rockets that can operate above the speed of sound (supersonic).
17.07.2021
4
8 unassigned participants
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
Mute All

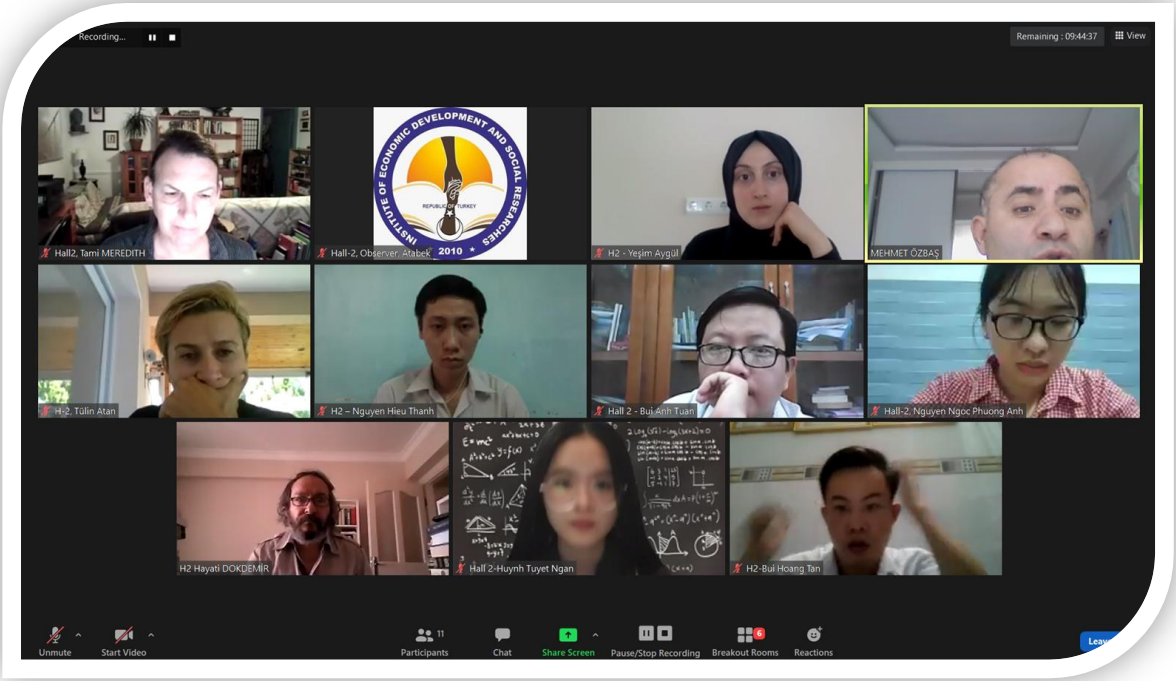

You are viewing H6-Simge Taslica's screen
View Options
Recording...
Remaining : 09:40:23
View
Participants (11)
Find a participant
Observer H6 Alina (Co-host, me)
H6-Simge Taslica
aydogan ozdamar
H6 - İbrahim Kağan Bilge
H6 - Tolga Aydın
H6- Fatih Taş
H6-Kübra Ka
H6-Serpil KAR
Mert Şener
Oguz Gurses
Varela E.A
FLOW COEFFICIENT (Kv)
The flow coefficient is a design factor that relates the pressure drop (ΔP) across the valve to the flow rate (Q).
$Q = K_v(\Delta P)^{0.5}$
Kv is defined as the flow rate in cubic meters/hour [m3/h] of water at 16°C with a pressure drop of 1 bar across the valve in metric units.
H6 - Tolga Aydın
Observer H6 Alina
H6-Kübra Ka
aydogan ozdamar
H6-Serpil KAR
H6- Fatih Taş
H6-Simge Taslica
H6 - İbrahim Kağan ...
Varela E.A
Mert Şener
Oguz Gurses
6 unassigned participants
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
Mute All

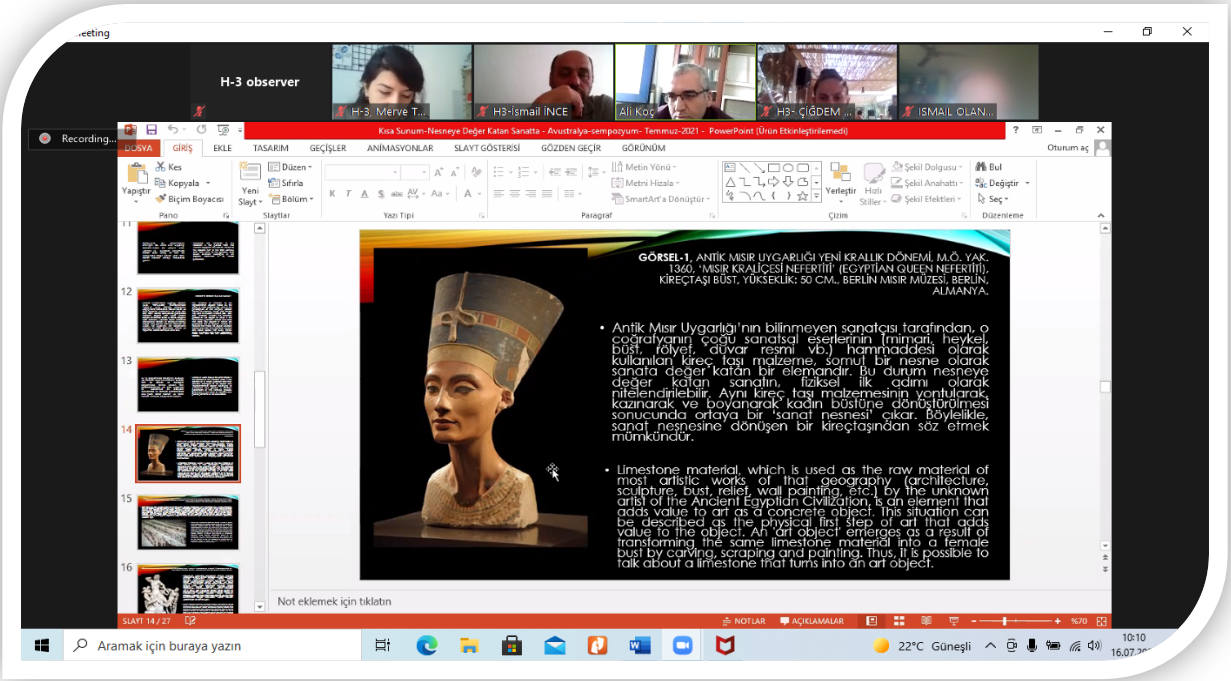
GALLERY


You are viewing H6-Kübra Ka's screen
View Options
Observer H6 Alina
H6-Kübra Ka
H6-Serpil KAR
H6- Fatih Taş
Gulnara Mamm...
Varela E.A
Recording...
Remaining : 09:04:52
Participants (15)
Find a participant
Observer H6 Alina (Co-host, me)
H6-Kübra Ka
Ali Osman KAYA
Cuma ECE
Ferhat Çaytut
FILIPPOS FILIPPOU
Gulnara Mammadzada
H6- Fatih Taş
H6-Serpil KAR
H6-Simge Taslica
Hall 6- Ioannidis Vasilis
Hall-6, Mehmet Gökhan GENEL
Mert Şener
Oguz Gurses
Varela E.A
Konvansiyonel Medya ve Önyargılar
150 kiloluk hippi Mary yürüdükçe sokakları titretiyor
8 Haziran 1971 tarihli Hürriyet Gazetesi'nde, "150 kilo olduğu için memleketi Teksas'ta koca bulamaması ve İstanbul'da koca avına çıktığında sokakları titretmesi" şeklinde haber yapılan olan Mary adındaki kadın, buna çarpıcı bir örnektir. Fiziki görünümü alaycı bir dille haberleştirilen kadın, "hippi" ifadesiyle de etiketlenmektedir.
Bu haber şu soruyu beraberinde getirmektedir: "Mary, kadını idealize eden ölçülere sahip olsaydı nasıl bir dille haberleştirilecekti?"
Kaynak: 8 Haziran 1971, Hürriyet Gazetesi
Click to add notes
4 unassigned participants
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
Mute All

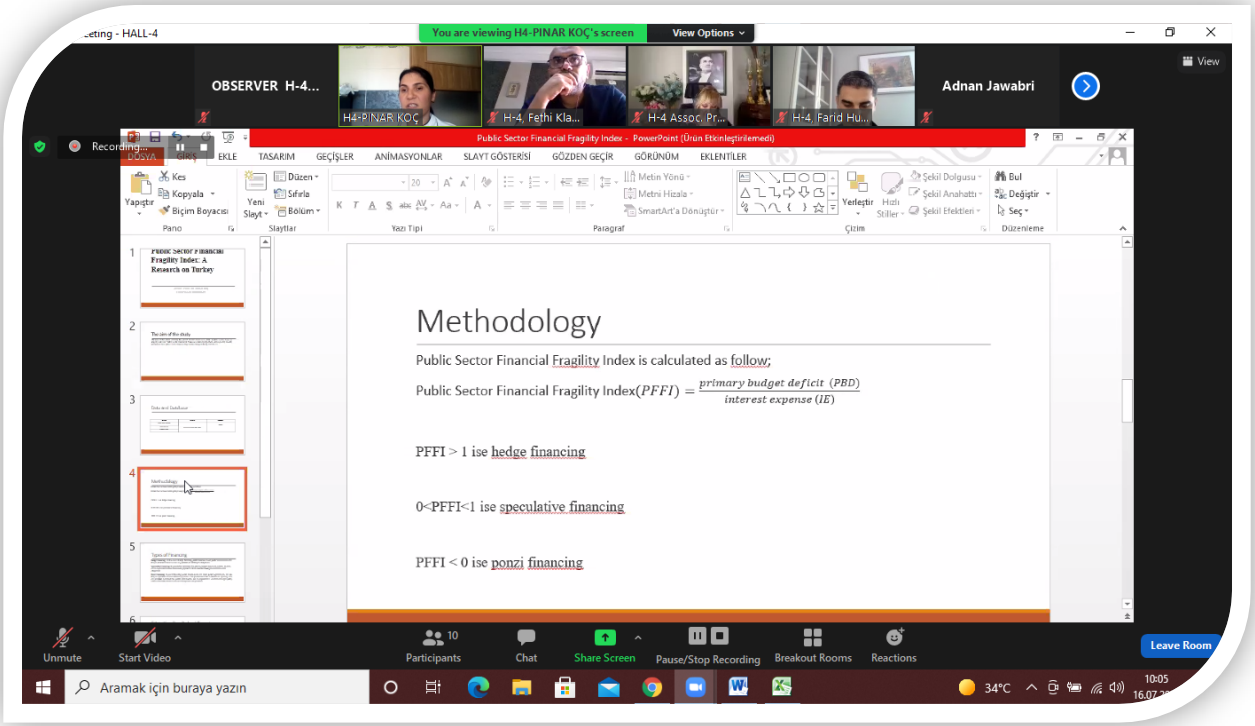

Remaining : 09:21:30
H-3. Grozi DELCHEV
Hall-3. Observer...
Hassan Aliyu
H3-Nevin AKDURA
H3-Kochar Khasro Saleh
H-3 Mete TÜRKOĞLU
Anam Zaidi
Ş
H3-Şeyda Şimşek
Zoom user
noor witwit

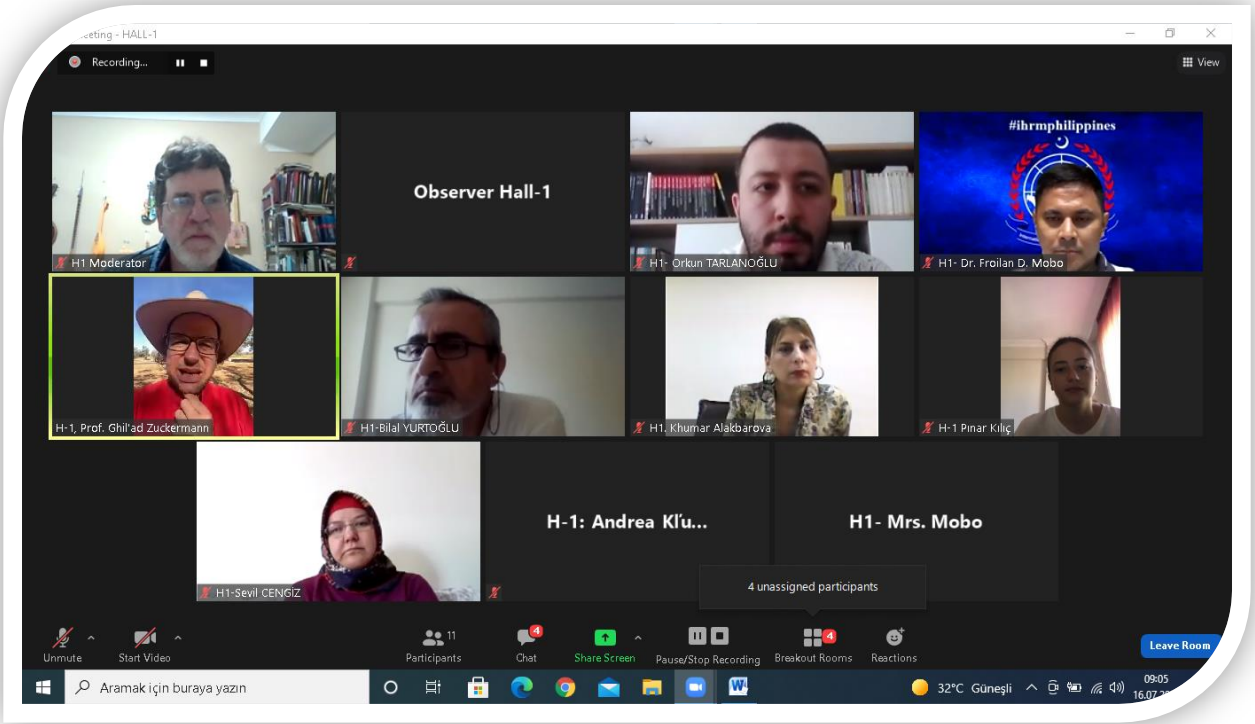
GALLERY


Recording...
Remaining : 09:44:37
View
Hall2, Tami MEREDITH
Hall-2, Observer, Atabek
H2 - Yeşim Aygül
MEHMET ÖZBAŞ
H-2, Tülin Atan
H2 – Nguyen Hieu Thanh
Hall 2 - Bui Anh Tuan
Hall-2, Nguyen Ngoc Phuong Anh
H2 Hayati DOKDEMİR
Hall 2-Huynh Tuyet Ngan
H2-Bui Hoang Tan
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions

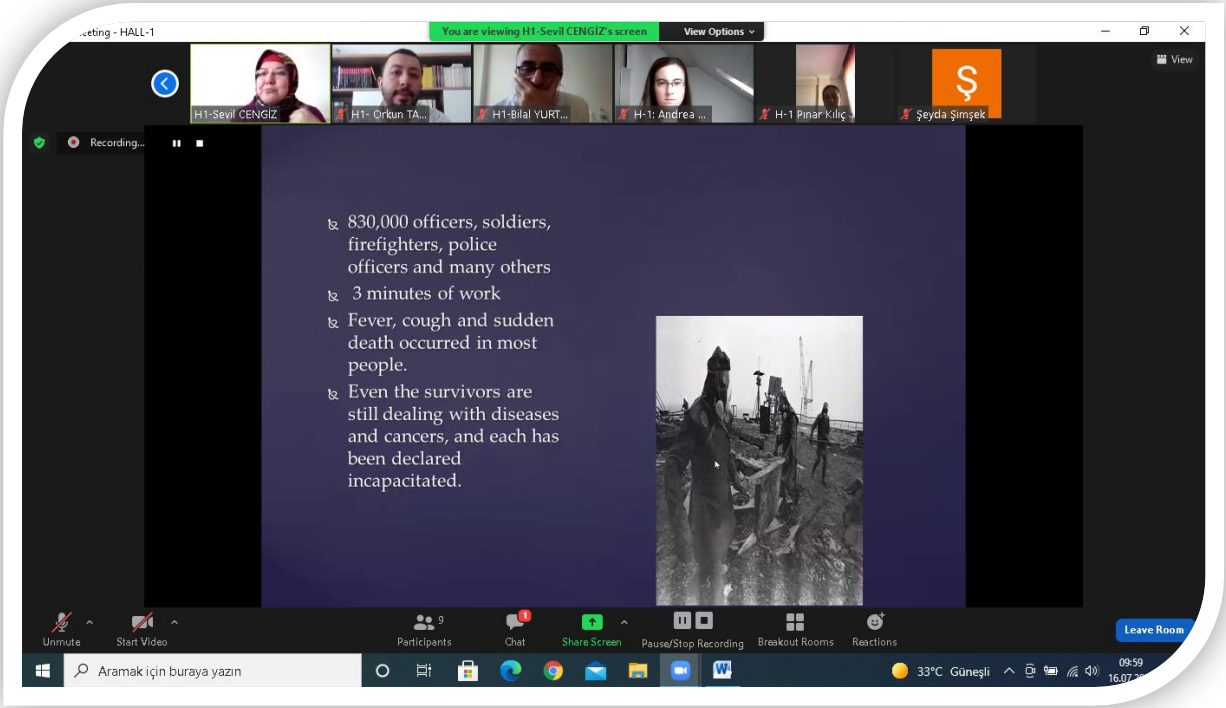

H-3 observer
H-3, Merve T...
H3-İsmail İNCE
Ali Koç
H3- ÇİĞDEM ...
İSMAİL OLAN...
Recording...
Kısa Sunum-Nesneye Değer Katan Sanatta - Avustralya-sempozyum- Temmuz-2021 - PowerPoint (Ürün Etkinleştirilemedi)
GÖRSEL-1, ANTİK MISIR UYGARLIĞI YENİ KRALLIK DÖNEMİ, M.Ö. YAK. 1360, 'MISIR KRALİÇESİ NEFERTİTİ' (EGYPTIAN QUEEN NEFERTITI), KİREÇTAŞI BÜST, YÜKSEKLİK: 50 CM., BERLİN MISIR MÜZESİ, BERLİN, ALMANYA.
• Antik Mısır Uygarlığı'nın bilinmeyen sanatçısı tarafından, o coğrafyanın çağdaş sanatsal eserlerinin (mimari, heykel, büst, tüyef, duvar resmi vb.) hammaddesi olarak kullanılan kireç taşı malzeme, somut bir nesne olarak sanata değer katan bir elemandır. Bu durum nesneye değer katan sanatın, fiziksel ilk adımı olarak nitelendirilebilir. Aynı kireç taşı malzemesinin yontularak, kazınarak ve boyanarak kadın büstüne dönüştürülmesi sonucunda ortaya bir 'sanat nesnesi' çıkar. Böylelikle, sanat nesnesine dönüşen bir kireçtaşından söz etmek mümkündür.
• Limestone material, which is used as the raw material of most artistic works of that geography (architecture, sculpture, bust, relief, wall painting, etc.) by the unknown artist of the Ancient Egyptian Civilization, is an element that adds value to art as a concrete object. This situation can be described as the physical first step of art that adds value to the object. An 'art object' emerges as a result of transforming the same limestone material into a female bust by carving, scraping and painting. Thus, it is possible to talk about a limestone that turns into an art object.
Not eklemek için tıklatın
Aramak için buraya yazın
22°C Güneşli

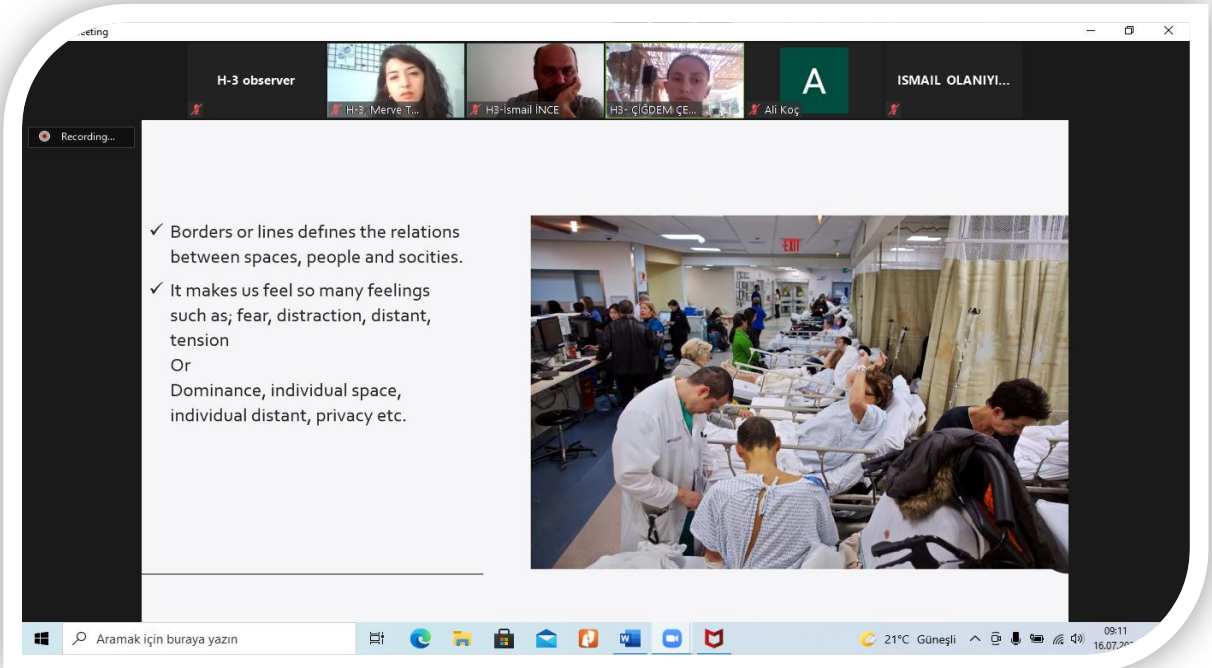
GALLERY


You are viewing H4-PINAR KOÇ's screen
View Options
OBSERVER H-4...
Adnan Jawabri
Methodology
Public Sector Financial Fragility Index is calculated as follow;
PFFI > 1 ise hedge financing
0<PFFI<1 ise speculative financing
PFFI < 0 ise ponzi financing
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room


Observer Hall-1
H1 Moderator
H1- Orkun TARLANOĞLU
H1- Dr. Froilan D. Mobo
H-1, Prof. Ghil'ad Zuckermann
H1-Bilal YURTOĞLU
H1. Khumar Alakbarova
H-1 Pınar Kılıç
H1-Sevil CENGİZ
H-1: Andrea Kl'u...
H1- Mrs. Mobo
4 unassigned participants
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room

GALLERY


You are viewing H1-Sevil CENGİZ's screen
View Options
H1-Sevil CENGİZ
H1- Orkun TA...
H1-Bilal YURT...
H-1: Andrea ...
H-1 Pınar Kılıç
Şeyda Şimşek
Recording...
830,000 officers, soldiers, firefighters, police officers and many others
3 minutes of work
Fever, cough and sudden death occurred in most people.
Even the survivors are still dealing with diseases and cancers, and each has been declared incapacitated.
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
Aramak için buraya yazın
33°C Güneşli


H-3 observer
H-3: Merve T...
H3-İsmail İNCE
H3- ÇİĞDEM ÇE...
Ali Koç
ISMAIL OLANIYI...
Recording...
✓ Borders or lines defines the relations between spaces, people and socities.
✓ It makes us feel so many feelings such as; fear, distraction, distant, tension
Or
Dominance, individual space, individual distant, privacy etc.
Aramak için buraya yazın
21°C Güneşli

5TH ASIA PACIFIC INTERNATIONAL MODERN SCIENCES CONGRESS

PROGRAM



July 16-18, 2021
Sydney, Australia

Meeting ID: 879 8621 7041
Passcode: 554701

ZOOM
Meeting ID: 879 8621 7041
Passcode: 554701

-Opening Ceremony-

16.07.2021
Sydney Local Time: 15:30–16:00
Ankara Local Time: 08:30–09:00

Dr. Alan Reed Libert
University of Newcastle, Callaghan, Australia
Congress Head
Welcoming Speech

Prof. Dr. Ghil'ad Zuckermann
Keynote Speaker
University of Adelaide, Australia
"Revivalistics"

Zoom Meeting ID: 879 8621 7041
Zoom Passcode: 554701

Participant Countries (24)

Australia, Morocco, Azerbaijan, India, Malaysia, Bulgaria, Ethiopia, Philippines, Iraq, Ukraine, Cyprus, Saudi Arabia, Pakistan, Greece, Nigeria, United Arab Emirates, Vietnam, Canada, Mexico, Brazil, Georgia, Republic of Moldova, Bangladesh, Slovakia

ZOOM
Meeting ID: 879 8621 7041
Passcode: 554701

16.07.2021 | HALL-1

Canberra Local Time: 16^{00}-18^{30}

Ankara Local Time: 09^{00}-11^{30}

SOCIAL SCIENCE SESSION

HEAD OF SESSION: Dr. Alan Reed Libert		
Prof. Dr. Ghil'ad Zuckermann	*University of Adelaide, Australia*	*REVIVALISTICS*
Dr. Alan Reed Libert	*University of Newcastle, Callaghan, Australia*	*A SURVEY OF FOODS NAMED AFTER ANKARA*
Dorcas Zuvalinyenga	*University of Newcastle, Callaghan, Australia*	*THE POLITICAL AESTHETICS OF UNOFFICIAL PLACE NAMING*
DR. FROILAN D. MOBO	*Philippine Merchant Marine Academy, Philippines*	*THE RESEARCH CULTURE AMIDST THE PANDEMIC*
Assist. Prof. Alakbarova Khumar Elqam	*Institute of Oriental Studies named after academician Bunyadov Z. of ANAS*	*NEW ERA EGYPTIAN NOVELISM ABOUT THE ADVERSE IMPACT OF WAR*
Assist. Prof. Dr. Sevil CENGİZ	*Gümüşhane University, Turkey*	*A PAGE FROM THE HISTORY OF THE DISASTER: CHERNOBIL ACCIDENT*
Assoc. Prof. Dr. Bilal Yurtoğlu	*Kastamonu University, Turkey*	*THE FIRST TRANSLATION ABOUT THE PHILOSOPHY OF HISTORY FROM THE WEST IN THE OTTOMAN EMPIRE: "TÂRÎH-İ TERAKKİ"*
Prof. Dr. Ramazan Şengül *Pınar Kılıç*	*Kocaeli University, Turkey*	*THE PLACE OF CITY COUNCILS IN THE PARTICIPATION PROCESS IN LOCAL GOVERNMENTS*
Orkun Tarlanoğlu	*Kırşehir Ahi Evran University, Turkey*	*INVESTIGATIVE STUDY ON GLOBALIZATION WITHIN THE FRAMEWORK OF THE COVID-19 EPIDEMIC*
Andrea Kľučarová Vladimír Šebeň	*The University of Prešov, Slovakia*	GENDER DIFFERENCES IN STUDENTS´ CRITICAL THINKING

ZOOM
Meeting ID: 879 8621 7041
Passcode: 554701

16.07.2021 | HALL-2

Canberra Local Time: 16^{00}-18^{30}

Ankara Local Time: 09^{00}-11^{30}

SCIENCE SESSION

HEAD OF SESSION: Prof. Dr. Bahtiyar A. Mamedov		
Bless Aldon Saidon	*Keningau Vocational College, Malaysia*	IMPROVING THE SAFETY OF CIRCUIT BOARD THROUGH AUTOMATED ALERT AND PROTECTION SYSTEM
Yusuf Ziya ÇİÇEK Assoc. Prof. Dr. Ercan ŞENYİĞİT	*Institutional Development and Planning Office, Turkey* *Erciyes University, Turkey*	SIMULTANEOUS OPTIMIZATION OF COATING ADHESION STRENGTH AND GALVANIZED CONSUMPTION IN HOT DIP GALVANIZING PROCESS WITH TAGUCHI-BASED GRAY RELATIONSHIP ANALYSIS METHOD
Yusuf Donat Halis Çelik	*Fırat University, Turkey*	INVESTIGATION OF THE METALLURGICAL EFFECTS OF BI AND IN REINFORCEMENT ON LEADED AND LEAD-FREE SOLDER WIRES INSTEAD OF AG REINFORCED SOLDER WIRES
Ahmet Kazan Mustafa Altın	*Malatya Turgut Özal University, Turkey* *Bingöl University, Turkey*	LAPLACE-BELTRAMI OPERATOR ON MONGE HYPERSURFACES IN
Dr. Ali Ercetin	*Bingol University, Turkey*	PRODUCTION OF MG4AL-XSN MAGNESIUM ALLOYS THROUGH HOT PRESSING METHOD
Bahtiyar A. Mamedov Elif Somuncu	*Gaziosmanpasa University, Turkey* *Usak University, Turkey*	CALCULATION OF ENTROPY USING THIRD VIRIAL COEFFICIENT WITH KIHARA POTENTIAL
Elif Somuncu Bahtiyar A. Mamedov	*Usak University, Turkey* *Gaziosmanpasa University, Turkey*	CALCULATION OF COMPRESSBILITY COEFFICIENT WITH FOURTH VIRIAL COEFFICIENT
Berkay Eren PEHLİVANOĞLU Sefa Haktan HATIK	*Istanbul Rumeli University, Turkey* *Sinop University, Turkey*	CHIROPRACTIC APPLICATIONS IN GERIATRIC POPULATION

ZOOM
Meeting ID: 879 8621 7041
Passcode: 554701

16.07.2021 | HALL-3

Canberra Local Time: 16^{00}-18^{30}

Ankara Local Time: 09^{00}-11^{30}

SOCIAL SCIENCES AND ARTS SESSION

HEAD OF SESSION: Assist. Prof. Dr. Çiğdem ÇETİN		
Assist. Prof. Dr. Çiğdem ÇETİN Assist. Prof. Dr. Filiz ÇETİNKAYA KARAFAKI	*Yaşar University, Turkey* *Ankara University, Turkey*	DESIGN OF HOSPITAL EMERGENCY SERVICES AND EMERGENCY FRONT EXTERIOR SPACES
Assist. Prof. Dr. Filiz ÇETİNKAYA KARAFAKI Assist. Prof. Dr. Çiğdem ÇETİN	*Ankara University, Turkey* *Yaşar University, Turkey*	HEALING HOSPITALS AND HEALING HOSPITAL LANDSCAPE
İsmail İNCE M. Ergün HATIR	*Konya Technical University, Turkey* *Necmettin Erbakan University, Turkey*	INFRARED THERMOGRAPHY FOR PRE-DIAGNOSIS IN MONUMENTS BUILT FROM PYROCLASTIC BUILDING STONES
Res. Assist. Merve TEMİZ Assoc. Prof. Dr. Alper SAĞLIK	*Çanakkale Onsekiz Mart University, Turkey*	ACT LIKE NATURE FOR SUSTAINABILITY
Ali KOÇ Mehmet Akif KAPLAN	*Kahramanmaraş Sütçü İmam University, Turkey*	FROM ART ADDING VALUE TO THE OBJECT TO CONTEMPORARY ART THAT MAKES THE OBJECT VALUE
Mehmet Akif KAPLAN Ali KOÇ	*Kahramanmaraş Sütçü İmam University, Turkey*	SOCIAL DYNAMICS OF ARTISTIC REPRESENTATION
Ismail Olaniyi MURAINA Olayemi M. ADESANYA Moses AGOI	*Adeniran Ogunsanya College of Education, Nigeria*	SOCIETAL AND SCIENTIFIC PERCEPTIONS TOWARDS 5G NETWORKS INTRODUCTION
Aysel Hüseynzadə Amil qızı Prof. Dr. Hacıyeva Səbinə	*Azərbaycan Memarlıq və İnşaat University*	WAYS OF DEVELOPMENT OF LANKARAN ARCHITECTURE

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BUSINESS ADMINISTRATION SESSION

HEAD OF SESSION: Assoc. Prof. Dr. F. Oben ÜRÜ		
Asst. Prof. Dr. Fatih Ferhat ÇETİNKAYA Hamdi Orhun GÜLBAHAR	*Kırşehir Ahi Evran University, Turkey* *Nevşehir Hacı Bektaş Veli University, Turkey*	VIKOR METHOD AS ONE OF THE MULTI-CRITERIAL DECISION MAKING TECHNIQUES AND ITS USAGE IN LOCATION SELECTION
Dr. Farid Huseynov Dr. Büşra Özdenizci Köse	*Gebze Technical University, Turkey*	A SURVEY STUDY EVALUATING INTERNET USERS' PRONENESS TO FALL PREY TO SOCIAL ENGINEERING ATTACKS
Fethi Klabi	*King Khalid University, Saudi Arabia*	TO WHAT EXTENT THE PSYCHOLOGICAL IMPACT OF COVID-19 AFFECTS THE TRAVELING BEHAVIOR OF SAUDIS
Dr. Muhammad Emad Al Shaikh	*Imam Abdulrahman Bin Faisal University, Saudi Arabia*	DESIGNING CURRICULUM FOR ENTREPRENEURIAL MARKETING
Assoc. Prof. Dr. F. Oben ÜRÜ Assoc. Prof. Dr. Ebru GÖZÜKARA Assoc. Prof. Dr. Yağmur ÖZYER AKSOY Assist. Prof. Dr. Yasin AKSOY	*Istanbul Arel University, Turkey*	THE GOOD, THE BAD, AND THE UGLY SIDES OF DIGITAL SURVEILLANCE OF REMOTE EMPLOYEES
Assist. Prof. Dr. Pınar KOÇ	*Gümüşhane University, Turkey*	PUBLIC SECTOR FINANCIAL FRAGILITY INDEX: A RESEARCH ON TURKEY
Adnan Jawabri Rouhi Faisal Maitha Al Baloushi	*Khawarizmi International College, United Arab Emirates*	THE IMPACT OF PERFORMANCE MANAGEMENT ON EMPLOYEE PRODUCTIVITY AT AL AIN ZOO, UAE
Atamoğlan MƏMMƏDLİ	*Baku State University, Azerbaijan*	MAIN FEATURES OF ECONOMIC COOPERATION BETWEEN IRAN AND TURKMENISTAN (1979-2000)

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HEALTH AND MEDICAL SCIENCES SESSION

HEAD OF SESSION: Asst. Prof. Gheorghe BORDENIUC		
M. Berk Toker Selim Alcay Elif Gokce Burcu Ustuner	*Bursa Uludag University, Turkey* *Tekirdağ Namık Kemal University, Turkey*	INVESTIGATION OF THE SUCCESS FOR RAM SEMEN CRYOPRESERVATION WITH VARIOUS ANTIOXIDANTS IN A LECITHIN BASED EXTENDER
Assist. Prof. Dr. Nevra Alkanli Alev Bakir	*Haliç University, Turkey*	INVESTIGATION OF THE ROLES OF MTHFR (C677T AND A1298C) GENE VARIATIONS IN ISCHEMIC STROKE PATIENTS WITH ATRIAL FIBRILLATION
Arzu Ay	*Trakya University, Turkey*	INVESTIGATION OF THE RELATIONSHIP BETWEEN CYTOCHROME P4501A1 (CYP1A1) A5360C (RS 2606345) GENE VARIATION AND SERUM SELENIUM LEVELS IN COLORECTAL CANCER DEVELOPMENT
Dr. Binyam Zigta	*Wolaita Sodo University, Ethiopia*	NUMERICAL STUDY OF PHYSIOLOGICAL BLOOD FLOW WITH STRETCHING CAPILLARY ON MHD MICROPOLAR FLUID
Assoc. Prof. Dr. Muhammad Bilal Khan Niazi Umer Shehzad Malik Zaib Jahan	*National University of Sciences and Technology, Pakistan*	BIO-POLYMER BASED SELF-HEALING HYDROGEL MEMBRANE FOR WOUND DRESSING APPLICATIONS
Mohauman Mohammed Majeed AL-Rufaie	*Kufa University, Iraq*	INDIRECT SPECTROPHOTOMETRIC DETERMINATION OF AMOXICILLIN IN PHARMACEUTICAL PREPARATIONS
Asst. Prof. Gheorghe BORDENIUC Prof. Dr. Victor LACUSTA Prof. Dr. Valeriu FALA	*State University of Medicine and Pharmacy, Republic of Moldova*	SELF-HELP METHOD IN THE EXACERBATION OF MASTICATORY MUSCLE DISORDERS
Noor witwit	*University of Baghdad, Iraq*	EXAMINATION OF MULTIPLE ANTIBIOTIC RESISTANT STREPTOCOCCUS PNEUMONIAE AND STAPHYLOCOCCUS AUREUS ISOLATED FROM PHARYNGITIS PATIENTS

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Multidisciplinary

HEAD OF SESSION: Assoc. Prof. Dr. Ebru Gozukara		
Doç. Dr. Ümit AYATA Prof. Dr. Bekir Cihad BAL	*Bayburt University, Turkey* *Kahramanmaraş Sütçü İmam University, Turkey*	Investigation of Some Surface Properties and Shore D Hardness Value in Red Elm (Ulmus rubra) Heat-treated at 200 o C
Prof. Dr. Bekir Cihad BAL Doç. Dr. Ümit AYATA	*Kahramanmaraş Sütçü İmam University, Turkey* *Bayburt University, Turkey*	The Effect of Heat Treatment with Vegetable Oil on the Physical Properties of Black Pine Wood
Tolga ÖZKAPTAN	*Ankara University, Turkey*	LATIN AMERICA TRADE UNION MERCOSUR
Assoc. Prof. Tinatin Tcharkhalashvili	*Georgian Technical University, Georgia*	THE ROLE OF ONLINE LEARNING IN THE NEW EDUCATIONAL REALITY CAUSED BY THE PANDEMIC
Lanke Benedict AWOMAILO Sunday OJEDIRAN Johnson O. AYENI	*Yaba College of Technology, Nigeria*	The Role of Entrepreneurial Traits on Business Success. Evidence from Mushin Local Government Council of Nigeria
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Dr. Shweta Bambuwala	*Gujarat Technological University, India*	The Case of Yes Bank - An Indian bank in distress
Khalida Madoui	*ENSC Assia Djebar Constantine Algeria*	The Inner Child in our Classes

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ECONOMY SESSION

HEAD OF SESSION: Assoc. Prof. Mete BUMİN		
Assoc. Prof. Dr. Levent AKSU	*Balıkesir University, Turkey*	ECONOMIC AND SOCIAL ANALYSIS OF THE RELATIONSHIP BETWEEN INCOME DISTRIBUTION AND ECONOMIC GROWTH
Kshitij Tewari	*School of Planning and Architecture, India*	APPLICATION OF ENVIRONMENTAL ECONOMICS CONCEPTS TO RESOLVE THE CONSTRUCTION RELATED ENVIRONMENTAL CONCERNS
Dr. Anton Filipenko	*Taras Shevchenko national university of Kyiv , Ukraine*	LOGICAL PROBABILITY OF RISK PREDICTON
Dr. Kamran Ahmed Siddiqui	*Imam Abdulrahman Bin Faisal University, Saudi Arabia*	ANALYZING VISION STATEMENTS OF INTERBRAND'S TOP 100 GLOBAL BRANDS
Ahmadova Turkan Yusuf kizi Safarova Chinara Gabil kizi	*Azerbaijan State University*	THE IMPORTANCE OF INNOVATIVE INVESTMENT IN MODERN PERIOD
Assoc. Prof. Nurgün TOPALLI	*Nevşehir Hacı Bektaş Veli University, Turkey*	STATIONARITY OF CARBON DIOXIDE EMISSIONS PER CAPITA IN TURKEY: THE FOURIER APPROACH
Assoc. Dr. Ebrucan İslamoğlu Aleyna Çeviker	*Nevşehir Hacı Bektaş Veli University, Turkey*	MEASURING THE EFFECT OF FINANCIAL LITERACY ON THE FINANCIAL CONSUMER: THE CASE OF NEVŞEHİR PROVINCE
Assoc. Dr. Ebrucan İslamoğlu Birsen Karslıoğlu	*Nevşehir Hacı Bektaş Veli University, Turkey*	THE EFFECTS OF THE FEAR OF MISSING OUT (FOMO) IN SOCIAL MEDIA ON TURNOVER INTENTIONS (THE CASE OF TURKEY)
Assoc. Prof. Mete BUMİN	*Banking Regulation and Supervision Agency, Turkey*	ANALYSIS OF BRANCH AND PERSONNEL BASED PRODUCTIVITY INDICATORS IN THE TURKISH BANKING SECTOR
Géssica Cappellesso Manuela Gonçalves Barros Marco Aurélio dos Santos	*University of Brasília, Brazil*	BOOK-TAX CONFORMITY AND ITS INFLUENCE ON FIRMS' CAPITAL STRUCTURE

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BEHAVIOURAL SCIENCES AND EDUCATION SESSION

HEAD OF SESSION: Prof. Dr. Tülin ATAN		
Hayati DOKDEMİR Prof. Dr. Mehmet ÖZBAŞ	*Ege University, Turkey* *Erzincan Binali Yıldırım University, Turkey*	A GENERAL OVERVIEW OF EDUCATION AND TEACHING IN BYZANTINE
Nguyen Ngoc Phuong Anh Huynh Tuyet Ngan	*Can Tho University, Vietnam*	ARTIFICIAL INTELLIGENCE IN MATHEMATICS EDUCATION: AN EMPIRICAL STUDY OF USING CHATBOT IN TEACHING AND LEARNING MATHEMATICS AT VIETNAMESE HIGH SCHOOLS
Nguyen Hieu Thanh Bui Anh Tuan	*Can Tho University, Vietnam*	USING ARTIFICIAL INTELLIGENCE IN ASSESSING STUDENTS' ACHIEVEMENT AT HIGH SCHOOLS: A CASE STUDY IN MATHEMATICS
Prof. Dr. Tülin ATAN Assist. Prof. Dr. Şaban ÜNVER	*Ondokuz Mayıs University, Turkey*	ANALYSIS OF THE STRESS FACTORS OF BASKETBALL REFEREES
Prof. Dr. Tülin ATAN Assist. Prof. Dr. Şaban ÜNVER	*Ondokuz Mayıs University, Turkey*	EXAMINATION OF THE INTERNET ADDICTION LEVEL OF UNIVERSITY STUDENTS
MSc. Yeşim AYGÜL Asst. Prof. Onur UĞURLU Prof. Dr. Urfat NURİYEV	*Ege University, Turkey* *Bakırçay University, Turkey*	A SOLUTION FRAMEWORK FOR SUPER CONNECTIVITY PROBLEM
Bui Hoang Tan Bui Anh Tuan	*Can Tho University, Vietnam*	THE TREND OF USING TEXT MINING TECHNIQUES IN HISTORICAL TEACHING AND RESEARCH: AN ANALYSIS OF DOCUMENTS ON LAND OWNERSHIP IN THE MEKONG DELTA FROM 1955 TO 1975
Tami Meredith Maryanne Fisher	*Dalhousie University, Canada* *Saint Mary's University, Canada*	ISSUES IN PERFORMING OBSERVATIONAL RESEARCH ON HUMANS

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HEAD OF SESSION: Assoc. Prof. Dr. Grozi Delchev		
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Assoc. Prof. Dr. Grozi Delchev	*Trakia University, Bulgaria*	SELECTIVITY AND STABILITY OF HERBICIDES AND HERBICIDE TANK MIXTURES ON DUO SYSTEM AND COVENTIONAL GRAIN MAIZE (ZEA MAYS L.)
Aysel Hüseynzadə Amil qızı Prof. Dr. Hacıyeva Səbinə	*Azerbaijan University of Architecture and Construction*	HOUSES AND LAMS (FUNCTIONAL DIFFERENCE BETWEEN HOUSES AND LAMS)
HAMDAOUI NORA MOUNCIF Mohamed MENNANE Zakariae OMARI Abdeloudoude MEZIANE Mustapha	Sciences, University Mohammed I, Morocco	MICROBIOLOGICAL AND PHYSICOCHEMICAL QUALITY OF PASTEURIZED MILK INTENDED FOR THE MANUFACTURE OF DAIRY PRODUCTS IN THE GHARB REGION OF MOROCCO
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Kochar K. SALEH Semih DALKILIÇ Sevda KIRBAĞ	*Erbil Polytechnic University, Iraq* *Firat University, Turkey*	INHIBITORY EFFECTS OF DESERT TRUFFLES ON BREAST AND LUNG CANCER CELL LINE GROWTHS VIA UP-REGULATION OF P53, P21, AND CYCLIN-DEPENDENT KINASE INHIBITOR
Mete TÜRKOĞLU Verdiyeva Vəfa Qaçay qızı	*Iğdır Provincial Directorate of Nature Conservation and National Parks, TURKEY* *ADAU, Azerbaijan*	BIRD RINGING IN IĞDIR, CONTRIBUTION OF BIRDS TO AGRICULTURE AND FORESTS IN THE WORLD

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BIOSCIENCE SESSION

HEAD OF SESSION: Dr. Muhammad Imran		
Hassane ABD-DADA Said BOUDA Abdelmajid HADDIOUI	*Sultan Moulay Slimane University, Morocco*	PHENOTYPIC DIVERSITY OF NATURAL POPULATIONS OF AN ENDEMIC PLANT (EUPHORBIA RESINIFERA) ORIGINATING FROM MOROCCAN MIDDLE AND HIGH ATLAS MOUNTAIN
Maria EL OUAZZANI Abdelmajid HADDOUI	*Sultan Moulay Slimane University, Morocco*	ASSESSMENT OF PURIFYING PERFORMANCE OF A WASTEWATER NATURAL LAGOON UNDER AN ARID CLIMATE CASE STUDY: ZAOUIAT-CHEIKH CITY -MOROCCO
Md. Mahbubor Rahman Prof. Dr. Ismail KARACAN	*Bangladesh University of Textiles, Bangladesh Erciyes University, Turkey*	IMPACT OF OXIDATIVE STABILIZATION OF JUTE FIBERS PRIOR TO CARBONIZATION AND ACTIVATION: TGA AND FT-IR ANALYSIS
Dr. Muhammad Imran Mr. Muhammad Abdul Rahim Dr. Muhammad Nadeem	*Government College University, Pakistan University of Veterinary and Animal Sciences, Pakistan*	FUNCTIONAL APPLICATIONS AND CHEMICAL COMPOSITION OF MUSTARD (BRASSICA) SEED OIL
Doan Ngoc Sinh Ngo Thai Bich Van	*Quality assurance and testing center, Vietnam University of Sciences and Technology, Vietnam*	SETTING UP RAPID DETECTION AND QUANTIFICATION OF LISTERIA MONOCYTOGENES IN FOODS BY REALTIME PCR
Álvaro de Jesús Ruíz-Baltazar	Universidad Nacional Autónoma de México	SYNTHESIS OF THE FEXOY NANOPARTICLES BY GREEN ROUTES BASED ON PLANT EXTRACTS: STRUCTURAL AND SPECTROSCOPIC CHARACTERIZATION
Şükrü KALAYCI	*Gazi University, Turkey*	DETERMINATION OF CHLORIDE AMOUNTS IN SOME WATER SAMPLES
Şükrü KALAYCI	*Gazi University, Turkey*	THE AMOUNT OF MOLYBDENE IN DRIED LEGUMES DETERMINATION WITH ION SELECTOR ELECTRODE
Youssef KHACHTIB Lalla Hasna ZINELABIDINE Said BOUDA Youssef AIT BELLA Abdelmajid HADDIOUI	*Sultan Moulay Slimane University, Morocco*	MOLECULAR CHARACTERIZATION OF APPLE CULTIVARS FROM MOROCCO USING MICROSATELLITE (SSR) MARKERS

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SOCIAL SCIENCE AND EDUCATION SESSION

HEAD OF SESSION: Assist. Prof. NIMBLE O J		
Marklin Muilin Sirhajwan Idek	*Keningau Vocational College, Malaysia*	EDUCATING STUDENTS TO BECOME KNOWLEDGE CONSTRUCTORS TO OPTIMIZE THE UBIQUITY OF INFORMATION
Prof. Dr. Wagida W.Kamle Hala A. Ahmed Bushra Musa Almuthibi	*King Khalid University, Saudi Arabia*	EFFECTIVENESS OF HEALTH EDUCATION PROGRAM ABOUT CORONAVIRUS (COVID-19) KNOWLEDGE AMONG FEMALE STUDENTS IN ABHA CITY, KSA
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Assıst. Prof. NIMBLE O J Dr. BIBIL BABU C	*Presidency College, India* *Royal Dental College, India*	AWARENESS AND ATTITUDE TOWARDS WOMEN'S HEALTH: WHAT HAVE WE LEARNED?
Naseem Hyder Rajput	*Shaheed Benazir Bhutto University, Pakistan*	PERCEIVED EFFECTIVENESS OF BIOMETRIC ATTENDANCE TAKING EXERCISE IN PUBLIC SECONDARY SCHOOLS
Remzi AKTAY	*MEB, Turkey*	RY Symmetric Encryption Algorithm
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SİBEL ORHAN MUHAMMET GÜMÜŞ EMİNE KIZILKAYA ELİF MALTAŞ	*Namık Kemal University, Turkey* *Cumhuriyet University, Turkey* *Karamanoğlu Mehmet Bey University, Turkey* *Hacı Bayram Veli University, Turkey*	A GENERAL RESEARCH ON TRADITIONAL/COMPLEMENTARY MEDICINE INITIATIVES AND STRATEGIES

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ENGINEERING, HEALTH SESSION & SCIENCES

HEAD OF SESSION: Assoc. Prof. Dr. Mehmet Gökhan GENEL		
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Simge Taşlıca Zafer Filik Erbil İyim Aydoğan Özdamar	*Ege University, Turkey* *Valf Sanayi A.Ş.*	MATHEMATICAL MODELLING AND NUMERICAL ANALYSIS OF FLOW IN SPRING-LOADED CHECK VALVE
Dr. Öğr. Üyesi Güneş BOLATLI Dr. Mahinur ULUSOY Dr. Öğr. Üyesi Fatih TAŞ Assoc. Prof. Dr. Naci Ömer ALAYUNT Prof. Dr. İsmail ZARARSIZ	*Siirt University, Turkey* *Selçuklu Community Health Center, Turkey* *Girne American University, Cyprus*	EFFECT OF OMEGA-3 FATTY ACID ON CONTRAST-INDUCED NEPHROPATHY
Atamoğlan MƏMMƏDLİ	*Baku State University, Azerbaijan*	MAIN FEATURES OF ECONOMIC COOPERATION BETWEEN IRAN AND TURKMENISTAN (1979-2000)
Varela E.A. Rokka, St. Mavridis, G. Ferekidis, K. Filippou, F.	*Democritus University of Thrace, Greece*	The Motivational Climate in Physical Education in Greek Educational Context: Gender Effects
Gülnarə MƏMMƏDZADƏ	*Baku State University, Azerbaijan*	TURKEY'S ATTITUDE TO THE MIDDLE EAST PROBLEM (1979-2004)
Assoc. Prof. Dr. Mehmet Gökhan GENEL Kübra KARAHANOĞLU	*Yalova University, Turkey*	THE ROLE OF THE MEDIA IN THE TRANSFORMATION OF PREJUDGES INTO FINAL JURISDICTIONS
Assoc. Prof. Dr. Mehmet Gökhan GENEL Serpil KAR	*Yalova University, Turkey*	THE RELATIONSHIP WITH CINEMA-TRUTH IN THE CONTEXT OF THE MATRIX MOVIE
Öğr. Gör. Dr. Semra Çetin Arş. Gör. Dr. Cuma Ece	*Sakarya Uygulamalı Bilimler University, Turkey*	Sports in Children in Ancient Times, Turks, Mesopotamia and Egypt
Ioannidis, V.I. Filippou, F. Batsiou, S. Rokka, St.	*Democritus University of Thrace, Greece*	THE DANCE AS A MEANS OF IMPROVING BODY HEALTH AND QUALITY OF LIFE CANCER PATIENT

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A SURVEY OF FOODS NAMED AFTER ANKARA

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Abstract

Ankara is not seen as a major culinary center. However, one can find foods named after it in a variety of countries. This paper will be a survey of such foods. For example, an Ankara Omelette is available at the Cafe Fulya in Philadelphia and on the internet there is a recipe for Zucchini Ankara (<https://www.food.com/recipe/zucchini-ankara-135378>). Issues to be examined will be which types of foods seem most often to include Ankara in their names and which countries and regions have restaurants which serve dishes named after Ankara. Of course one would expect some foods and restaurants to have such foods and names, but there may also be some surprises, e.g. an Ankara Salad available in a food court in Nairobi, Kenya (although the food court itself is called the Ankara Food Court, so in this case what is surprising is the name of the food court, not the name of the dish). The focus will be on food names in English, but those in other languages will also be brought up, e.g. the French Petit déjeuner "Ankara" (https://www.soscuisine.com/recette/petit-dejeuner-ankara) and the Turkish Ankara Çorbası (https://www.haberturk.com/ankara-corbasi-tarifi-nasil-yapilir-yemekteyiz-hbrt-2532183). In some cases names are given in two languages, e.g. the Kuzu Ankara Tavası (Ankara-style Lamb Casserole) (der Haroutunian 2015:54). The ingredients of the foods will be discussed, as one or more ingredients might be responsible for the appearance of Ankara in their names. For example, one might be surprised to find a recipe for an Ankara Cocktail (http://kuletos.com.au/cocktails/How-To-Make-A/Ankara), but this cocktail contains rakı, which might well be the reason for its name.

Keywords: Food Names, Onomastics, Toponyms

INTRODUCTION

Ankara is not one of the world's culinary centers or a well-known source of particular types of foods. One might therefore expect that not many foods would be named after it. However, there are a few such foods; this paper will look at some of them. This survey is not meant to be comprehensive; for one thing, I will only be looking at sources available on the internet (e.g. online menus), and not, for example, at cookbooks which are only available as hard copies. Nevertheless, one may perhaps be able to get a general idea of the situation with respect to foods named after Ankara.

FOOD NAMES IN ENGLISH

We will start with food names in English, which will be the majority of names looked at here. An Ankara Burger is served at the Ankara Kebab restaurant in Givors, France. Oddly enough in the menu this is not listed among the burgers, but among the kebabs. The ingredients are "Kebab, jambon de dinde, crudités, oeuf, 2 cheddars" ('Kebab, turkey ham, crudités [raw vegetables], egg, 2 slices of cheddar cheese'; http://www.ankarakebab-

givors.fr/tag/ankara-kebab-givors/). One might suspect that this "burger" is named not directly after Ankara, but after the restaurant, which is named after Ankara.

The Cafe Fulya in Philadelphia served an Ankara Omelette, which was a "Three egg omelette with choice of beef sausage or pastrami" (https://www.yelp.com/menu/cafe-fulya-philadelphia). This restaurant apparently no longer exists, but there is one with a different name, There is a restaurant named Daffodil, at the same address, so perhaps the Cafe Fulya did not close, but just changed names and maybe also owners; in fact, one might argue that the name has not really changed: fulya is the Turkish word for 'jonquil', and jonquils are related to daffodils, and in fact some people see jonquils as a kind of daffodil. It also has an Ankara Omelette, with more details given in its menu (or perhaps it includes more ingredients); it is a "three-egg omelette with choice of beef pepperoni or pastrami. served with warm turkish [sic] bread, a side salad, a side of potatoes or sliced cucumbers and tomatoes" (https://www.menuwithprice.com/menu/the-daffodil/). As is usually the case with dishes named after Ankara, no information is given about why the Ankara Omelette is called such; given the original name of the restaurant, and the fact that there are Turkish and Mediterranean items on the menu, it is not a great surprise to find an omelette named after a Turkish city served here, but it is not clear why Ankara was chosen (rather than, say, Istanbul).

The Little Turkish Village Dining Lounge in Orleans, Ontario serves an Ankara Salad, which is a "Cold potato salad sprinkled with spring onions, capsicum pepper and finely chopped parsley. Olive oil and lemon juice" (https://turkishvillage.ca/menu/). Again no reason is given for the choice of name.

An Ankara Salad is also offered at the Ankara Food Court in Nairobi, Kenya. It consists of "Crispy chicken strips served with freshly prepared gardenlettuce [sic], tomatoes, cucumber and onions with your choice ofdressing [sic]" (https://food.jumia.co.ke/restaurant/k0pk/ankara-food-court). One might suspect that the name of the food court, and the salad, has nothing to do with the capital of Turkey; the same is probably true of the Ankara pancake with sweet peppers, spring onions, king prawns, spinach and palm oil dressing (https://daisuki-smile.blogspot.com/2017/09/ounje-nigerian-8-course-meal.html?m=1). These names may come from the word ankara, defined as "a type of cotton cloth featuring brightly colored patterns produced by means of a wax-resist dye technique, associated especially with West African fashion" (https://www.lexico.com/definition/ankara).

Another salad contains Ankara in its name, the Ankara Salad with Poppy Seed Dressing (Parve) (https://ku. hiloved. com/ankara-salad-with-poppy-seed-dressing-parve/) This recipe is in Kurmanji Kurdish; the ingredients include lettuce, a pomegranate, and an apple.

A cookbook, New Recipes from Moosewood Restaurant (The Moosewood Collective 1987) has a recipe for Zucchini Ankara (see Figure 1). Among its ingredients are olive oil, garbanzo beans, kalamata olives, and feta cheese. It is "[a]n unusual Mediterranean-style dish with a bright lemony flavor" (ibid.:126).

Figure 1. Zucchini Ankara (https://www.food.com/recipe/zucchini-ankara-135378)



There is a recipe for an Ankara Cocktail (http://kuletos.com.au/cocktails/How-To-Make-A/Ankara) It contains rakı, which might well be the reason for why it is named after a place in Turkey, although why Ankara was chosen is, again, not clear. Also, a cocktail named Ankara is served at the Shuka restaurant in New York (https:// 18575f51-352d-442f-b823-d15bb123573e.filesusr.com/ugd/3a1223_b0d5c54ca9be4251ae593d545df0593c.pdf).

ItcContains "scotch whisky, apricot liqueur, lemon-turmeric cordial, ginger" (ibid.), but not rakı, so there must be a different explanation for its name. The menu has other cocktails named after other cities in the Mediterranean region, Tunis, Haifa, and Tangier, so it is part of this set.

Perhaps as interesting as the food names which I found are those which I did not find; I have seen no foods or recipes named Ankara Chowder, Ankara Pudding, Ankara Soup, or Ankara Waffle(s). Some of these are not a surprise, e.g. waffles are not a typical Turkish food and may not be eaten much in Turkey, so one would not expect to find any waffles named after Ankara.

FOOD NAMES IN OTHER LANGUAGES

We will now see just a few food names in languages other than English which contain Ankara, starting with one in French. There is a recipe for a Petit déjeuner "Ankara" ('Ankara Breakfast'; https://www.soscuisine.com /recette/petit-dejeuner-ankara) (see Figure 2). Ingredients include a peach, "ou autre fruit de saison" ('or other season fruit'), and peanut butter. It seems difficult to figure out why it was named after Ankara.

Figure 2. Petit déjeuner "Ankara" (https://www.soscuisine.com/recette/petit-dejeuner-ankara)



Turning to food names in Turkish, there is a recipe for an Ankara Çorbası ('Ankara Soup'; https://www. haberturk.com/ankara-corbasi-tarifi-nasil-yapilir-yemekteyiz-hbrt-2532183) (see Figure 3). Its ingredients include minced meat, yogurt, and garlic.

Figure 3. Ankara Çorbası (https://www.haberturk.com/ankara-corbasi-tarifi-nasil-yapilir-yemekteyiz-hbrt-2532183)



An Ankara Pidesi (‘Ankara Pide’) is available at the Fermanlı Pide restaurant in Ankara) (http://www. fermanlipide.com/atlantis/resimler.html) (see Figure 4). No ingredient are given, but the restaurant is in Ankara, which might explain the name.

Figure 4. Ankara Pidesi (http://www.fermanlipide.com/atlantis/resimler.html)



Also, an Ankara Pidesi (Açık) (‘(Open) Ankara Pide’) is served at the Sampi Pide Çayyolu Ankara in Çankaya, Ankara (https://www.neredenekadarayenir.com/2021/05/sampi-pide-cayyolu-ankara-menu-fiyat-yorum.html). No information on ingredients is given, but again the restaurant is in Ankara, which could account for the name of this dish.

BILINGUAL FOOD NAMES

Finally, let us look at two cases where a name is given in more than one language; in both cases the languages involved are Turkish and English. Der Haroutunian (2015:54) contains a recipe for Kuzu Ankara Tavası / Ankara-style Lamb Casserole. As usual, no explanation of the name is given. Its ingredients include a carrot, green beans, and yogurt. The menu of the O’Döner restaurant in Dubai includes ‘Ankara’ Style Sautéed Meat / Ankara Tava, which is made up of “[s]low-cooked meat cubes with Orzo Pilaf” (https://www.odoner.com/O-Doner%20Menu.pdf) (see Figure 5). It is not clear what “Ankara style” means.

Figure 5. 'Ankara' Style Sautéed Meat (https://www.odoner.com/O-Doner%20Menu.pdf)



CONCLUSION

There do not seem to be many foods named after Ankara, but there are some of them. However, in most cases, it is not clear why Ankara is part of their name. It would be interesting to look at foods named after other cities in Turkey (especially those in languages other than Turkish); for example, are there many foods named after Izmir or Edirne?

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E^4'TE MONGE HİPERYÜZEYLERİ ÜZERİNDE LAPLACE-BELTRAMİ OPERATORÜ

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ÖZET

Riemannian manifoldu üzerinde tanımlanan Laplace-Beltrami operatörü, Laplacian'ın bir genellemesi olarak düşünülebilir.

Laplacian, kuantum mekaniği, sıvı akışı ve ısı için difüzyon denklemi, elektrik potansiyeli, yerçekimi potansiyeli ve dalga yayılımı gibi birçok fiziksel olayı tanımlayan diferansiyel denklemlerde kullanılır.

Ayrıca, 3-boyutlu uzay en basit anlamıyla nesnelerin boyutlarını veya konumlarını tanımlamak için kullanılan uzay olarak düşünülebilir. 4-boyutlu uzay ise, 3-boyutlu uzayın geometrik bir genişletilmesi olarak düşünülebilir. Bu bağlamda, ilk olarak Jean le Rond d'Alembert, 1754 yılında yayınlanan "Dimensions" adlı makalesinde 3-boyutlu uzaya dördüncü bir boyut ekledi; ardından J.L. Lagrange, bu uzayı geliştirdi ve bundan da yaklaşık 100 yıl sonra da 4-boyutlu uzay kavramı B. Riemann tarafından tam olarak tanımlandı. 4-boyutlu uzay kavramı, Charles Howard Hinton'un 1880 yılında yayınlattığı "What is the Fourth Dimension" başlıklı makalesinin ardından daha da popüler olmaya başladı. Böylece, boyutları 3'ten daha büyük olan uzaylar, modern fizik ve matematiğin ifade edilmesinde temel kavramlardan biri haline geldi.

Bununla birlikte, 3 ve 4-boyutlu uzaylarda önemli bir çalışma alan olan Monge (hiper)yüzeyleri ile ilgili pek çok çalışma bulunmaktadır. Bu bağlamda, $F: U \longrightarrow R$ diferensiyellenebilir bir fonksiyon olmak üzere, 4-boyutlu Öklidyen uzayında Monge hiperyüzeyi

$$M: U \subset R \longrightarrow R^4, \quad (u_1, u_2, u_3) \mapsto \left(u_1, u_2, u_3, F(u_1, u_2, u_3)\right),$$

şeklinde tanımlanır.

Bu çalışmada, 4-boyutlu Öklidyen uzayında hiperyüzeylerle ilgili bazı temel tanım ve formüller hatırlatıldıktan sonra, Monge hiperyüzeylerinin birim normal vektör alanı, birinci ve ikinci temel formları, şekil operatörü, Gaussian ve ortalama eğrilikleri gibi bazı önemli değişmezleri verilmektedir. Ardından, uzun hesaplamalar sonunda, E^4'te Monge hiperyüzeylerinin Laplace-Beltrami operatörü elde edilmekte ve bu karmaşık sonuçlar, indisli bir halde kısa bir teorem şeklinde ifade edilerek ispatlanmaktadır. Son olarak da, Laplace-Beltrami minimalliği ile ilgili bir sonuç verilmektedir.

ABSTRACT

The Laplace-Beltrami operator, defined on the Riemannian manifold, can be thought as a generalization of Laplacian.

Laplacian is used in differential equations describing many physical phenomena, such as quantum mechanics, diffusion equation for fluid flow and heat, electric potential, gravitational potential and wave propagation.

Also, 3-dimensional space can be thought in the simplest sense as the space used to describe the sizes or positions of objects. 4-dimensional space can be thought as a geometric extension of 3-dimensional space. In this context, Jean le Rond d'Alembert first added a fourth dimension to 3-dimensional space in his article "Dimensions" published in 1754, later J.L. Lagrange developed this space and this concept of 4-dimensional space was fully defined by B. Riemann about 100 years later. The concept of 4-dimensional space became more popular after Charles Howard Hinton's article entitled "What is the Fourth Dimension" published in 1880. Thus, spaces with dimensions larger than 3-dimensional have become one of the basic concepts in expressing modern physics and mathematics.

Furthermore, there are many studies on Monge (hyper)surfaces, which is an important field of study in 3 and 4-dimensional spaces. In this context, Monge hypersurface in Euclidean 4-space is defined as

$$M: U \subset R \longrightarrow R^4, \quad (u_1, u_2, u_3) \mapsto \big(u_1, u_2, u_3, F(u_1, u_2, u_3)\big),$$

where $F: U \longrightarrow R$ is a differentiable function.

In this study, after reminding some basic definitions and formulas about hypersurfaces in 4-dimensional Euclidean space, some important invariants of Monge hypersurfaces, such as unit normal vector field, first and second fundamental forms, shape operator, Gaussian and mean curvatures are given. Then, at the end of long calculations, the Laplace-Beltrami operator of Monge hypersurfaces was obtained in E^4, and these complex results were proved by expressing them in the form of a short theorem in an indexed state. Finally, a result for Laplace-Beltrami minimality is given.

1 GENEL BİLGİLER VE TEMEL KAVRAMLAR

3 ve 4-boyutlu uzaylarda önemli bir çalışma alanı olan Monge (hiper)yüzeyleri ile ilgili literatürde pek çok çalışma bulunmaktadır. Örneğin, [2] numaralı çalışmada yazarlar, yoğunluklu 4-boyutlu Öklidyen uzayda Monge hiperyüzeyeri ile ilgili önemli sonuçlar elde etmişlerdir. [7]'de ise 4-boyutlu Öklidyen uzayında Monge yaması çalışılmış ve bu yüzeylerin eğrilikleri ile ilgili bazı sonuçlar verilmiştir. Bunlarla birlikte, Öklidyen, Minkowskiyan, Galileyan ve pseudo-Galileyan gibi farklı uzaylarda (hiper)yüzeylerle ilgili farklı çalışmalar için [1], [3-6], [8-22] numaralı kaynaklar incelenebilir.

Şimdi 4-boyutlu uzaylarda hiperyüzeylerle ilgili bazı kavramları hatırlayalım.

E^4 uzayında $\overleftarrow{u} = (u_1, u_2, u_3, u_4)$, $\overleftarrow{v} = (v_1, v_2, v_3, v_4)$ ve $\overleftarrow{w} = (w_1, w_2, w_3, w_4)$ keyfi üç vektör olsun. E^4 de iç çarpım, bir vektörün normu ve vektörel çarpım, sırasıyla,

$$\langle \overleftarrow{u}, \overleftarrow{v} \rangle = u_1v_1 + u_2v_2 + u_3v_3 + u_4v_4, \tag{1.1}$$

$$\|\overleftarrow{u}\| = \sqrt{\langle \overleftarrow{u}, \overleftarrow{u} \rangle}$$

ve

$$\overleftarrow{u} \times \overleftarrow{v} \times \overleftarrow{w} = \det \begin{bmatrix} e_1 & e_2 & e_3 & e_4 \\ u_1 & u_2 & u_3 & u_4 \\ v_1 & v_2 & v_3 & v_4 \\ w_1 & w_2 & w_3 & w_4 \end{bmatrix} \tag{1.2}$$

şeklinde tanımlanır.

E^4 uzayında,

$$\begin{aligned} &M: E^3 \longrightarrow E^4 \\ &(u_1, u_2, u_3) \longrightarrow M(u_1, u_2, u_3) \\ &\qquad = (M_1(u_1, u_2, u_3), M_2(u_1, u_2, u_3), M_3(u_1, u_2, u_3), M_4(u_1, u_2, u_3)) \end{aligned} \tag{1.3}$$

olarak ifade edilen bir hiperyüzeyin birim normal vektörü, birinci temel formunun ve ikinci temel formunun matrissel gösterimleri ise, sırasıyla

$$N = \frac{M_{u_1} \times M_{u_2} \times M_{u_3}}{\|M_{u_1} \times M_{u_2} \times M_{u_3}\|}, \tag{1.4}$$

$$[g_{ij}] = \begin{bmatrix} g_{11} & g_{12} & g_{13} \\ g_{21} & g_{22} & g_{23} \\ g_{31} & g_{32} & g_{33} \end{bmatrix} \tag{1.5}$$

ve

$$[h_{ij}] = \begin{bmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{bmatrix} \tag{1.6}$$

şeklindedir. Burada $g_{ij} = \langle M_{u_i}, M_{u_j} \rangle$, $h_{ij} = \langle M_{u_i u_j}, N \rangle$, $M_{u_i} = \frac{\partial M(u_1,u_2,u_3)}{\partial u_i}$, $M_{u_i u_j} = \frac{\partial^2 M(u_1,u_2,u_3)}{\partial u_i u_j}$, $i, j \in \{1,2,3\}$ dir.

$[g_{ij}]$ matrisinin tersini $[g^{ij}]$ ile gösterilirse,

$$S = [a_{ij}] = [g^{ij}].[h_{ij}] \tag{1.7}$$

eşitliği, (1.3) hiperyüzeyinin şekil operatörünü verir.

(1.4)-(1.6) eşitlikleri yardımıyla, E^4 uzayında bir hiperyüzeyin Gaussian ve ortalama eğrilikleri, sırasıyla,

$$K = \det(S) = \frac{\det[h_{ij}]}{\det[g_{ij}]} \tag{1.8}$$

ve

$$3H = \mathrm{tr}(S) \tag{1.9}$$

olarak tanımlanır (4-boyutlu hiperyüzeylerle ilgili detaylı bilgi için, [12]'ye bakılabilir).

Ayrıca

$$[A_{ij}] = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix} \tag{1.10}$$

ile verilen herhangi bir matrisin determinantı ve tersi ise

$$\det[A_{ij}] = -A_{13}A_{22}A_{31} + A_{12}A_{23}A_{31} + A_{13}A_{21}A_{32} - A\ \ A_{23}A_{32} - A_{12}A_{21}A_{33} + A\ \ A_{22}A_{33} \quad (1.11)$$

olmak üzere,

$$[A^{ij}] = \frac{}{\det[A_{ij}]}\begin{bmatrix} A_{22}A_{33} - A_{23}A_{32} & A_{13}A_{32} - A_{12}A_{33} & A_{12}A_{23} - A_{13}A_{22} \\ A_{23}A_{31} - A_{21}A_{33} & A\ \ A_{33} - A_{13}A_{31} & A_{13}A_{21} - A\ \ A_{23} \\ A_{21}A_{32} - A_{22}A_{31} & A_{12}A_{31} - A\ \ A_{32} & A\ \ A_{22} - A_{12}A_{21} \end{bmatrix}, \quad (1.12)$$

dir.

2 E^4'TE MONGE HİPERYÜZEYLER

Bu bölümde, E^4'te Monge hiperyüzeyinin Gaussian ve ortalama eğrilikleri verilecektir.

U, $\mathbb{R}'$de açık bir küme iken,

$$M: U \longrightarrow \mathbb{R}^4$$
$$(u\ , u_2, u_3) \longrightarrow (u\ , u_2, u_3, F(u\ , u_2, u_3)), \quad (2.1)$$

ile verilen bir hiperyüzeye Monge hiperyüzeyi denir. Burada $F: U \to \mathbb{R}$ diferensiyellenebilir bir fonksiyondur.

(1.4) ve (2.1) eşitliklerinden yararlanılırsa, E^4'te M hiperyüzeyinin birim normal vektörü

$$N = \frac{}{W}\left(F_{u_1}, F_{u_2}, F_{u_3}, -1\right) \quad (2.2)$$

olarak hesaplanır, ki burada $W = \sqrt{1 + F_{u_1}^2 + F_{u_2}^2 + F_{u_3}^2}$ ve $F_{u_i} = \frac{\partial F(u_1,u_2,u_3)}{\partial u_i}$ dir.

Ayrıca (1.5), (1.6) ve (2.2) eşitlikleri kullanılarak, E^4'te M hiperyüzeyinin birinci temel formu, ikinci temel formu ve bunların determinantları, sırasıyla,

$$[g_{ij}] = \begin{bmatrix} 1 + F_{u_1}^2 & F_{u_1}F_{u_2} & F_{u_1}F_{u_3} \\ F_{u_1}F_{u_2} & 1 + F_{u_2}^2 & F_{u_2}F_{u_3} \\ F_{u_1}F_{u_3} & F_{u_2}F_{u_3} & 1 + F_{u_3}^2 \end{bmatrix}, \quad [h_{ij}] = \frac{-1}{W}\begin{bmatrix} F_{u_1u_1} & F_{u_1u_2} & F_{u_1u_3} \\ F_{u_1u_2} & F_{u_2u_2} & F_{u_2u_3} \\ F_{u_1u_3} & F_{u_2u_3} & F_{u_3u_3} \end{bmatrix}, \quad (2.3)$$

ve

$$\det[g_{ij}] = W^2,$$
$$\det[h_{ij}] = \frac{-2F_{u_2u_3}F_{u_1u_3}F_{u_1u_2} + F_{u_3u_3}F_{u_1u_2}^2 + F_{u_1u_1}F_{u_2u_3}^2 + F_{u_2u_2}(F_{u_1u_3}^2 - F_{u_1u_1}F_{u_3u_3})}{W^3} \quad (2.4)$$

şeklinde elde edilir, burada $F_{u_iu_j} = \frac{\partial^2 F(u_1,u_2,u_3)}{\partial u_i u_j}$. Şimdi, (1.8) eşitliğinde, elde edilen (2.3) ve (2.4) eşitikleri yerine yazıldığında; 4-boyutlu Öklidyen uzayında (2.1) Monge hiperyüzeyinin Gaussian eğriliği

$$K = \frac{-2F_{u_2u_3}F_{u_1u_3}F_{u_1u_2} + F_{u_3u_3}F_{u_1u_2}^2 + F_{u_1u_1}F_{u_2u_3}^2 + F_{u_2u_2}(F_{u_1u_3}^2 - F_{u_1u_1}F_{u_3u_3})}{W^5} \quad (2.5)$$

olarak elde edilir.

Ayrıca birinci temel formun tersi matrissel olarak

$$[g^{ij}] = \begin{bmatrix} g^{11} & g^{12} & g^{13} \\ g^{21} & g^{22} & g^{23} \\ g^{31} & g^{32} & g^{33} \end{bmatrix}, \tag{2.6}$$

şeklinde gösterilirse,

$$g^{11} = \frac{1+F_{u_2}^2+F_{u_3}^2}{W^2}, g^{22} = \frac{1+F_{u_1}^2+F_{u_3}^2}{W^2}, g^{33} = \frac{1+F_{u_1}^2+F_{u_2}^2}{W^2},$$

$$g^{12} = g^{21} = -\frac{F_{u_1}F_{u_2}}{W^2}, g^{13} = g^{31} = -\frac{F_{u_1}F_{u_3}}{W^2}, g^{23} = g^{32} = -\frac{F_{u_2}F_{u_3}}{W^2}$$

olarak hesaplanır.

Böylece, (1.7) ifadesinde (2.3) ve (2.6) eşitlikleri kullanılırsa, E^4'te (2.1) Monge hiperyüzeyinin şekil operatörü

$$S = \frac{1}{W^3}\begin{bmatrix} S_{11} & S_{12} & S_{13} \\ S_{21} & S_{22} & S_{23} \\ S_{31} & S_{32} & S_{33} \end{bmatrix} \tag{2.7}$$

şeklinde gösterilirse, şekil operatörünün bileşenleri

$$\begin{aligned}
S_{11} &= F_{u_1}\left(F_{u_3}F_{u_1u_3} + F_{u_2}F_{u_1u_2}\right) - F_{u_1u_1}\left(1 + F_{u_2}^2 + F_{u_3}^2\right) \\
S_{12} &= F_{u_1}\left(F_{u_3}F_{u_2u_3} + F_{u_2}F_{u_2u_2}\right) - \left(1 + F_{u_2}^2 + F_{u_3}^2\right)F_{u_1u_2} \\
S_{13} &= F_{u_1}\left(F_{u_3}F_{u_3u_3} + F_{u_2}F_{u_2u_3}\right) - \left(1 + F_{u_2}^2 + F_{u_3}^2\right)F_{u_1u_3} \\
S_{21} &= F_{u_2}F_{u_3}F_{u_1u_3} - \left(1 + F_{u_1}^2 + F_{u_3}^2\right)F_{u_1u_2} + F_{u_2}F_{u_1}F_{u_1u_1} \\
S_{22} &= F_{u_2}F_{u_3}F_{u_2u_3} - \left(1 + F_{u_1}^2 + F_{u_3}^2\right)F_{u_2u_2} + F_{u_2}F_{u_1}F_{u_1u_2} \\
S_{23} &= F_{u_2}F_{u_3}F_{u_3u_3} - \left(1 + F_{u_1}^2 + F_{u_3}^2\right)F_{u_2u_3} + F_{u_2}F_{u_1}F_{u_1u_3} \\
S_{31} &= F_{u_3}\left(F_{u_1}F_{u_1u_1} + F_{u_2}F_{u_1u_2}\right) - F_{u_1u_3}\left(1 + F_{u_2}^2 + F_{u_1}^2\right) \\
S_{32} &= F_{u_3}\left(F_{u_2}F_{u_2u_2} + F_{u_1}F_{u_1u_2}\right) - F_{u_2u_3}\left(1 + F_{u_2}^2 + F_{u_1}^2\right) \\
S_{33} &= F_{u_3}\left(F_{u_2}F_{u_2u_3} + F_{u_1}F_{u_1u_3}\right) - F_{u_3u_3}\left(1 + F_{u_2}^2 + F_{u_1}^2\right)
\end{aligned}$$

olarak elde edilir.

Dolayısıyla, (1.9) ve (2.7) eşitliklerinden; 4-boyutlu Öklidyen uzayında (2.1) Monge hiperyüzeyinin ortalama eğriliğinin ise

$$H = -\frac{\begin{pmatrix} F_{u_1u_1}\left(1+F_{u_2}^2+F_{u_3}^2\right)+F_{u_2u_2}\left(1+F_{u_1}^2+F_{u_3}^2\right)+F_{u_3u_3}\left(1+F_{u_2}^2+F_{u_1}^2\right) \\ -2F_{u_3}\left(F_{u_2}F_{u_2u_3}+F_{u_1}F_{u_1u_3}\right)-2F_{u_2}F_{u_1}F_{u_1u_2} \end{pmatrix}}{3W^3} \tag{2.8}$$

olduğu görülür.

3 E^4'TE MONGE HİPERYÜZEYLERİNİN LAPLACE-BELTRAMİ OPERATÖRÜ

Bu bölümde, E^4 Öklidyen 4-uzayında (2.1) Monge hiperyüzeylerinin Laplace-Beltrami operatörü elde edilecek ve bazı özel durumlar için Laplace-Beltrami-minimallik durumları incelenecektir.

Bir hiperyüzey üzerinde C^3-sınıfından diferensiyellenebilir bir $\varphi = \varphi(x^1, x^2, x^3)|_D$ $(D \subset \mathbb{R}^3)$ fonksiyonun, Laplace-Beltrami operatörü

$$\Delta\varphi = \frac{1}{\sqrt{\det[g_{ij}]}} \sum_{i,j=1}^{3} \frac{\partial}{\partial x^i}\left(\sqrt{\det[g_{ij}]}\, g^{ij} \frac{\partial \varphi}{\partial x^j}\right) \tag{3.1}$$

olarak tanmlanır.

$\varphi = \varphi(u_1, u_2, u_3)$ nin Laplace-Beltrami operatörü; (1.11), (1.12) ve (3.1) eşitlikleri yardımıyla açık olarak

$$\Delta\varphi = \frac{1}{\sqrt{\det[g_{ij}]}} \left\{ \begin{array}{l} \dfrac{\partial}{\partial u_1}\left(\dfrac{(g_{22}g_{33}-g_{23}^2)\varphi_{u_1}+(g_{13}g_{23}-g_{12}g_{33})\varphi_{u_2}+(g_{12}g_{23}-g_{13}g_{22})\varphi_{u_3}}{\sqrt{\det[g_{ij}]}}\right) \\ +\dfrac{\partial}{\partial u_2}\left(\dfrac{(g_{13}g_{23}-g_{12}g_{33})\varphi_{u_1}+(g_{11}g_{33}-g_{13}^2)\varphi_{u_2}+(g_{12}g_{13}-g_{11}g_{23})\varphi_{u_3}}{\sqrt{\det[g_{ij}]}}\right) \\ +\dfrac{\partial}{\partial u_3}\left(\dfrac{(g_{12}g_{23}-g_{13}g_{22})\varphi_{u_1}+(g_{12}g_{13}-g_{11}g_{23})\varphi_{u_2}+(g_{11}g_{22}-g_{12}^2)\varphi_{u_3}}{\sqrt{\det[g_{ij}]}}\right) \end{array} \right\}. \tag{3.2}$$

şeklinde yazılabilir.

E^4 Öklidyen uzayında (2.1) Monge hiperyüzeyinin Laplace-Beltrami operatörü ΔM şeklinde gösterilsin. Bu durumda, (2.3) ve (3.2) eşitlikleri yardımıyla, $j \in \{1,2,3,4\}$ için

$$\left.\begin{array}{l} Q_{1_j} = \frac{1}{W}\{(g_{22}g_{33}-g_{23}^2)(M_j)_{u_1}+(g_{13}g_{23}-g_{12}g_{33})(M_j)_{u_2}+(g_{12}g_{23}-g_{13}g_{22})(M_j)_{u_3}\}, \\ Q_{2_j} = \frac{1}{W}\{(g_{13}g_{23}-g_{12}g_{33})(M_j)_{u_1}+(g_{11}g_{33}-g_{13}^2)(M_j)_{u_2}+(g_{12}g_{13}-g_{11}g_{23})(M_j)_{u_3}\}, \\ Q_{3_j} = \frac{1}{W}\{(g_{12}g_{23}-g_{13}g_{22})(M_j)_{u_1}+(g_{12}g_{13}-g_{11}g_{23})(M_j)_{u_2}+(g_{11}g_{22}-g_{12}^2)(M_j)_{u_3}\} \end{array}\right\} \tag{3.3}$$

olmak üzere

$$\begin{aligned} \Delta M &= ((\Delta M)_1, (\Delta M)_2, (\Delta M)_3, (\Delta M)_4) \\ &= \frac{1}{W}\begin{pmatrix} (Q_{1_1})_{u_1}+(Q_{2_1})_{u_2}+(Q_{3_1})_{u_3}, (Q_{1_2})_{u_1}+(Q_{2_2})_{u_2}+(Q_{3_2})_{u_3}, \\ (Q_{1_3})_{u_1}+(Q_{2_3})_{u_2}+(Q_{3_3})_{u_3}, (Q_{1_4})_{u_1}+(Q_{2_4})_{u_2}+(Q_{3_3})_{u_3} \end{pmatrix}, \end{aligned} \tag{3.4}$$

şeklinde yazılabilir.

Teorem 1. E^4 Öklidyen uzayında (2.1) Monge hiperyüzeyinin Laplace-Beltrami operatörü, $k \in \{1,2,3\}$ olmak üzere

$$\Delta M = \sum_{i=1}^{3}\left(\frac{2\sum_{i<k}\left(F_{u_i}F_{u_k}F_{u_iu_k}\right)-F_{u_iu_i}-\sum_{i\neq k}\left(F_{u_iu_i}(F_{u_k})^2\right)}{1+(F_{u_i})^2}\right)(F_{u_1}, F_{u_2}, F_{u_3}, -1) \tag{3.5}$$

dir.

İspat. (2.1) Monge hiperyüzeyi için (3.3) ifadesindeki Q_{i_j} bileşenleri hesaplanırsa

$$\left.\begin{array}{l} Q_{1_1} = \frac{1+F_{u_2}^2+F_{u_3}^2}{W}, Q_{1_2} = -\frac{F_{u_1}F_{u_2}}{W}, Q_{1_3} = -\frac{F_{u_1}F_{u_3}}{W}, Q_{1_4} = \frac{F_{u_1}}{W} \\ Q_{2_1} = -\frac{F_{u_1}F_{u_2}}{W}, Q_{2_2} = \frac{1+F_{u_1}^2+F_{u_3}^2}{W}, Q_{2_3} = -\frac{F_{u_2}F_{u_3}}{W}, Q_{2_4} = \frac{F_{u_2}}{W} \\ Q_{3_1} = -\frac{F_{u_1}F_{u_3}}{W}, Q_{3_2} = -\frac{F_{u_2}F_{u_3}}{W}, Q_{3_3} = \frac{1+F_{u_1}^2+F_{u_2}^2}{W}, Q_{3_4} = \frac{F_{u_3}}{W} \end{array}\right\} \tag{3.6}$$

olduğu görülür. Kısalığın hatırı için, bu bileşenler $i,k \in \{1,2,3\}$ ve $j \in \{1,2,3,4\}$ olmak üzere

$$Q_{i_j} = \begin{cases} 1 + \sum_{i \neq k} (F_{u_k})^2, & i = j \; için \\ -F_{u_i} F_{u_j}, & i \neq j \; için \\ F_{u_i}, & j = 4 \; için \end{cases} \tag{3.7}$$

şeklinde yazılabilir. (3.6) ifadeleri, (3.4)'de kullanılırsa,

$$(\Delta M)_1 = \frac{1}{W^4}\left(F_{u_1} \begin{pmatrix} 2F_{u_3}\left(F_{u_2}F_{u_2u_3} + F_{u_1}F_{u_1u_3}\right) + 2F_{u_2}F_{u_1}F_{u_1u_2} \\ -F_{u_1u_1}\left(1 + F_{u_2}^2 + F_{u_3}^2\right) - F_{u_2u_2}\left(1 + F_{u_1}^2 + F_{u_3}^2\right) - F_{u_3u_3}\left(1 + F_{u_1}^2 + F_{u_2}^2\right) \end{pmatrix} \right),$$

$$(\Delta M)_2 = \frac{1}{W^4}\left(F_{u_2} \begin{pmatrix} 2F_{u_3}\left(F_{u_2}F_{u_2u_3} + F_{u_1}F_{u_1u_3}\right) + 2F_{u_2}F_{u_1}F_{u_1u_2} \\ -F_{u_1u_1}\left(1 + F_{u_2}^2 + F_{u_3}^2\right) - F_{u_2u_2}\left(1 + F_{u_1}^2 + F_{u_3}^2\right) - F_{u_3u_3}\left(1 + F_{u_1}^2 + F_{u_2}^2\right) \end{pmatrix} \right),$$

$$(\Delta M)_3 = \frac{1}{W^4}\left(F_{u_3} \begin{pmatrix} 2F_{u_3}\left(F_{u_2}F_{u_2u_3} + F_{u_1}F_{u_1u_3}\right) + 2F_{u_2}F_{u_1}F_{u_1u_2} \\ -F_{u_1u_1}\left(1 + F_{u_2}^2 + F_{u_3}^2\right) - F_{u_2u_2}\left(1 + F_{u_1}^2 + F_{u_3}^2\right) - F_{u_3u_3}\left(1 + F_{u_1}^2 + F_{u_2}^2\right) \end{pmatrix} \right),$$

$$(\Delta M)_4 = \frac{1}{W^4}\left(-\begin{pmatrix} 2F_{u_3}\left(F_{u_2}F_{u_2u_3} + F_{u_1}F_{u_1u_3}\right) + 2F_{u_2}F_{u_1}F_{u_1u_2} \\ -F_{u_1u_1}\left(1 + F_{u_2}^2 + F_{u_3}^2\right) - F_{u_2u_2}\left(1 + F_{u_1}^2 + F_{u_3}^2\right) - F_{u_3u_3}\left(1 + F_{u_1}^2 + F_{u_2}^2\right) \end{pmatrix} \right)$$

ve bu eşitlikler ile birlikte (3.7) ifadesi ele alınırsa, (3.5) elde edilir ve böylece ispat tamamlanır.

Örnek. E^4 Öklidyen uzayında

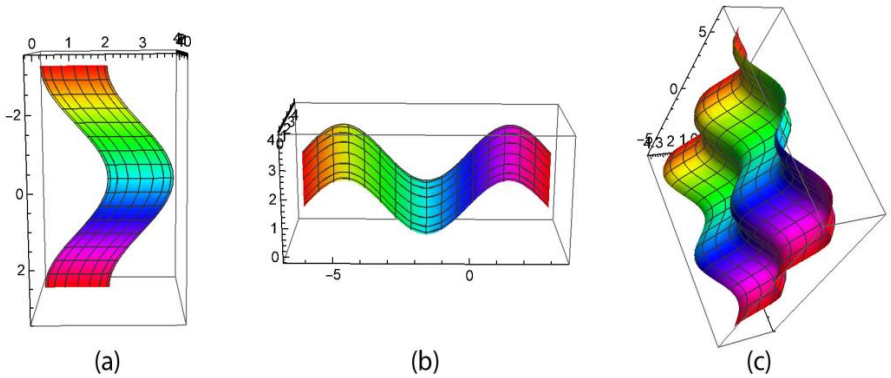
$$\begin{aligned} &M: U \longrightarrow \mathbb{R}^4 \\ &(u_1, u_2, u_3) \longrightarrow (u_1, u_2, u_3, sinu_1 + cosu_2 + u_3) \end{aligned} \tag{3.8}$$

şeklinde tanımlı Monge hiperyüzeyinin Laplace-Beltrami operatörü

$$\Delta M = A(cosu_1, -sinu_2, 1, -1)$$

olarak elde edilir, burada $A = \frac{(2+cos^2u_1)cosu_2 + (2+sin^2u_2)sinu_1}{(2+cos^2u_1+sin^2u_2)^2}$ dir.

Aşağıdaki (a), (b) ve (c) şekillerinde, $z = 2$ için (3.8) Monge hiperyüzeyinin, sırasıyla, $x_2x_3x_4$, $x_1x_3x_4$ ve $x_1x_2x_4$ uzaylarına izdüşümleri görülebilir.



Şekil: (3.8) Monge hiperyüzeyinin, $x_2x_3x_4$, $x_1x_3x_4$ ve $x_1x_2x_4$ uzaylarına izdüşümleri

Ayrıca, Teorem 1'den faydalanılarak, şu teorem ifade edilebilir:

Teorem 2. (2.1) Monge hiperyüzeyi, $F(u_1,u_2,u_3) = au_1 + bu_2 + cu_3 + d,\ a,b,c,d \in \mathbb{R}$, şeklinde tanımlı F fonksiyonu için Laplace-Beltrami minimaldir.

İspat. Bir M hiperyüzeyinin Laplace-Beltrami operatörü $\Delta M = 0$ ise, bu hiperyüzeye Laplace-Beltrami minimal denir. Dolayısıyla, Teorem 1'den ispat tamamlanır.

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THE MOTIVATIONAL CLIMATE IN PHYSICAL EDUCATION IN GREEK EDUCATIONAL CONTEXT: GENDER EFFECTS

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Abstract

The aim of this work was to investigate the motivational climate in Physical Education classes. Additionally, gender had been investigated as a factor in differentiating motivational climate. In this work took part 263 male (101 or 38.4%) and female students (162 or 61.6%) attending the 7^{th} (58 or 22.1%), 8^{th} (117 or 44.4%) & 9^{th} (88 or 33.5%) grade of High School from all over Greece. For data's collection the Greek version (Masadis et al, 2019) of "Motivational Climate in Physical Education Scale (Soini, Liukkonen, Watt, Yli-Piipari, & Jaakkola, 2014) was used. The scale consists of 18 items researching the four factors - autonomy, social relatedness, task involvement, ego involvement - of motivational climate. Data's statistical analysis included: Descriptive statistics, reliability Analysis, discriminant and convergent (Composite Reliability -CR- & Average Variance Extracted -AVE) and t-test for Independed samples was used to examine if the gender differences on motivational climate. From research's data's analysis we claim that: 1. The four factors showed satisfactory reliability -CR index ranking from .843 (Task involvement) to .915 (Autonomy). 2. The AVE index showed satisfactory values for the four factors ranking from .521 (Social Relatedness) to .683 (Autonomy). 3. Task involvement factor gathers the highest value (M=4.31, SD=.50) and is followed by autonomy (M=3.75, SD=.58). 4. The lowest value is this of "Ego involvement" (M=2.26, SD=.82). 5. The factor "Ego involvement" is the only factor who is differentiated from gender ($t_{(261)}$= 9.50, p< .001 & n^2= .035) with male students scoring higher (M=2.45 & SD= .82) than female (M=2.08 & SD= .78). From the analysis of the results, we come to the following conclusions: a. The professor of physical education through the programs he designs and the educational methods he uses, he creates the motivational climate that favors task climate orientation, students' autonomy, and development of social relatedness. b. gender become partly differentiating motivational climate. ego involvement.

Key-words: autonomy, social relatedness, task climate, ego climate

INTRODUCTION

Physical Education (PE) is one of the most important courses of the curriculum of both primary and secondary education, as it offers ample opportunity for students' physical, mental, psychological and social development (Bourneli, Koutsouki, Zografou, Aggelonidis, Hatzopoulos, & Agalianou, 2012). The ultimate goal of the PE course is to promote and foster behaviors and attitudes that will lead students to seek and engage in physical activity after graduating from school and for the rest of their lives (Slingerland, Haerens, Cardon, &

Borghouts, 2013). Furthermore, as part of the educational process, the PE primary and secondary education course, aims to prevent and address issues directly related to the physical and psychological health of students (Bournelli et al., 2012).

Despite the well-documented benefits that active participation in both the PE class and extracurricular sports activities can offer, students tend to participate less and less in the PE course as they grow older, while, at the same time, their effort and engagement during their participation is reduced (Ntoumanis, Barkoukis, & Thøgersen-Ntoumani, 2009; Iconomescu, Mindrescu, & Popovici, 2018). It is known that, as children grow into adulthood, their exercise levels tend to reduce, but, in reality, athletic behavior has been shown to gradually decrease even during the school years (Papaioannou, Dania, Zabetaki, Kamtsios, & Christodoulidis, 2016). The greatest decrease appears to occur abruptly during adolescence, especially in girls (Biddle, Backhouse, & Faulkner, 2004), while the most significant decrease in participation in physical activity is observed between the ages of 13 to 18 years.

Regarding students' participation in the PE class in the Greek primary and secondary school environment, there has been a gradual and dramatic decrease in students' interest in the subject of physical education, both when transitioning from primary to secondary education and then further during high school. This fact may be related to a reduction of the teachers' emphasis on learning and its development (Papaioannou, Marsh, & Theodorakis, 2004). In particular, it has been observed that, as children get older, they show a significant reduction in intrinsic motivation to participate in the PE course, they are less project-oriented and more self-oriented, while they believe that the overall classroom motivation is less learning-oriented and feel less capable when participating in various sports activities. As a result, children gradually lose interest in the PE course and find it less useful and challenging compared to other courses and activities.

The aim of this work was to investigate the motivational climate in Physical Education classes. Additionally, gender was investigated as a factor in differentiating motivational climate.

METHODOLOGY

Participants

In this work took part 263 male (101 or 38.4%) and female students (162 or 61.6%), attending the 7^{th} (58 or 22.1%), 8^{th} (117 or 44.4%) & 9^{th} (88 or 33.5%) grade of High School from all over Greece.

Questionnaire

For data's collection the Greek version (Masadis et al., 2019) of "Motivational Climate in Physical Education Scale (Soini, Liukkonen, Watt, Yli-Piipari, & Jaakkola, 2014) was used. The scale consists of 18 items researching the four factors - task involvement, autonomy, social relatedness, ego involvement - of motivational climate. More specifically: the factor task involvement consists of 5 statements (e.g. It is important to keep trying even though you make mistakes), the factor autonomy consists of 5 statements (e.g. Students have significant freedom to make choices during PE lessons), the factor social relatedness consists of 4 statements (e.g. During PE lessons, students "pull together") and the factor ego involvement consists of 4 statements (e.g. During PE lessons, students compare their performance, mainly with that of others).

This was the first time that the questionnaire was used in the Greek educational environment. Its internal validity showed very satisfactory levels, with Cronbach's α values ranging from

.85 (ego involvement) to .90 (social relatedness). These results are similar to those of Soini et al. (2014) (Cronbach's α autonomy = .85, social relatedness = .88, task involvement= .80, and ego involvement = .78) and Jaakkola, Wang, Soini, and Liukkonen (2015) (Cronbach's α autonomy = .85, social relatedness = .88, task involvement = .80, and ego involvement = .78).

Process

The survey was conducted through the Google-Form platform since the special conditions that prevailed during the survey period, namely the COVID-19 pandemic, did not allow for the completion of the questionnaire in person. Complete anonymity of the participants was guaranteed, and the results were used exclusively for research purposes, as stated at the beginning of the application form.

Statistical analysis

Data's statistical analysis included: Descriptive statistics (Mean & Standard Deviation), reliability Analysis, discriminant and convergent (Composite Reliability -CR- & Average Variance Extracted -AVE) to investigate the internal cohesion of factors and t-test for Independed samples was used to examine if the gender differences on motivational climate.

RESULTS

Reliability analysis

The four factors showed satisfactory reliability -CR index ranking from .843 (Task involvement) to .915 (Autonomy). In terms of discriminant and convergent validity, the AVE index showed satisfactory value only for the factor ego involvement (.683). In contrast, the three factors -task involvement, autonomy and Social Relatedness- showed marginally acceptable values, .521 and .595 and .575 respectively (Table 1).

Table 1. Composite Reliability & Variance Extracted

Construct	Item	CR	AVE
Task involvement	.705 .587 .818 .704 .774	.843	.521
Autonomy	.899 .788 .788 .764 .873	.854	.595
Social Relatedness	.717 .778 .818 .769	.841	.575
Ego involvement	.718 .840 .794 .660	.915	.683

As we can see in the table 2, factor “task involvement” gathers the highest value of all the others and is followed by factors “autonomy” and “social relatedness”. The lowest value is this of “Ego involvement”.

Table 2. M, SD & gender differences

Factors	Total		Men		Women		Gender differences	
	M	SD	M	SD	M	SD	$t_{(261)}$	p
Task involvement	4.31	.50	4.30	.49	4.32	.51	.391	.696
Autonomy	3.75	.58	3.75	.58	3.75	.59	.105	.916
Social Relatedness	3.45	.84	3.42	.87	3.47	.82	.505	.614
Ego involvement	2.26	.82	2.45	.83	2.08	.79	9.50	< .001 η^2=.035

Gender as a specific distinction of the satisfaction

For the determination of whether there are statistically significant differences in the scale factors between boys and girls, the t-test for independent samples analysis was conducted. From the results came out that the factor “Ego involvement” is the only factor who is differentiated from gender ($t_{(261)}$ = 9.50, p< .001 & n^2= .035) with male students scoring higher (M=2.45 & SD= .82) than female (M=2.08 & SD= .78) (Table 2).

DISCUSSION

One of the most important factors that contribute to students' motivation for active participation in the physical education course as well as their continuous engagement with physical activity after school graduation, is the motivation climate that prevails during the course (Masadis et al., 2019). Therefore, the role of the physical education teacher is decisive, as he/she is the one who designs the syllabus, chooses the teaching method as well as the type of feedback allowed. So, the aim of this work was to investigate the motivational climate in Physical Education classes. Additionally, gender had been investigated as a factor in differentiating motivational climate.

It should be noted that the research was conducted online, through the Google Form platform. This fact does not negate the validity of the research since the link was initially provided to physical education teachers who then shared it with their students who could subsequently decide whether or not they wished to complete it. Every effort possible was made to ensure the participants' anonymity. Participants were also assured that the research data would be used exclusively for scientific purposes.
Regarding the structural validity of this questionnaire, it was assessed using the CR and AVE indices. The values obtained for these two indices certified the questionnaire's structural validity, thus the questionnaire was deemed appropriate for use in research in the Greek educational field. The results of the study are in line with the results of Masadis et al. (2019) as well as those of Soini et al. (2014) and Jaakkola et al. (2017).

The results show that the climate of motivation that prevails during the PE school course is project-oriented, promoting students' autonomy and the development of their social

relationships to a satisfactory degree. The above results are also confirmed by the low levels of the ego involvement factor. This proves that the physical education teachers included in the sample develop and implement teaching programs as well as methods that promote the autonomy of the students, the development or even strengthening of the social relations between them and, most importantly, enjoyable learning and a more work-oriented value. This might be a positive factor, indicating a greater possibility that students will continue to play sports or participate in extracurricular physical activities even after graduating from school. The results of this study are consistent with the results of Masadis et al. (2019), according to which physical education teachers promote methodologies and teaching strategies that contribute to the development of internal motivation and cooperation between students while, at the same time, providing them with opportunities to act on their own and showcase their skills.

Regarding gender as a differentiating factor, it was found that gender differences were observed only in the ego involvement factor. The results of the survey are partly in line with and partly differing from the results of other surveys. More specifically, these research results contradict the results of Masadis et al. (2019) in terms of autonomy - boys are more autonomous than girls -, task involvement - girls show greater learning-orientation - and social relatedness levels - girls are more socially oriented. However, they agree in terms of the ego involvement factor, since in both studies it was found that boys are more ego-oriented. Furthermore, the results of this study contradict the results of Castro-Sánchez, Zurita-Ortega, Garcia-Marmol, and Chacón-Cuberos (2019), according to which boys do not believe in cooperation when solving a problem while girls appear to be more social. Finally, compared to the research of Jaakkola et al. (2017), both agreements and differences can be found. Both studies found no gender differences in the task involvement factor, while both indicated that boys are more ego-oriented compared to girls. The observed differences between studies may be due to the different ages of the samples or even the different environments in which they live.

CONCLUSIONS

From the analysis of the results, we come to the following conclusions: a. The professor of physical education through the programs he designs and the educational methods he uses, he creates the motivational climate that favors task climate orientation, students' autonomy, and development of social relatedness. b. gender become partly differentiating motivational climate.

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A PAGE FROM THE HISTORY OF THE DISASTER: CHERNOBYL

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Disasters, which are mostly unknown when, where, how and to what extent, due to human or natural events, negatively affect all or a part of all living things, including people in the region, make daily life difficult and cause social, economic, physical and social losses in all areas. is the set of events. Accident is defined as an unintentional and involuntary event, according to the dictionary of the Turkish Language Association. In order for an accident to turn into a disaster, many living things must be affected by this event and cannot cope alone and need help. According to official sources, as a result of the "accident" in the 4th unit of the Chernobyl nuclear power plant in Ukraine, which is a part of the former Soviet Union, on April 26, 1986, the entire reactor heart and a large part of the building were damaged, and a large amount of radioactive material was released into the environment. The effects of this accident, which are not taken seriously by many countries including Turkey, still continue today. With this study, it was aimed to determine how the size of an “accident” reached the catastrophic stage by taking the Chernobyl accident as an example, by examining before, during and after the event. As a result of this study, it has been understood that even though it is called an accident, it can be easily observed with this event that it is always human to turn a disaster into a disaster, whether it is man-made or natural.

Key Words: Disaster, Accident, Chernobyl

INTRODUCTION

General Concepts

With the definition accepted by international sources, disaster; nature and/or nature, which causes losses in all aspects of the society physical, social, economic, social, etc.) at the time it occurs and after it occurs, has such an impact that it interrupts or cuts ordinary life, and forces the inhabitants of the region to seek help from outside sources because they cannot cope with their own means. An accident is defined as an unexpected or unintended bad thing that usually damages something or injures someone.

Since the number of neutrons in the atomic nucleus of a substance is more than the number of protons, it shows an unstable structure, so it disintegrates by emitting various rays such as alpha, beta and gamma, by throwing away the excess energy it has to turn into a stable structure. Substances that break down by scattering rays in this way are called radioactive material, and this transformation is called radioactivity radioactive fragmentation), and the excess energy emitted is called ionizing radiation.

Nuclear energy is the high amount of energy that occurs in a short time as a result of the uncontrolled chain reaction that starts as a result of the absorption of the neutrons, which are formed by the splitting of the atomic nuclei of radioactive substances by spontaneous or external intervention Fission) or the merger of two atoms Fusion), by other atoms capable of transformation in the environment. The power plants that can convert the heat energy released into electrical energy are called nuclear power plants. The spread of radioactive materials as a

result of accidents that may occur as a result of human-induced or natural disasters such as earthquakes, floods and tsunamis that may occur in facilities where radioactive materials are kept is called nuclear hazard. Although it is very rare in terms of the frequency of occurrence, nuclear-related accidents have an important place among the human-made disasters when evaluated in terms of mass destruction power, affecting thousands of people at the same time in a wide geography and causing long-lasting great destruction. The rapid depletion of energy resources such as oil, natural gas, coal, and the damage they cause to the environment and the desire of countries that do not have these energy sources to reduce their energy dependence have led to the emergence of alternative energy sources such as nuclear energy.

The first nuclear reaction took place on December 2, 1942 at the University of Chicago. The United States dropped the first of the atomic bombs, the fruit of the Manhattan Project, the 'Little Boy' on Hiroshima on August 6, 1945, and the second, Fat Man The Chubby Man) on Nagasaki on August 15. . Experimental Breeder Reactor I, the reactor in the US state of Idaho, produced the first nuclear-based electrical energy on December 20, 1951. There are 435 nuclear power plants in 16% of the UN member states 31 countries). It is planned to build 164 new nuclear power plants by 2030.

The advantages of using nuclear energy are that it has high potential reserves, provides a very high amount of energy compared to the raw material volume, the cost of raw materials is very low, nuclear power plants use less land than other power plants, the fuel is easy to store for ten years and the facilities are not suitable for nuclear weapons production countable.

With the increasing number of nuclear power plants, the demands for radioactive materials used as fuel in the power plants have increased as well as the risks on the environment. Due to radioactivity, it poses a danger due to waste before and during production. For example, after 1 ton of uranium is obtained, 20 thousand tons of waste material remains. Used. The difficulty of transporting the fuel from the reactors to the processing plants and the high-level waste to be buried, and the necessity to establish the power plants in places with certain geographical features can be counted among the disadvantages. Nuclear disaster causes physical, mental, emotional and economic damage to people and also causes serious effects on future generations. It is a disaster that deeply affects cancer, disabled and stillbirths and genetically.

It uses the International Nuclear and Radiological Event Scale INES) to determine the severity of nuclear accidents based on their effects. Figure 1) Although radiation accidents are rare, there has been a significant increase and death in the last 50 years. It is known that radiation-related accidents in the world are generally caused by natural disasters and human errors. Between 1944 and 1977, there were 392 radiation accidents, 38 of which were fatal, and 113 people lost their lives. The most well-known of the worldwide nuclear accidents, the "Windscale Nuclear Reactor Accident" in Scotland in 1957, the "Three Mile Island" in 1979 in the United States Nuclear Power Plant Accident" is the "Chernobyl Nuclear Power Plant Accident" in 1986 in current Ukraine Former USSR) and most recently the "Fukushima Nuclear Power Plant Accident" in Japan in 2011 due to the tsunami caused by the earthquake.

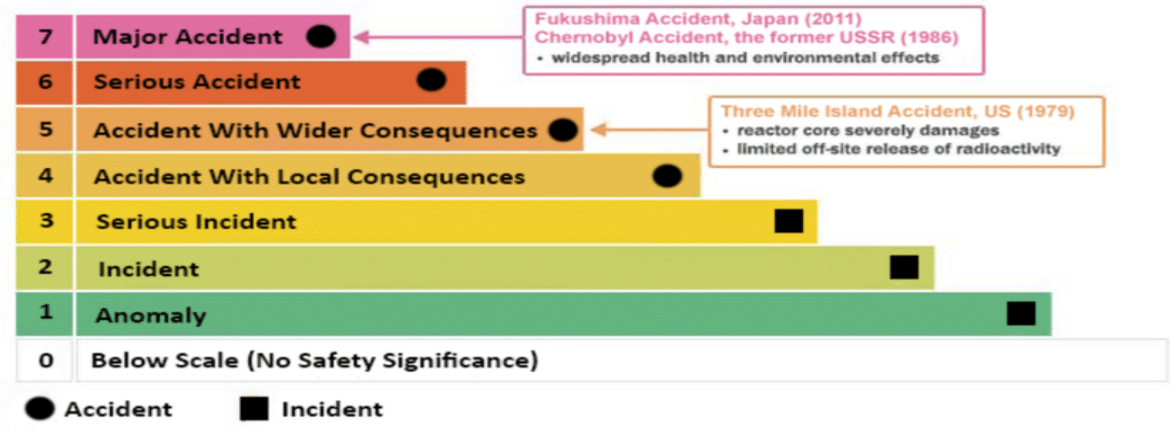


Figure1. INES Scale

Chernobyl accident

The Chernobyl Disaster is the deadliest nuclear accident in recent history on nuclear INES 7 scale, which took place at the reactor number 4 of the Chernobyl Nuclear Power Plant near the city of Pripyat in the Soviet Union on April 26, 1986. Northwest Europe was exposed to radioactive fallout. According to official figures, 237 people were exposed to excessive radiation in the first days after the accident, and 31 of them died within the first three months. After the accident, 135,000 people living in the region were evacuated. The medium and long-term environmental effects of the accident are still under investigation.

Chernobyl is a city located near the Belarusian border, 130 km from the city of Kiev in the north of Ukraine. 49,000 people live in Pripyat city, which is 3 km from the power plant, and 12,500 people live in the city of Chernobyl, which is 15 km away from the power plant. The estimated total population in the area of the power plant with a diameter of 30 km at the time of the accident was between 115,000 and 135,000. Today, only 1000 people, who have been partially abandoned due to the disaster, live here.

Chernobyl Nuclear Power Plant, Ukraine, and RMBK - is a power plant with 4 nuclear reactors of type 1000. 1 in the plant. and 2 . units built in 1970 and 1977, 3 . and 4 . units were completed in 1983. Two more units were under construction at the time of the accident Figure 2). Before the incident, this facility was inspected by ENT specialists between 1979-1986 and many deficiencies were reported beforehand. It was later found out that these reports were under the carpet and that those who carried out this study were not aware of them.

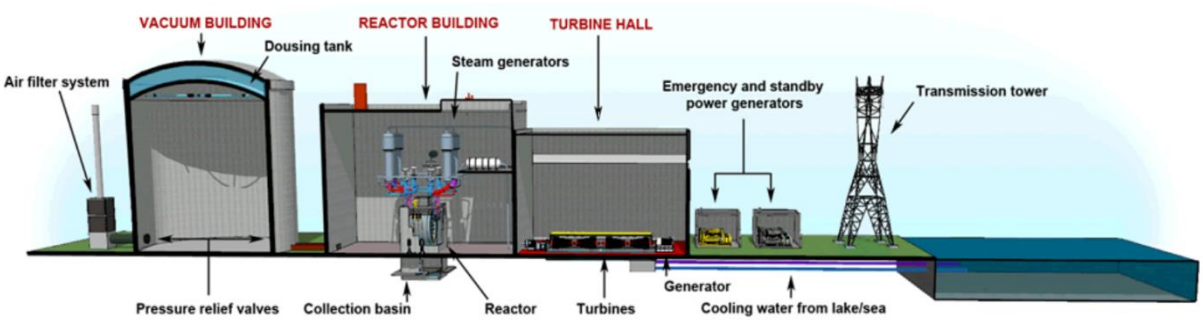


Figure 2. RMBK - 1000

The Cheronobyl disaster was actually an experimental accident. It was made to check whether the safety systems would work against accidents that may occur due to the simultaneous loss of refrigerant and interruption of the mains current, which is one of the accidents that form the basis of the design in terms of nuclear safety. In such a case, the pumps of the emergency cooling system that will be activated are normally supplied by the mains. If the mains goes out, the supply is made by independent diesel generators. There is a 25 second delay between the mains power cut and the diesels starting and feeding the pumps. As a result of such an accident, the reactor is immediately stopped and the rotation of the turbine generators begins to slow down with the flywheel inertia. The purpose of the experiment was to test whether the rotational energy of the generator flywheels would feed the emergency cooling pumps at the desired voltage for 25 seconds until the diesel generators were activated.

At 00:00 on 25 April, the experiment was started with the reactor starting to power down. Later;

- ✓ At 00:00, the reactor power was reduced to 50%. As part of the test, one of the turbines was disabled and all steam was sent to the other turbine. The emergency cooling system has been disabled. Due to the energy requirement, the reactor was operated for 9 hours in this condition.
- ✓ Power reduction continued at 00:10. It started to go down to 700 MW th minimum limit).
- ✓ 26 April 00:28 at low power value, since local auto power control is difficult, global auto power mode was switched, but power level dropped to 30 MW th because power stop setting was not set to 700 MW th. Vapor production in the heart decreased and the xenon concentration increased.
- ✓ More control rods were pulled up at 01:00 than the operating instructions allowed. The reactor could only be stabilized at 200 MW th power, since the excess reagent was greatly reduced. Although the operation of RBMK reactors at this power level is inconvenient in terms of safety, it was decided to conduct the experiment.
- ✓ At 01:03, 2 recirculation pumps were activated. The increased flow amount caused a decrease in steam production, a decrease in the water level in the steam separators and a decrease in system pressure. The control rods were pulled higher to compensate for the negative reactivity caused by the decrease in the amount of steam.
- ✓ At 01:19, the feed water flow amount was increased to three times the normal value to raise the water level in the steam separators.
- ✓ The amount of steam approaching zero in the cooling channels at 01:20 brought the cooler temperature closer to the saturation temperature throughout the entire channel.
- ✓ At 01:19:58 the steam bypass valves were closed to normalize the system pressure.
- ✓ At 01:22:10, it was decided that the water level in the steam separators had reached its normal value, and the feed water flow was suddenly reduced to 2/3 of the thermal equilibrium value. The coolant temperature, which was already close to the saturation temperature, rose and the channels began to boil.
- ✓ The control rods were pulled down to keep the power level constant against the positive reactivity created by the steam production that started suddenly at 01:22:10.
- ✓ At 01:22:45, the rise of steam production was stopped, the system pressure was brought to the desired value. It was determined that the neutron flux accumulated in the upper parts of the heart, and there was less negative reactivity than the safety criteria predicted to

stop the reactor urgently. In this case, the reactor should have been stopped immediately, but it was decided to continue the experiment.

- ✓ At 01:23:04, the steam valve to turbine 8, which was reserved for the experiment, was closed. Since the safety system that automatically stopped the reactor was already turned off, the system pressure increased, the amount of coolant passing through the heart began to decrease, which caused the boiling to start from the entrance of the channel. In addition, the reactor was in an unstable region in terms of operating power and thermohydraulic.
- ✓ At 01:23:21, it was detected that the power increased slowly.
- ✓ At 01:23:40, the emergency stop signal came on on the control panel. The operator pressed the reactor stop button and the control rods began to move down.
- ✓ At 01:23:44 the power level reached 100 times the nominal value within 4 seconds. The slow drop rate of the control rods could not prevent the power increase. As a result of the uncontrolled increase in power, the fuels overheated, the fuel envelope melted, the hot parts came into contact with the water, causing a steam explosion.
- ✓ The shock caused by the explosion lifted the 1000-ton reactor lid, the control rods jumped out of the heart, about 30% of the fuel in the heart melted and disintegrated. A second explosion followed a few seconds after the first explosion. Although the reason for this is not fully understood, the opinion that it may be the result of a number of chemical reactions such as graphite-steam interaction comes to the fore.

From this moment on, the series of events that will turn the event from accident to disaster is accelerating.

- ✓ It was incorrectly reported to the reactor employees, authorized institutions and organizations as a fire that occurred as a result of the explosion of the system control tank and was taken under control.
- ✓ The radiation measurement devices of the reactor employees were limited to the maximum value of 3.6 Röntgen. There are 2 devices capable of measuring up to 1000 x-rays in their warehouses, but 1 device that can measure up to 1000 x-rays was inaccessible because it was located in Unit 4. The staff continued to carry out their work without any personal protective clothing, taking as reference the devices measuring up to 3.6 x-ray values.
- ✓ The explosion is reported to the fire department as a roof fire. Since correct information is not provided, the response personnel who arrive at the scene without adequate and correct equipment intervene in the incident without taking protective measures such as protective equipment and iodine tablets before the intervention. 31 of the firefighters who extinguished the reactor lost their lives by being exposed to high radiation. Even if the firefighters who arrived at the scene report that there is a common metallic smell in the environment, they are not taken seriously. It was understood after the events that this was caused by the radioactive iodine-131 isotope in the radioactive cloud content.
- ✓ Among the first attempts to extinguish the burning reactor were firefighters' intervention in the reactor with cold water. This effort was terminated after 10 hours. More than 30 military helicopters flew over the burning reactor from April 27 to May 5. In order to control the fire and trap the radiation, 2400 tons of lead and 1800 tons of sand were left from these helicopters.
- ✓ Heat accumulated under the materials dropped from the helicopters. The temperature in the reactor increased once again with the scattered radiation. In the final phase of firefighting, the reactor core was cooled with nitrogen. The fire and radioactive release could only be brought under control on 6 May.

As these efforts did not yield any results, the situation was worsened by the fact that the Soviet authorities concealed the information about this disaster at the beginning, remained

silent, and the necessary precautions were not taken. The public was not informed at the time of the incident. The public gathered around the power plant to monitor the fire. The public's evacuation plan was not prepared. There is no limitation and information about daily life. Public institutions and organizations operating such as education and training continued their activities normally.

An abnormal level of radioactive material is detected at the Forsmark Nuclear Power Plant in Sweden 36 hours after the nuclear accident at the Chernobyl Nuclear Power Plant. The plant was alarmed with the thought that there was a leak. As a result of the investigations, it was determined that the radioactive pollution they detected was not caused by the Forsmark Nuclear Power Plant. A brief examination revealed that the radioactive particles got on the workers' feet while they were outside. In order to investigate the source, jets and helicopters were collecting samples over the Baltic Sea and the direction of the source was determined exactly as Chernobyl with the samples they collected. Sweden claims that its facilities in Chernobyl may be responsible for the radioactive waste in this incident. After it was reflected in the world press, the USA determines the Chernobyl event in satellite images. After that, 47,000 Pripiyat residents are evacuated by 1,200 buses and 200 trucks, for a few days, 9 days after the event. A thirty-kilometer-wide exclusion zone is being created around the facility. All animals on 2000 m2 of land were culled. Trees are cut down and buried in the ground. Car burial areas are determined for vehicles in the vicinity.

Meanwhile, the decontamination work continues. In order to ensure that the melted fuel in the reactor core pierces the plant floor and does not mix with the soil and groundwater, mine workers are having excavation works on the ground. 400 miners were brought from Tula and Donbass, Ukraine, to cool the excavated ground by filling it with liquid nitrogen. 2 Moon robots and 3828 soldiers are used to clean the graphite waste from the roof. As the radiation rate on the roof: 17 thousand x-rays, 90% of these military personnel die before they can see their forties.

CONCLUSION AND DISCUSSION

As a result of an experimental accident at the Chernobyl Nuclear Power Plant, a steam explosion occurred as a result of the fire, resulting in a meltdown and a large amount of radioactive material released. In the accident, the reactor number 4 of the power plant exploded, the roof of the building was blown up and the reactor became completely unusable. This explosion had various negative effects in Ukraine, Belarus and Russia. Within ten days, a high rate of radioactive material 1019 Bq) was emitted Figure 3). The emitted radiation reached as far as Europe and even Asia North America, especially Belarus and Russia. radioactive clouds; Radioactive clouds formed after the explosion in Chernobyl reached Marmara on 3 May 1986 Saturday, Western Black Sea on 4-5 May, Sivas via Çankırı on 6 May, and Trabzon-Hopa on 7-9 May. then radioactive particles spread all over Turkey.

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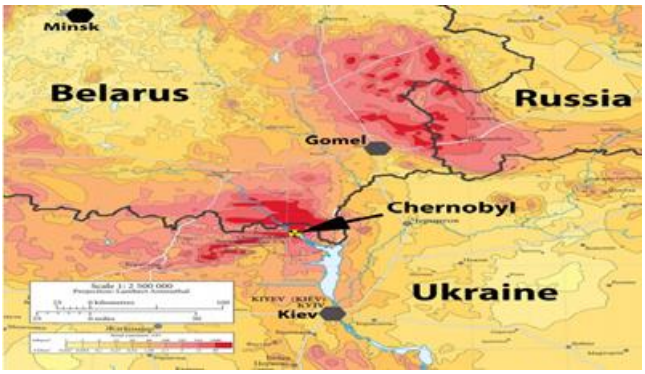


Figure 3. Distribution of Radioactive Contamination in the Chernobyl Area

Depending on the atmospheric situation, the amount and content of contamination varied. These include 131iodine 131I), 137Caesium 137Cs), 90Strontium 90Sr) and 239Plutonium, and several residual products e.g. 241Americium) was found. Among them, io131 has only a few days of half-life, while many others have years or even centuries (137Cs, 90Sr and 239Pu 30, 29 and 24,000 years). The storage of radioactive iodine-131 in the thyroid glands acutely stops the functioning of the thyroid glands and then causes cancer. Others are also known to have quite dangerous effects.

They have the capacity to last for a long time, hundreds of kilometers away from Chernobyl. Maps and charts showing the effects of the Chernobyl accident on Europe show that the radioactive fallout spread over a wide area and directly affected many countries in Europe; There are still doubts that the reason for the increase in cancer cases, cardiovascular disease, congenital defects and spontaneous abortions cases in the country is the Chernobyl accident.

According to the World Health Organization, more than 600,000 workers responded to the nuclear disaster after the accident, and many were exposed to radiation. The estimated cost was 18 billion rubles. The number of people who died during the accident was around 4,000-93,000 people, and after the event, about 600,000 people, who were used to isolate the power plant, got cancer or died as a result of the radiation they were exposed to, but this number was covered by the USSR government and only 31 people were recorded. In addition, it is considered that the long-term consequences of radiation spread over a very large area are more severe.

Dizziness, vomiting and fatigue, generate burns or eye damage and death were observed depending on the dose and duration due to high acute radiation in those who were first exposed to the event. Long-term effects were observed in the form of diseases consisting of differences in the levels of antioxidants, immunity and hormones of people. The environmental consequences of the accident were examined in a report prepared by the International Atomic Energy Agency. According to the UNSCEAR report, it was confirmed that 64 out of 4,000 people who were exposed to high doses of radiation from the accident until 2008 died as a result of radiation. Information on 200,000 emergency response workers, 116,000 rescued people, and 270,000 people evacuated from contaminated areas was compiled in the created Chernobyl Forum. The total radiation dose received by these purge personnel is estimated to be 60000 thousand sievert 6 million rem). The deaths of 50 emergency response workers who died shortly after the accident due to acute radiation syndrome and thyroid cancer due to radiation and other types of cancer related to radiation.

In 2006, the results of the Chernobyl Forum study were followed up with a different methodology in the International Journal of Cancer, a peer-reviewed journal, and the survival rates of people who were reported to have died due to cancer and who were diagnosed with

cancer were examined in a way that would not allow any discussion. As a result of their modeling, they suggested that 16,000 people exposed to radiation will get thyroid cancer and 25,000 people will get other cancers by 2065, and the rate of cancer will be several hundred million by this date. The European Green Party, on the other hand, stated in the TORCH report it commissioned in 2006 that it predicted that the number of people diagnosed with cancer would be 60,000 and that 30,000 would die due to cancer. Greenpeace, on the other hand, announced that more than 200,000 people will get cancer due to the accident. The non-profit organization called the Union of Concerned Scientists stated that in the evaluations made according to the non-linear threshold model, the radiation rate close to zero is not added, therefore, when a wider geography is included in the results, 50,000 due to the accident. He announced that they estimate that more than 25,000 people will get cancer and 25,000 of them will die.

After the explosion, cancer rates increased dramatically in Ukraine and Belarus. Children were most affected by this increase. Radioactive isotopes found in radioactive clouds were scattered and accumulated in various countries.

In another study, increased albinism was detected in humans and other species due to early skin melanocyte reduction due to decreased antioxidant activity.

Müller in 2006,2011, 2015; Evaluating the studies, he emphasized the effects of Chernobyl, whether cancerous or many other carcinogenic, mutagenic and cytogenetic abnormalities. In addition, in a study he carried out, he determined that the birds in the region exposed to high radiation in Chernobyl had a smaller than normal brain and head diameters (12.6%) without any changes in other body structures, and suggested that this may be caused by the decreased antioxidant stores due to the increase in oxidative stress, and this may cause a decrease in cognitive ability (Table 1).

The chemist Valeri Legasov, who was the biggest supporter of the government and the head of the team in the cleaning works after the explosion, filled 5 tapes in which he explained the Chernobyl incident with all its truth and committed suicide 2 years after the event. Victor Bryukhanov, Anatoly Dyatlov and Nikolai Fomin, who were responsible for the incident, were each sentenced to 10 years of hard labor.

The clothes of the firefighters who took part in the Chernobyl disaster are still in the Pribyat city hospital. It still contains high doses of radiation even today. None of the people who went to the railway bridge to watch the fire caused by the explosion in Chernobyl survived. In a short time they were all dead. After this event, this bridge was named the bridge of death.

Table 1.Studies on the Effects of the Chernobyl Accident and Their Results

Species	Genetic marker	Effect	Comments
Chromosome aberrations			
Human *Homo sapiens*	Lymphocytes with chromosomal aberrations	Increased by a factor 2–10	In women from Gomel and Mogilev, Belarus
		Increased by a factor 10–20	In clean-up workers
		Increased by a factor 3–7	In children from Belarus
Yellow-necked mouse *Apodemus flavicollis*	Chromosomal aberrations	Increased by a factor 3–7	
Mouse *Mus musculus*	Number of reciprocal translocations	Increase by a factor of 15	
Channel catfish *Ictalurus punctatus*, Crucian carp *Carassius carassius*, carp *Cyprinus carpio*, tench *Tinca tinca*	Frequency of aneuploidy	Increased aneuploidy in contaminated areas	
Oligochaetes: *Dero obtuse*, *Nais pseudobtusa*, *Nais pardalis*	Chromosomal aberrations	Increased by a factor ~2	In field populations
Scots pine *Pinus sylvestris*	Chromosomal aberrations	Increased by a factor 3	In field populations
Somatic mutations			
Human *H. sapiens*	Minisatellites	Increased rate	
		No significant increase	
	Minisatellites and microsatellites	No significant increase	
	Microsatellites	No significant increase	
Bank vole *Clethrionomys glareolus*	Mutations	No significant increase	
	Substitutions in cytochrome *b*	Multiple substitutions and transversions were restricted to samples from Chernobyl	
	Mutations and heteroplasmy	Increased by 19% in mutations and by 5% in heteroplasmy, although not significant	
Mouse *M. musculus*	Point mutations	No significant increase	Transplant experiment with exposure during 90 days
	Mitochondrial Cytochrome *b* heteroplasmy	No significant increase	Short-term transplant experiment
Channel catfish *I. Punctatus*	Breakage in DNA	Increased rate of breakage	
Crucian carp *C. carassius*	DNA content based on flow cytometry	Changes in DNA content, but unrelated to known measures of contamination	
Fruit-fly *Drosophila melanogaster*	Sex-linked recessive lethal mutations	Increased	
Wheat *Triticum sativum*	Microsatellites	Increased by a factor 10	Transplant experiment
Thale cress *Arabidopsis thaliana*	Lethal mutations	Increased by a factor 2–4	In greenhouse and field populations
	Lethal mutations	Rate 4–8 times higher than in controls in 1992	
Scots pine *P. sylvestris*	Mutation rate at enzyme loci	Increased by a factor 20	In field populations
	Protein-coding genes	Increased by a factor 4–17	In field populations
Germline mutations			
Human *H. sapiens*	Minisatellites	Increased	
		Increased by a factor 1.6 in men only	
	RAPDs	Increased rate	
Barn swallow *Hirundo rustica*	Microsatellites	Increased by a factor 2–10	Increased in only two out of three microsatellites
Other effects			
Mouse *M. musculus*	Lethality, embryo mortality and sterility	Increased	Outcomes of mated laboratory animals
Wheat *T. sativum*, rye *Secale cereale*	Aberrant cells	Increased in a dose-dependent manner	
Scots pine *P. sylvestris*	Hypermethylation of genomic DNA	Dramatic increase; probably stress response	In experimental populations

But life still goes on. People are forgetful if not history. The abandoned site of the Chernobyl reactor accident has been open to the public and tourist visits since authorities announced it was safe to visit in 2011. Within the scope of the seven-hour excursion program, after the reactor area is toured, a few kilometers away, we go to the city of Pripyat, which was built for the power plant workers and their families. Disaster Tourism).

As a result, a disaster may be caused by nature or human beings, but even this event, which is a leaf from the pages of history, shows that it is man who turns an experiment into an accident and an accident into a disaster.

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ACT LIKE NATURE FOR SUSTAINABILITY

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ABSTRACT

Mankind has sought various solutions to the problems it has faced for millions of years and has continued its life by imitating nature as a matter of existence. Various organisms, ecosystems and behavioral features in nature were examined and problems were solved with various simulations. In this relationship between man and nature, different experiences have revealed various designs in the built environment. Thus, various approaches have been adopted for an ecologically based sustainable environment in science and technology. One of these approaches created with the help of various technologies inspired by nature is the understanding of biomimicry. Biomimicry is an innovative approach that produces sustainable solutions to the problems experienced in our environment by imitating various organisms or ecosystems existing in nature in form or shape. With biomimicry, there are not only solutions developed by nature, but also various design strategies, mechanisms and systems. Thanks to biomimicry, sustainable practices are possible by understanding nature and developing production models. As a result of environmental disasters that come with climate change, people have understood that problems can be found in nature-based solutions, and the ideas of returning to nature and finding in nature have increased. With the ideas developed, solutions can be found to problems such as environmental destruction, clean water, energy and transportation. For years, various biomimicry designs have been created in engineering, architecture, textile and various sciences. The aim of this study is to bring a new perspective to the problems encountered in the city periphery by examining the basic principles of biomimicry. The main focus of the study is to reveal the interaction of biomimicry understanding with landscape architecture by producing nature-based solutions to urban problems. In the study, it is argued that the understanding of biomimicry should also advance in the field of landscape architecture, which acts with sustainable approaches, and the necessity of increasing nature-based solutions. It has been suggested to find solutions to the problems experienced in today's cities by utilizing the systems found in nature and to create sustainable living spaces by increasing the quality of life in the cities.

Keywords: Biomimicry, Nature, Innovation, Sustainability

1. INTRODUCTION

Although cities constitute a general settlement in terms of historical and social conditions, they express a structure that includes differences. Complex social organizations for the formation of cities first emerged in Mesopotamia, and the first cities in the modern sense were established in this region between 3500-4000 BC. Cities have undergone a great change since they first emerged (Pustu, 2006).

When the first human settlements appeared millions of years ago, the human population was so sparse that it could be expressed not in hectares but in density per square kilometer, and nature was rich in flora and fauna. People have also changed their living spaces by consuming plants and animals in line with their needs (Chapman, 2019). In line with these developments in the world, the concept of urbanization has emerged. Problems such as population growth, consumption of natural resources, and wars that emerged with industrialization and urbanization have adversely affected the natural environment. In the last 50 years, the population has doubled and most of the resources have been depleted. In the history of humanity, the balance of nature and the idea of sustainability have been severely damaged (Seymenoğlu, 2019). Especially in urban areas, the issues of space, sustainability and livability were questioned. The unplanned and uncontrolled works and the pressure on the cities caused the existing tissue to be damaged, various environmental problems and a decrease in the quality of life. With the destruction of natural resources and the deterioration of ecological balance, the concepts of sustainability have come to the fore.

The carbon footprints we create in all areas of our daily life, in all spatial frameworks, cause significant environmental problems. Depending on the effects of global climate change, struggle areas such as heat island effect, air pollution, flood disasters, deprivation of green areas, loss of biodiversity, drought, food security show that the relationship of cities with nature needs to be reconsidered. Solution proposals for emerging problems need to be developed quickly. The solutions produced and developed should bring sustainable solutions with future goals that are compatible with the natural balance and ecological structure. Various studies are carried out to address the environmental problems that occur in the environment we live in and to eliminate them. One of these studies is the understanding of biomimicry, which is a nature-based approach.

Throughout history, people have produced many solutions to the problems faced by the evolution of nature. These solutions have been passed down from generation to generation. In the 1990s, Benyus added the concept of biomimicry to the literature, examined the models of nature, and then explained that it is a sustainable science that takes into account the forms, processes, systems and functions of nature for the problems of living things (Benyus, 2002).

With this study, it is aimed to bring a new perspective to the problems encountered in the city periphery by examining the concept and basic principles of biomimicry. In the study, the importance of biomimicry in the field of urban design and landscape architecture was mentioned by giving examples of biomimicry at various levels.

2. WHAT IS BIOMIMICRY?

Mankind has been in interaction with many living species in nature since its existence. With the interaction they established, they observed the flawless order of nature and tried to make their own lives easier by imitating the living patterns of other living things (Bilmen, 2019). Thus, by examining the characteristics of living things in nature, many problems were solved as a result of various simulations.

In the field of science and technology, various approaches have been adopted to create ecologically based sustainable living spaces. One of these approaches created with the help of various technologies inspired by nature is the understanding of biomimicry. This concept, which comes out as Biomimetic Science, tries to find solutions to existing problems by making use of ecosystems, organisms and behavioral features in nature (Pedersen-Zari, 2010). In summary, biomimicry is an innovative discipline that explores nature's best ideas, imitates these designs, and develops them for people's problems.

2.1. Definition and Etymology of Biomimicry

Biomimicry comes from the Greek words bios, meaning life, and mimesis, meaning imitation. The idea of imitating nature is a very old idea and dates back to the existence of humans. Biomimicry is a branch of science that emerged with the change and development of learning from nature. With the development of technologies with the industrial revolution, it was possible to examine nature at the atomic level. Thus, the idea of imitating nature was transferred to scientific knowledge and research. New approaches have begun to be sought in order to produce more livable spaces and to be a solution to human problems (Steadman, 2008).Biomimicry was first made in history by US Air Force Base Jack Steele in 1960 with the name "Bionics". In 1969, the American biophysicist Otto Schmitt used the term "Biomimetics" in an article he presented at the International Congress of Biophysics in Boston. In 1997, biologist and science writer Janine M. Benyus coined the term biomimicry in her book "Biomimicry: Innovation Inspired by Nature" (Avcı, 2019). Benyus, in her book, explains that by examining animals, plants and many other living, non-living and all formations in nature, revealing the working principles of these systems, it has an important meaning for scientists to produce new ideas (Benyus, 2002).

On the basis of biomimicry, it includes biology as well as science branches such as zoology, anatomy, botany and chemistry. Inspiring new designs by imitating animate and inanimate objects entered the literature at the end of the 20th century; It has been systematically discussed what the forms of learning, inspiration and adaptation from nature can be and how they can be used in different information/technology fields (Selçuk and Sorguç, 2007). Over the years, a rich source of biomimicry has been created by developing extraordinary qualities for nature, survival, efficiency and performance, and it is aimed to benefit from these resources to achieve the goal of sustainability (Oguntona and Aigbavboa, 2017).

2.2. Biomimicry Principles

After introducing the concept of biomimicry, Janine Benyus presented healthy and long-lasting design ideas that imitate the life and functioning of nature in all the design examples she gave about nature. As a result of the studies carried out by examining nature and being inspired by nature, the working principles of nature were internalized and the principles of nature consisting of 9 items were formed:

- Nature runs on sunlight.
- Nature uses only the energy it needs.
- Nature fits form to function.
- Nature recycles everything.
- Nature rewards cooperation.
- Nature banks on diversity.
- Nature demands local expertise.
- Nature curbs excesses from within.
- Nature taps the power of limits (Benyus, 2002).

All living things in nature are in an absolute relationship with each other. What is waste for one can be a source of life for other living things. Thus, it is possible for both lives to continue by benefiting from each other's lives. The principles created by this flawless

functioning in nature support the cycle. The following principles are important for a correct design with the understanding of biomimicry (Figure 1) (Baumaster, 2013).

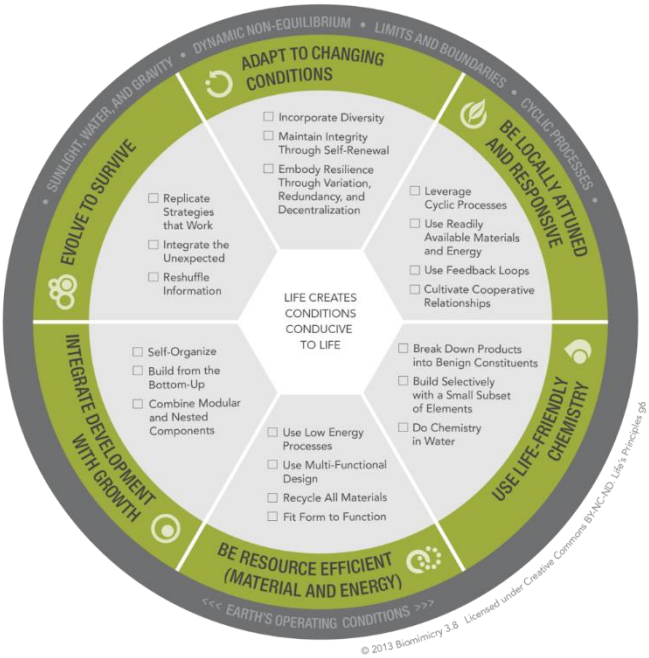


Figure 1. Biomimicry Design Lens (URL-1)

- Surviving to thrive: Continuously obtaining and incorporating information to ensure the durability of performance.
- Being resource efficient (materials and energy): Taking advantage of resources and opportunities skillfully and conservatively.
- Adapting to changing conditions: Responding appropriately to dynamic situations.
- Integrating growth with development: Best investing in strategies that promote both development and growth.
- Being locally sensitive and responsible: Integrating and adapting with the immediate environment.
- Using eco-friendly chemicals: Using chemicals that support the life process (Baumaster, 2013).

2.3. The Biomimicry Design Spiral

The biomimicry design spiral illustrates the process for a successful biomimicry design (Figure 2). A systematic study is required to find answers to existing design problems in nature. For this reason, the following steps are important for a systematic study:

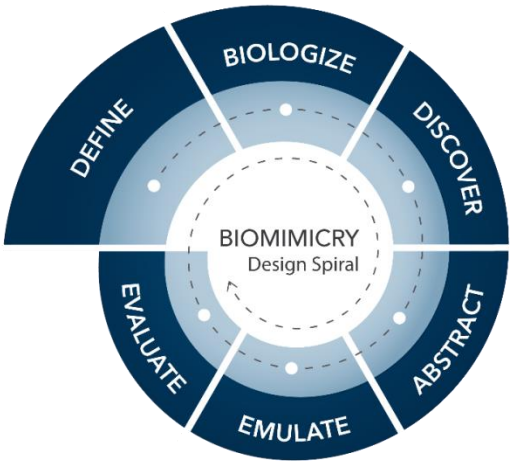


Figure 2. Biomimicry Design Spiral (Cohen and Reich, 2016)

1. Define: Identifying the problem

2. Biologize: Biological response

3. Discover: Observing nature

4. Abstract: Finding nature models that have succeeded

5. Emulate: Implementing a nature-based solution

- Formal mimicry
- Functional mimicry
- Mcosystem mimicry

6. Evaluate: Comparison of the solution's compatibility with the principles of nature (Cohen and Reich, 2016).

2.3.1. Biomimicry Levels

Living things in nature are in harmony, balance and a flawless system. Researchers and scientists have introduced different methods in biomimicry. These methods have been developed for fields such as design and engineering, and the methodology of the biomimicry approach differs, although it is basically similar to other methods, due to the necessity of cooperation with different disciplines and the sustainability of the obtained product.

Scientists have conducted many studies to find nature-based solutions to existing problems by examining nature. Research indicates that full imitation of nature involves at least three levels of biomimicry: organism, behavior, and ecosystem. These three levels aim at the successful application of biomimicry to solve current problems that increase the regenerative capacity of the built environment and promote environmental sustainability (Othmani, 2018).

1. Organism Level: This level, which refers to a certain organism such as a plant or animal, refers to the imitation of some or all of the organism.

2. Behavior Level: It mimics the behavior of living things in nature and refers to an aspect of how an organism behaves or in a wider context.

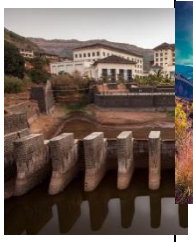
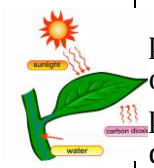
3. Ecosystem Level: It refers to the imitation of all ecosystems existing in nature and common principles by allowing them to work successfully (Othmani et all, 2018).

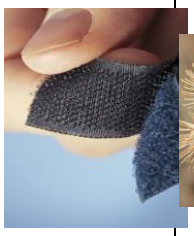
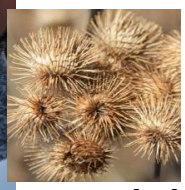
3. EXAMPLES OF BIOMIMICRY

Many products, structures and environments that we encounter in our daily lives are designed with the understanding of biomimicry inspired by nature. Biomimicry is associated with many areas of human activity (Rossin, 2010). Studies in fields such as architecture, engineering, medicine, industry and landscape have enabled new lifestyles. Examples of designs where nature finds a solution to human life and facilitates the lives of living things are presented in Table 1.

Table 1. Examples of Biomimicry

Discipline	Name	Inspiration	Applicaton in design	Problem Solved	Level Biomimicry
Architecture	 Eiffel Tower, Paris	 Thighbone	It consists of tiny bars in the form of a cage, which are interlocked with each other, not in one piece, inside the thighbone, which has the	With its durable construction, it was able to resist the wind and the ventilation problem was	Organism Level
Architecture	 Eastgate Center, Harare	 Termite Nests	Ventilation and air conditioning systems were used. There are channels from a central point to other points.	Thanks to the chimneys with low air pressure on their sides, they can easily take in the light winds and	Behavior Level
Architecture	 Esplanade Theater,	 Durian	The plant's spiny, multi-layered and semi-rigid pressurized shell protects the seeds inside.	With the building envelope, it allows sunlight while preventing the interior from	Organism Level

Architecture	 Lavasa City, India	 Ecosystem	Rocks, bushes, plant, animal varieties, soil structure, etc. has been imitated.	Affected by Masonic rains, the city was inspired by trees and provided water	Ecosystem Level
Landscape Architecture	 Orquideorama, Colombia	 Orchid	With its thin, long, durable stem and flowers that are symmetrical to each other, it is perceived as nature on a macro scale with	To benefit from the sun's rays and for the botanical garden, canopies have been	Organism Level
Landscape Architecture	 Treepod, Boston	 Photosynthesis	Treepod produces oxygen after the process of CO2 decomposition and moisture release in the air. It generates electricity with a	1 treepod produces more oxygen than 100 trees. With PV panels, both air filtration	Organism Level
Landscape Architecture		 Mountains in Azerbaijan	It is a natural topography formed by the geometry of mountains, cliffs and bushes.	Photovoltaic panels, wind turbines, water purification systems are used. It is	Ecosystem Level

Engineering	 Bullet Train	 Kingfisher	The kingfisher dives from the air with low resistance to the water with high resistance to hunt.	The speed of the train is increased by 10%, preventing the sonic boom as it exits the tunnels. Air pressure has been reduced by 30% and electricity usage by 15%.	Behavior Level
Engineering	 Olympic Stadium, Munich	 Dragon fly	Its wings, which are 1/3000 of a millimeter thick, are durable despite being thin.	Thanks to the divisions of its wings, there are no tears while flying.	Organism Level
Industry	 Velcro tape	 Burdock	Due to the paddy nature of the grass, it is difficult to separate from the area it comes into contact with.	In the production of the tape, tapes that we can use in every product have been created, inspired by	Behavior Level
Industry	 Self Cleaning Paint	 Lotus	Lotus leaf is the best waterproof material in nature. Leaf surface throws dust and particles from the surface with a fine secretion.	The paint is also included in the paint, so that the secretion on the plant is not dirt-repellent.	Organism Level

4. BIOMIMICRY IN URBAN DESIGN

The concept and approach of biomimicry was first used in engineering fields to produce technological solutions and in architecture as form and function transfer. In the last 10 years, as the examples of biomimicry have increased and its scope has expanded, it has been seen that it is a remarkable issue on an urban and ecological scale and has begun to be emphasized (Pedersen-Zari, 2007).

Cities are the most important living spaces of people. It is estimated that 68% of the world's population will live in cities until the mid-2000s. Cities with human settlements depend on ecosystem services for their natural benefits. Urbanization and its accompanying urban activities cause depletion of natural resources, loss of biodiversity and damage to ecosystem health (Alberti, 2005).

In order to eliminate these damages, urban projects are produced that allow the development of social and ecological systems. Thus, it is aimed to strengthen the ecosystem health by reducing the negative effects of the urbanization process (Cole, 2012). Biomimicry takes advantage of the functioning of living organisms and entire ecosystems to find solutions to the problems present in the life of living things. In order to produce sustainable solutions in the built environment, applications in architecture and many related disciplines are increasing (Chayaamor-Heil et all, 2018). For this purpose, studies are carried out in the city periphery with the biomimicry approach.

One of these studies is the example of the city of Lavasa in India. The city has been designed based on the smart city approach and biomimicry understanding. The city, which was designed by imitating monsoon forests, was aimed to get rid of the heavy monsoon rains. Providing water collection in the city and water management are the primary goals (Rossin, 2010).

The Langfang region of China is among the cities created with another biomimicry. The region, which had a local ecosystem consisting of deciduous forests 4000 years ago, could not manage rainwater due to the effects of urbanization and deforestation and struggled with water scarcity. Efficiency has been increased by providing soil and rainwater management with the designed green cover systems (Lazarus and Crawford, 2011).

The Exploration Architecture Office in Europe has developed an algorithm to move liquids and gas in infrastructure systems, mimicking nature's minimal use of materials and energy. With this building system created with a holistic design approach, it is thought that the design will spread throughout the city (Öztoprak, 2020).

It is formed in the form of a vascular mushroom, very similar to the system of cities in and around Tokyo. It is aimed to create efficient transportation systems in cities by imitating the behavioral characteristics of the physarum mushroom (Tero et all, 2010).

5. RESULTS

Biomimicry stands out as a promising approach in response to the disconnection of humans from nature. With the developments in urbanization and production technology, people produce much more artificial spaces and use industrialized products. Some ecological approaches, on the other hand, turn their backs on this technology and call people back to their old life. In practice, people can neither get out of the comfort zone they have created nor give up on the nature that keeps them alive.

Studies and researches show that studies created with the biomimicry approach are intense in fields such as medicine, engineering and architecture industry. The negative effects of greenhouse gases caused by the increase in population, rapidly developing industrialization, and the increase in consumption of fossil fuels have become a global problem. The carbon footprints we create in every aspect of our daily life cause significant environmental problems. Cities, on the other hand, are greatly affected by the increase in extreme events as a result of climate change.

It is important to find solutions to the problems experienced in today's cities by making use of the systems found in nature and to create sustainable living spaces by increasing the quality of life in the cities. For the sustainability of cities, parks and recreation areas should be preserved in today's fragile and volatile urban environment. In this context, it is necessary to advance the understanding of biomimicry in the field of landscape architecture, which acts with sustainable approaches, and to increase nature-based solutions.

Thanks to biomimicry, sustainable practices are possible by understanding nature and developing production models. This nature-based approach will contribute to increasing the productivity and quality of life in cities and making sustainable decisions by producing solutions to the problems experienced in today's cities.

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FROM ART ADDING VALUE TO THE OBJECT TO CONTEMPORARY ART THAT MAKES THE OBJECT VALUE

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Abstract

This research aims to create a theme that emphasizes the 'different' by following the path taken by the concepts of object, value and worthlessness in the artistic process, accompanied by prominent artistic examples of civilizations, periods and understandings. For this purpose, the relevance of the definitions made by social science disciplines (philosophy, sociology, linguistics) to art is emphasized. Here, the object, which is raw, unprocessed or amorphous in nature, is first perceived as objective reality by art organizations, processed by the artist, distilled from his imagination, metamorphosed and formally referred to as an 'art object'; Afterwards, the semantic layers made on this 'art object' and the processes of transforming it into a 'representational object' and adding value are observed. Briefly, the history of artistic periods that created artificial art objects from natural objects is evaluated. This entire process covers the times from the beginning of human history to the present Postmodern years. The 'art that adds value to the object' part of the process in question is a limestone bust from the Ancient Egyptian Civilization (3000-300 BC); A collection of terracotta sculptures from the Chinese Empire Civilization Period (300 BC - 1900 AD); It creates an example of a marble sculpture from the Antiquity (Greek-Roman Civilization) Period (900 BC-300 AD) and a canvas painting from the European Baroque Period (17th century AD). The part of 'contemporary art that makes the object worthless' is the Postmodern Period, which has made its influence felt in the art world from the second half of the 20th century to the present day. Here, too, a sculpture by one of the contemporary British artists Damien Hirst (1965-) and an installation by Chinese artist Ai Weiwei (1957-) are examined regarding the Postmodern Period. Therefore, this research, by gathering under the same roof the examples of works of art that 'add value to the object', which refers to the long historical process, and the examples of contemporary art 'work' of the last seventy years that make the object worthless, the different; It refers to the 'Postmodern Situation' and the 'small narratives' set against the 'grand narratives' of thousands of years. It is hoped that the results obtained from this study, which emphasizes contemporary art (Postmodernism) by revealing the historical and periodical differences of the art field, can contribute to the field.

Keywords: Object, Value, Insignificance, Contemporary Art, Postmodernism.

NESNEYE DEĞER KATAN SANATTAN NESNEYİ DEĞERSİZ KILAN ÇAĞDAŞ SANATA

Özet

Bu araştırma, nesne, değer ve değersizlik kavramlarının sanatsal süreçte aldığı yolu uygarlıkların, dönemlerin ve anlayışların öne çıkan sanatsal örnekleri eşliğinde takip ederek, 'farklı' olana vurgu yapan bir izlek oluşturmayı hedefler. Bunun için sözü edilen kavramların, sosyal bilim disiplinleri (felsefe, sosyoloji, dilbilim) tarafından yapılan tanımlarının sanatla olan ilgileri üzerinde durulur. Burada, doğada ham, işlenmemiş ya da amorf halde bulunan nesnenin, sanat örgütlenmeleri tarafından önce, nesnel gerçeklik olarak algılanması, sanatçı tarafından işlenmesi, imgeleminden damıtılması, başkalaştırılması ve biçimsel yönden 'sanat nesnesi'ne; sonra da bu 'sanat nesnesi' üzerinde yapılan anlamsal katmanlar ile içeriksel yönden 'temsil nesnesi'ne dönüştürülmesi ve değer katılması süreçleri gözlemlenir. Kısaca, doğal nesneden, yapay sanat nesneleri yaratan sanatsal dönemler tarihi değerlendirilir. Bu sürecin tümü, insanlık tarihinin başlangıcından günümüzün Postmodern yıllarına kadar olan zamanları kapsar. Söz konusu sürecin 'nesneye değer katan sanat' kısmını, Antik Mısır Uygarlığı (M.Ö. 3000-300) Dönemi'ne ait kireçtaşı bir büst; Çin İmparatorluğu Uygarlık (M.Ö. 300-M.S. 1900) Dönemi'ne ait pişmiş toprak heykel topluluğu; Antikite (Yunan-Roma Uygarlığı) Dönemi'ne (M.Ö. 900-M.S. 300) ait bir mermer heykel ve Avrupa'nın Barok Dönemi'ne (M.S. 17. yüzyıl) ait bir tuval resmi örneği meydana getirir. 'Nesneyi değersiz kılan çağdaş sanat' kısmını ise, 20. yüzyılın ikinci yarısından günümüze kadar sanat dünyasında etkinliğini hissetttiren Postmodern Dönem oluşturur. Burada da, Postmodern Dönem'le ilgili olarak çağdaş İngiliz sanatçılarından Damien Hirst'e (1965-) ait bir heykel ile Çin'li sanatçı Ai Weiwei'ye (1957-) ait bir yerleştirme irdelenir. Dolayısıyla bu araştırma, uzun tarihsel süreci kasteden 'nesneye değer katan' sanat eseri örnekleri ile son yetmiş yılın 'nesneyi değersiz kılan' çağdaş sanat 'iş'i örneklerini aynı çatı altında toplayarak, farklı olanı; 'Postmodern Durum'u ve binlerce yılın 'büyük anlatı'larına karşı ortaya serilen 'küçük anlatı'ları ifade etmektedir. Sanat alanının tarihsel ve dönemsel farklarını ortaya koyarak çağdaş sanat (Postmodernizm) vurgusu yapan bu çalışmadan elde edilen sonuçların alana katkılar sağlayabileceği umudu taşınmaktadır.

Anahtar Kelimeler: Nesne, Değer, Değersizlik, Çağdaş Sanat, Postmodernizm.

ENTRANCE

Art, object, value and worthlessness are concepts that have long occupied the interests of social science disciplines. In particular, philosophy as a social science discipline has been art for thousands of years; object, value and worthlessness have been discussed for hundreds of years. In other words, the world of social science, art from the Ancient Period (300s BC); The object speaks of its value and worthlessness from the Enlightenment Period of Europe (17th century). Sociology, psychology, anthropology, ethnology, psychogeography, etc., which emerged due to the diversification of social sciences after the Modern Period. Those who take up the subject also express opinions about the concepts of object, value and worthlessness. Meanwhile, art field organizations deal with the concepts of object, value and worthlessness on the basis of their own practices (work, artwork, representation, form, sign, work).

As the subject of the historical process, the search for the truth, good, useful, truth and beauty of the person who makes art brings the object to the agenda and also leads to its

interaction with the object. The object is in the dictionary of Turkish Language Institution; It is defined as 'any inanimate being with a certain weight and volume, color, any subject, thing, object other than the subject'. For the object called 'object' in English, the following is said in philosophy: “In general, the entity that is opposite the subject pole in the world that modern philosophy has divided into two. Something that can be perceived by one or more of the senses, tangible, visible, that is, existing in time and space. As something that can be mentioned, named for itself, and has a substantive (root, original) existence in the external world, the object represents all kinds of inanimate beings that have a certain volume and occupy space. What has been presented to consciousness, what consciousness knows, recognizes; a mediation between the act of knowing and the known truth.” In the same place, the following is stated for the concept of objective: “In general, a concrete object existing independently of the knowing mind; in other words, the object as something that is real, determinable or physical, and therefore observable and verifiable by everyone, whose state, function or position is not dependent on inner experience, mental experience, subjective experience; adjective for something whose nature can be determined by physical measurement.” (Cevizci, 2005, p. 1221).

It is man and nature that determine the position of the object in the world. Nature is a structure that shapes people with what they give and take. The natural entities that we see and perceive around us constitute the world of objects in terms of their physical and concrete properties. This world of natural objects in question provides benefits when giving to people, and harms when receiving. That is, there is a time when man makes nature his own; however, it does not exist when it submits to the conditions of nature. On the other hand, human is an entity that uses the tangible assets of nature, sometimes in their natural state, as natural objects, and sometimes by processing them in formal and contextual aspects through science and art and transforming them into artificial objects. So much so that the object, on the one hand, creates the natural living environment of man, on the other hand, it causes man-made artificial environments produced by the efforts of man. In other words, people in the world try to benefit from the natural and artificial (scientific and artistic work) states of the object in order to improve their living conditions and to reach the right, good and beautiful.

The field of sociology states that natural objects, as 'a component of the world we live in', have the power to give and take things to man and have the quality of freedom: “Libertarian (free) thought focuses on all kinds of dualism, the opposition between culture and nature, between human and non-human. objects, according to this idea, are a component of the world in which we live, in the same capacity as other collective beings; the only difference is the degree of power and freedom (or autonomy). In other words, as the old ethnological concept 'fetish' expresses well and some currents of contemporary sociology show, objects are strictly manufactured by an external and other structured force, with only their physical qualities (weight, density, form, etc.). equipped, neutral and passive devices; they are not instruments that meekly obey the intentions, goals, and commands of the masters who designed them. On the contrary, objects have a power and a quality of their own which depend as much on the nature of the situations in which they exchange meaning and effect, as well as on the nature of the type of collective activity or arrangement to which they belong. (Colson, 2005, p. 264).

According to the sociological perspective, objects are one of the components of the world we live in (nature, object, human, culture, science, animal). However, objects differ from these other components in terms of their freedom and power. That is, objects do not stay in a passive position like some components of the world. On the contrary, objects, in

accordance with their free structure, are in active positions in terms of the effects of the features they reveal (power of giving and receiving, power of representation, power of expression, expressive direction, content dimension etc.). In addition, passing the objects through the value scale leads to the emergence of their qualities. Objects are perceived as values, especially in the field of art; they have a free character and a power that affects other components of the world in the context of active/passive or artist/audience. In terms of art, this freedom of objects and their power affecting societies make it different from other components. In fact, thanks to the power that objects give to the field of art, some societies even choose to dominate other societies through their own civilizations - by creating some privileges of their own. Even among societies with close cultures within the same civilization, examples of this struggle for dominance can be found through artistic objects.

Value, according to the TDK dictionary, is 'the abstract measure that determines the importance of something, the value that something is worth'. Value, which is used as 'value' in English, is called axiology in philosophy and is handled on the basis of man's relations with the object: "... The quality that the subject attributes to the thing, the phenomenon. Accordingly, when it comes to value, the subject and personality must be involved; on the other hand, value is the expression of a practical attitude or orientation of the subject or mind rather than a theoretical attitude or orientation, and value is what the subject subsequently adds to it, in addition to its other qualities, to express its relation to the object's own purpose and actions. is an attribute. It is after this process that value is objectified and projected onto the object, being seen as something of value in itself and objectively. Value, as a measure, includes the distinction between what is and what ought to be, and it always appears as something positive or negative. On the other hand, not all values can be controversial, as their way of valuing and valuing may not be correct, as it involves the relation of an appraiser subject to an object or phenomenon, whose attitude is not necessarily accepted. Within this framework, from hedonistic values such as pleasure (positive) and pain (negative), aesthetic values such as beautiful (positive) and ugly (negative), moral values such as good (positive) and bad (negative), useful (positive) and unhelpful (negative) values. negative) utilitarian values, religious values such as thawab (positive) and sin (negative), and finally logical values such as right (positive) and wrong (negative). (Cevizci, 2005, p. 432).

The concepts and actions that people produce in order to internalize objects lead to the emergence of their own value (axiology) world. In this context, value constitutes the whole of the facts, which consist of the definitions, inquiries, discussions, actions, activities and games made by the human on the quality (good, beautiful, correct), 'quantity' (form) and 'what' (content) of the object. . The quality activities that people perform on the basis of religion, art and science are also busy with creating and accumulating formal and contextual ones. Meanwhile, the search for the 'beautiful' of the art field brings the concept of aesthetics to the fore. Therefore, while the relationship between art and value gives rise to the term 'Aesthetic Value', the following is expressed regarding this philosophical perspective that preaches how 'beautiful' and 'ugly' should be: The characteristic of cultural products and activities defined as etc. In this context, it can be said that aesthetics is related to the type of value in question, and it deals with the principles that underpin the attribution of value to individual works of art. At the very least, even if aesthetics itself is not directly concerned with valuing works of art, its concern for art, especially cultural products consumed by the ruling classes in society, presupposes that these products are valuable objects and activities, that there is such a thing as aesthetic value. It is of great importance in this regard that at the end of the eighteenth century, Kant, in his Critique of Judgment, made a distinction between pleasure in beauty and pleasure in non-art objects and activities. (Cevizci, 2005, p. 433).

Aesthetic value uses a set of principles, methods and criteria to reveal the differences between 'beautiful' and 'ugly'. All these criteria that determine the characteristics of the beautiful and the ugly are the elements that create the term aesthetic value. On the way from the very beginning of the historical process to the Modern Period, the principles of aesthetic value cause a factual situation that almost all civilizations, geographies, cultures and societies refer to. Although there are temporal, spatial and ground differences between these organizations, each organization has a 'beautiful' and an 'ugly' understanding that it owns. In fact, these organizations do not neglect to use the formal and content aspects of art together while creating their own 'beautiful'. In other words, the concept of value, which determines art at the point of beauty and ugly, continues to shape both the "nice" and "what" of the world we live in for a long time.

In the TDK dictionary, worthlessness is defined as 'the state of being worthless, depreciation', while the terms 'valueleness' and 'vanity' are used in English. While the concept of 'vanity' in English is based on the Latin origin 'vanitas', "vanitas; It means 'empty', 'emptiness', 'uselessness' or 'worthlessness'. A vanitas is a symbolic work of art that shows the ephemerality of life, the futility of pleasure, and the certainty of death, and is often the opposite of symbols of wealth and ephemeral and death." (https://en.wikipedia.org/wiki/Vanitas&prev=search&pto=aue accessed May 2021). Vanitas, which means worthlessness, was used as a preferred genre in European painting in the form of still life (still life). "The Latin word meaning 'nothing' is derived from 'vanitas vanitatum' (nothingness of nothings). A stillbirth species that originated in the Netherlands (Netherlands) in the early 17th century. In these compositions, which usually emphasize the inevitability of death and the transience of worldly achievements and pleasures, objects symbolizing the aforementioned concepts ('memonto mori': remember that you are mortal) are included." (Rona, Beykan, 1997, p. 1867).

Some periods of art history and especially today's postmodern contemporary art environment witness images of devaluation of the object. While the concept of worthlessness in art is met with 'vanitas', it is aimed to produce objects (works of art) that represent life and that life is temporary. In paintings with vanitas meaning useless, empty and nothingness, the fact that life is mortal, that is temporary, is emphasized contextually through still life paintings made from the Baroque Period of Europe and continuing until the Postmodern Period (1960s). The importance of still life painting in 17th century art in Europe devalues fruits and vegetables, which are natural objects, in a physical sense, while making the image of the painting valuable as an art object. That is, the expressive language of these paintings seems to say that life is like a passing fad and that it is a worthless thing. In this respect, still lifes, which are the representational objects of that period, gain value by referring to the worthless. In fact, this situation creates a paradoxical image that extracts value from worthlessness through art. That is, still life paintings, whose content is based on worthlessness, gain an artistic value in terms of their formal aspect. After the Postmodern Period, the relationship of art objects with the concept of worthlessness changes shape and takes on a different identity. Contemporary art activities are carried out by rendering the art objects of this period worthless (e.g., temporary, ordinary, simple, industrial or technological production material, etc.).

Man can add value to the raw objects of the natural world on the one hand, and render them worthless on the other. Man's choices between adding value to the object or depreciating it show his artistic inclination. From another point of view, transforming objects that are in the form of "inanimate worlds that can be perceived with the senses, have a certain volume, can be tangible and visible, can be defined and named, and exist in time and space" into artwork

material or art object, can be seen as adding value to them. That is, this action can also be described as creating a new object (work of art) from a natural object. On the other hand, 'destroying, corrupting, breaking, corrupting or killing' the same natural and objective world can also be understood as depreciating them. So, on the one hand, there are classical art organizations that claim to tell people 'truth, beauty and truth' by making art, and there are contemporary art organizations of the Postmodern Period that claim to tell 'the curve, the ugly and the unreal' on the other hand. In this respect, the historical journey of art is the scene of the artistic productions of practitioners and theorists of both views.

The art history story of thousands of years is full of civilizations and understandings that add or think to add value to natural objects. “In Mesopotamian Cultures from different geographies of the world, lapis lazuli stone, limestone, ivory and bronze; Ivory, enamel, limestone and silver in the Ancient Egyptian Civilization; Iron, natural rock and basalt stone in the Hittite Civilization; Terracotta, ivory, jade, bronze, copper, silver, gold and marble; Bronze, volcanic rock and sandstone in the Indian Civilization; Bronze, terracotta, porcelain, natural rock, wall painting, silk and paper in Chinese Civilization; Wood and woodcut (estamp) in Japanese Civilization; wood in Australian and Oceanian Cultures; ivory, mosaic and fresco in Byzantine Civilization; Stained glass and tempera in European Medieval Civilization; Renaissance, Baroque, Enlightenment Periods and Classicism, Romanticism, Realism, Impressionism etc. canvas painting is used during the transformation of a natural object into an art object.” (Honor and Fleming, 2016). The use of natural objects for their own artistic purposes in terms of all these civilizations and understandings; it is important to make them new art objects and to give people 'beautiful, true and correct' information. Namely, as a result of these efforts of art, people try to obtain new objective realities (art objects) by adding their own subjective views to the real objects of nature.

METHOD

This research uses the qualitative research method and, depending on this method, the descriptive analysis approach while evaluating 'art that adds value to the object' and 'contemporary art that makes the object worthless'. American academic Michael Quinn Patton (1945), in his 2002 book 'Qualitative Research & Evaluation Methods', states the following about this method: “The data required for qualitative analysis is usually obtained from fieldwork. During fieldwork, the researcher spends time in the environment where he/she works. This environment can be a program, an organization or a society, or it can be situations in which important observations and analyzed documents are included in the research. As a 'participating observer', the researcher makes first-hand observations by sometimes taking part in activities or interactions.” (Patton, 2014, p. 1-2). On the other hand, the descriptive analysis approach of the qualitative research method was also applied here. The descriptive analysis approach is; “... it is used to define, interpret and examine any situation, event and problem in detail, and the existence and degree of the relationship between the examined events and variables is questioned by determining the criteria.” (Aydoğdu, Karamustafaoğlu, Bülbül, 2017, pp. 558-559).

The data of this research were obtained from the visuals of books, articles and applied artistic works written in the field. In this context, the textual references and sample visual data obtained as a result of the literature review with the qualitative research method were evaluated with the descriptive analysis approach. In other words, all written and visual data determined regarding 'art that adds value to the object' and 'contemporary art that renders the object worthless' were first subjected to definition, examination, interpretation and

questioning. Then, the conclusion part of the research was written on the basis of the proven relationships between these two different titles. In this respect, the aim of the research is to reveal the relevance between 'art that adds value to the object', whose effects are seen in the historical process, and 'contemporary art that makes the object worthless', which includes today's postmodern art. The importance of the research is to contribute to the concepts of object, value and worthlessness, which are the subject of discussion in the field of social sciences, through the titles of 'art that adds value to the object' and 'contemporary art that makes the object worthless'.

The universe of this research consists of evaluating the concepts of 'object', 'value' and 'worthlessness', which occupy social science circles, with an artistic perspective within the scope of the elements seen in different parameters of the historical process ('art that adds value to the object', 'contemporary art that makes the object worthless'). The sample of this research is civilizations and understandings that create artistic works that stand out in different parameters of the historical process, while in the context of art that adds value to the object, a limestone bust from the Ancient Egyptian Civilization Period; A collection of terracotta sculptures from the Civilization Period of the Chinese Empire; A marble statue from the Antiquity (Greek-Roman Civilization); A canvas painting from the Baroque Period of Europe and a sculpture and an installation by contemporary artists of the Postmodern period (Damien Hirst and Ai Weiwei) are examined in the context of contemporary art that renders the object worthless. Therefore, the limitation of this research is the period from the Ancient Egyptian Civilization Period to the second half of the 20th century and from here to the present, and six different examples of art objects identified in all these processes.

ART THAT ADDS VALUE TO THE OBJECT

On the historical journey of art, the object gains value. As the active witness of this process, the artist uses the object freely and empowers it by giving new tasks in terms of form and content. The artist adds value to the object by transforming the raw state of the object in nature into artificial objects. When the raw materials of the world we live in are included in the scope of visual art, -imitation (mimesis), imitation of imitation, representation, image, image, icon, sculpture, painting, illusion, work, work, object, sign, form, form, simulacrum, work, etc. - called by different names. In some of these different names, the object is made valuable, while in others the object is rendered worthless. The multiplicity view of historical photography is full of artistic examples that add value to the object. However, in today's postmodernist understanding of art, there is a 'state' of devaluation of the object. The postmodern paradigm's deconstruction (poststructural) understanding is a factor that causes this situation.

The 'imitation of imitation' to the representation objects made by the artists of Plato (428-348 BC), one of the philosophers of the Antiquity (Greek-Roman Civilization) Period (900 BC-300 AD), and his student Aristotle (BC. . 384-322) 'imitation' initiates the relational process of the object to value in the field-literary platform. Before and after that date, the raw objects of nature are processed into art objects. Among the features that make the object valuable before and after, the traditional, cultural and social codes that every nation, every civilization and every geography make their own are the determining factors. These are embodied in some civilizations and in some written civilizations through verbal dynamics. On the other hand, civilizations that add value to the objects of representation also become valuable as the main actors of the historical process.

The writings of Plato and Aristotle, philosophers of the Antiquity Period, on art and representation object/imitation help the artists of that period and later periods to realize the way they approached the object and what the criteria of 'beautiful' and 'ugly' are. Artists of

this period resort to different ways and methods to make 'ugly' objects 'beautiful' and transform them into 'representational objects'. “Greek sculptors, by researching, found new techniques, new ways to image the human figure. Each innovation was passionately implemented by others, this time enriched by their findings. Someone was exploring the way of carving the body, another was finding that for the sculpture to gain more vitality, both feet had to be not very firmly on the ground... The painters followed the same path... The only way we could learn, albeit uncertain, about early Greek painting is through pottery paintings ” (Gombrich, 1997, p. 78).

How does an amorphous and 'ugly' object standing in nature turn into a 'beautiful' object of representation when it is under the control of the artists of the civilizations and periods in the historical process? Does this transformation have qualitative dimensions on the basis of 'good-beautiful-correct' or what is it? Does it have formal and contextual features? Or how does the mentioned transformation find a response in the works of the artists of this period? To what extent do the external objects (nature objects) and the internal objects (art objects) interest the artists? Where or what should the artist stand in the context of this interest? Here, in the context of all these questions and their answers, examples of 'art object' and 'representational object' belonging to civilizations and periods in different parameters of the historical process, prominent in the world of literature and public platforms will be evaluated.

In many artistic productions of the Ancient Egyptian Civilization Period, limestone (object) material, which is abundant in Egypt as raw material, occupies an important place. “Limestone, which has a granular texture, has been used as a building stone from time to time since Antiquity; It has been seen that it is also used as a sculpture material as well as interior and exterior coatings.” (Rona, Beykan, 1997, p. 1018). Amorphous object in the limestone bust of 'Egyptian Queen Nefertiti' (Image-1), belonging to the New Kingdom Period (1500-1000 BC) of the Ancient Egyptian Civilization (3000-300 BC), an unknown sculptor of the period carved, painted by it has been transformed into an artistic representation object and thus gained value. “... The limestone painted bust of Queen Nefertiti, rightly regarded as one of the most famous works of ancient Egyptian art (...) reflects its idealized beauty, yet with its elegant, earthy tone, a strange naturalness, with the head looking noblely high. Her eyelids are down, her skin is skilfully processed and painted with cosmetic colors to a uniform soft smoothness... The sculpture is an example of an unusual sculptural form. The head and the high cap on the slender neck, made with a daring trial, are in 'perfect harmony' and the head rises so delicately from the shoulders that it seems as if it pauses its movements for a moment.” (Honour and Fleming, 2016, p. 91).

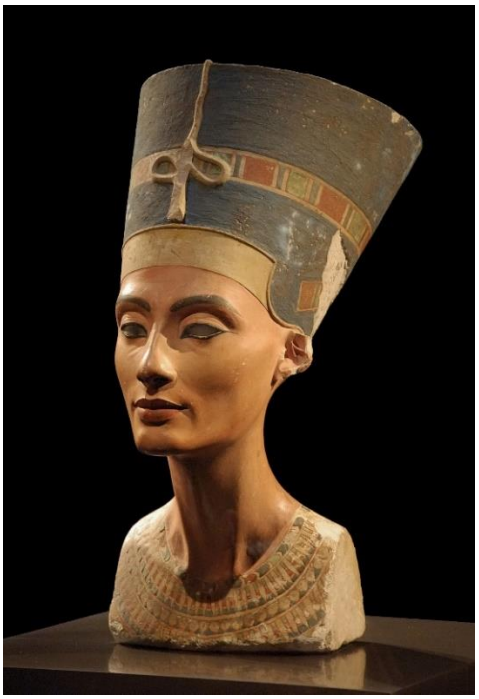


Image-1, Ancient Egyptian Civilization, New Kingdom Period, BC. approx. 1360, 'Egyptian Queen Nefertiti' (Egyptian Queen Nefertiti), Limestone Bust, height: 50 cm., Berlin Egyptian Museum, Berlin, Germany.

Limestone material, which is used as the raw material of most artistic works of that geography (architecture, sculpture, bust, relief, wall painting, etc.) by the unknown artist of the Ancient Egyptian Civilization, is an element that adds value to art as a concrete object. This situation can be described as the physical first step of art that adds value to the object. An 'art object' emerges as a result of transforming the same limestone material into a female bust by carving, scraping and painting. Thus, it is possible to talk about a limestone that turns into an art object. Representing the Egyptian Queen Nefertiti, this bust was in the Royal Palace during and after; thousands of years later, it continues to exist as a 'representation object' living in museums because it is found as a historical artifact. The elegance of woman reflected in the bust of Nefertiti, the shape and motifs of her dress and headdress show both her semantic (content) world and her historical knowledge potential. In other words, the work contributes to the image world of the people of the time it was made, on the one hand, and on the other hand, it strengthens the authority of the Egyptian Kingdom. The art object in question, after being found as a historical artifact after thousands of years, provides information (episteme) as a historical document belonging to the Ancient Egyptian Civilization. In addition, this work leads to traditional, cumulative, cultural and value formations as an artistic prototype for the art world. So, here, by transforming the raw limestone object in the bust of the Egyptian Queen Nefertiti into an "art object" formally and then into a "representation object" contextually, art that adds value to the object emerges.

At the beginning of the historical process (Prehistoric Period), the person who made the basic usage items necessary for himself from stone or wood, started to make objects and art objects (figurines, figures, sculptures, etc.) by baking the soil in later times (Neolithic Period). “Tired earth is the name given to works made of earth and hardened by firing since the Renaissance. In almost all cultures, clay, which is easily shaped and widely used, was used in the making of pottery and oil lamps, as well as figurines, statues, sarcophagi and architectural elements.

extends to . Many terracotta figurines have survived from the Minoan civilization in Crete, the Pre-Dynasty Period in Egypt, the Bronze Age cultures in Greece and Anatolia, and the pre-Columbian civilizations in America; the most important examples have been found in tombs, sanctuaries and houses... The most important terracotta works of China and perhaps the world have been found in the recently unearthed tomb of the country's first king, Qin Shi Huang Di." (Rona, Beykan, 1997, pp. 1482-1485).

From an amorphous object (earth) to an 'art object' in a collection of sculptures named 'Terrace Army' (Image-2), made during the Chinese Empire Civilization Period (300 BC - 1900 AD), the Qin Dynasty (300-206 BC). (sculpture campus) and the process of gaining value is followed. "The first emperor of China, Qin Shi Huangdi (259-210 BC), plans for himself an underground necropolis (cemetery space) consisting of corridors and other structures, surrounded by walls with gates. This compound is 'protected' by a huge army of more than 8,000 terracotta figures hidden in trenches in three separate pits. The fourth hole is empty. The first and largest pit contains more than 6,000 foot soldiers, chariots and horses. These figures represent the main army of the first emperor... The warriors vary according to their rank in terms of length, uniform and hairstyle... The bodies of terracotta warriors are made of fired clay and mass-produced interchangeable parts or modules... Although each figure may seem unique, the face and torso are modeled with a number of basic types. Studies on the broken and separated figures revealed that the clay was pressed and poured into hollow, perforated vessels... Since the emperor ordered that the faces not be alike, 8 different basic face molds were used. The sculptures were polished after cooling and painted with a wide variety of pigments." (Farthing, 2012, pp. 46-47).

While the terracotta material, which is used in many civilizations of the world, was used by a group of artists (craftsmen) during the Civilization Period of the Chinese Empire and the Qin Dynasty, -as in other geographies- it enters the identity of an element that adds value to art in terms of tangible (formal) and abstract (content) aspects. That is, the terracotta material first serves as an 'art object' as a raw material, and then as a 'representation object' that creates the content of the work of art, adding value to the object. The fact that the Chinese artist group made more than 8 thousand human and animal (horse) figures in their life-size and terracotta materials in an area of 16 thousand square meters, using the casting technique, points to the tangible or 'art object' part of the event. The terracotta army in this extraordinary necropolis, built on the orders of the first emperor of China, Qin Shi Huangdi, aims to show the state authority to the Chinese people of that period. It also proves that Emperor Qin tried to go with the help of art on the idea of immortality. So, through the army created from terracotta material, Emperor Qin will be protected even after his death. Unearthed thousands of years after it was built, the 'terracotta army' gives historical information about the Civilization Period of the Chinese Empire, on the other hand, it leads to cumulative, traditional, cultural, artistic and value dimensions. Therefore, the art process that adds value to the object is followed by transforming the terracotta as a raw material into a formal art object first and then into a semantically representational object in the sculpture ensemble of "Army of Terracotta".

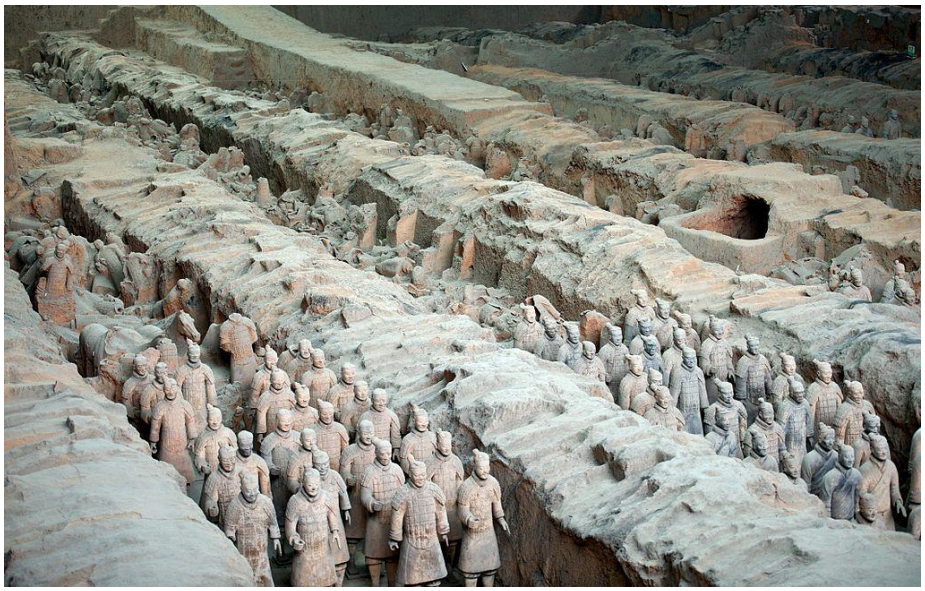


Image-2, Chinese Empire Civilization Period Qin Dynasty (300-206 BC), 'Army of Terracotta', Terracotta and Colored Lacquer, Terracotta Naturally Measured Sculptures, 16,000 Square Meters Area, Xi' Near an, Shaanxi District, China.

The use of marble material, which is common in art works (architectural structure, sculpture, bust, relief, etc.) of the Antiquity (Greek-Roman Civilization) Period, is based on the rich raw material resources from the Marmara region of Turkey. “Marble is used in interior and exterior coatings of buildings, floors and other structural elements due to its homogeneous structure, not being too hard, easy to process, not containing large pores, low water absorption rate, and being available in different colors and patterns. Colored and veined marbles and onyx marble (veined agate stone) have been used throughout history as decoration materials in buildings, monuments and sculptures... In Turkey (...) because of the abundance of Marmara Island marble reserves, ease of operation and economical sea transportation. It has found a wide usage area in Greek, Roman, Byzantine and Ottoman civilizations.” (Rona, Beykan, 1997, p. 1201).

Agesander, Athenodoros and Polydorus, one of the Rhodes artists of the time of Tiberius (14-37 AD), one of the Roman emperors of the Antiquity (Greek-Roman Civilization) Period (900 BC - 300 AD). It is seen that an amorphous object is transformed into an "art object" and "representation object" in the marble sculpture named "Laokoon and His Two Sons" (Visual-3), made in the 1st century B. "This statue depicts a sad story told in Virgil's epic 'Aeneas': The Trojan priest Laokoon warned his countrymen to take the giant wooden horse with Greek soldiers into the city. Seeing that their plan to destroy Troy was thwarted, the gods send two huge snakes from the sea. The snakes suffocate both the priest and his unfortunate two sons by their knuckles... It would be nice to know how this story affected the Greek artist(s) who designed this stunning 'Laokoon' group... The way he communicates his pain, the tortured expression on the priest's face, the hopeless squirming of the two children, and the way all this turmoil and movement is frozen forever are still admirable... The truth is that art in the Hellenistic period has largely lost its old connection with magic and religion. Its artists were only concerned with technical problems as technical problems. In this respect, the question of how to portray such a striking subject with all its movement, expression, and tension was the most appropriate test to gauge the artist's caliber.” (Gombrich, 1997, p. 111).



Image-3, Agesander, Athenodoros, Polydorus, M.S. 1st Century , 'Laocoon and His Two Sons', (Laocoon and His Two Sons), Marble Sculpture, 1,63x2,08 cm., Vatican Museum, Rome, Italy.

Turkey's Marmara region has rich marble deposits; While meeting the raw material needs of the civilizations (Greek, Roman, Byzantine, Ottoman) established here and in the nearby region, art productions add value to art from concrete and abstract perspectives. Agesander, Athenodoros and Polydorus, who are Roman artists of the island of Rhodes in the Aegean Sea, add formal value to a concrete material by transforming an amorphous marble into an art object in the sculpture called 'Laokoon and His Two Sons'. The technical and formal interventions (chipping, scraping, painting, etc.) on marble by Rhodesian artists mean that they create an 'art object' out of a natural object. On the other hand, the internalization of the scene in the same sculpture group in line with their own belief systems (the dramatic story of the Trojan priest and his son), causes the work to gain the identity of the 'representational object'. Because, in the context of the content of this statue, both the artists who carved the marble and the people of the city of Troy of that period witnessed the suffocation of the priest and his two sons with snakes while protecting Troy, and they share that pain. The sculpture named 'Laokoon and His Two Sons', which was unearthed two thousand years after the date of its creation, provides historical information about the Antiquity Period, as well as conducive to artistic, traditional, cultural and value accumulations for the whole art world. In this respect, in the sculpture group in question, firstly, the marble, which is the raw material, is shaped into an 'art object' by technical interventions, and then semantically 'representation' of art organizations (museum, art historian, art critic etc.) turns into Object. Therefore, the art process that adds value to the object is observed here.

First the person who uses the cave walls to paint, then; He works on stone, terracotta, wet plaster (fresco), wood, papyrus, paper and cloth. The transition to canvas painting comes to the fore with the Renaissance Period of Europe (15-16th century AD). “Canvas is a painted canvas, often woven from linen or cotton, sometimes from hemp and jute, stretched over a wooden frame. The best canvas is made of raw or bleached linen... Although its general use

began in the 15th century, a piece of dyed linen was found in Ancient Egypt in 2000 BC. It is also known that it was used before Columbus in South America. According to the sources, the Roman emperor Nero (AD 37-68) wanted a portrait of a giant size on canvas... In the 15th century, with the Italians' development and refinement of high-quality Flemish cloth (panni flandreschi), painters replaced wood that required a long preparation time, making it cheaper. they preferred this new device. Mantegna (1431-1506) and Jacopo Bellini (1396-1470) were the first to use cloth canvas." (Rona, Beykan, 1997, p. 1830).



Image-4, Rembrandt Harmensz Van Rijn, 1642, 'The Night Watch', (The Night Watch), Oil on Canvas, 379.5x453.5 cm. Rijksmuseum, Amsterdam, Netherlands.

An amorphous object (canvas cloth) in the painting 'The Night Watch' (Image-4) made in 1642 by Rembrandt Harmensz Van Rijn (1606-1669), one of the Dutch painters of Europe's Baroque Period (17th century AD). It is in question to add value by transforming it into an 'art object'. "In 1642, at the height of his fame, Rembrandt Harmensz Van Rijn is commissioned for a prestigious painting that includes portraits of a large group of guards... Surrounded by darkness and the sound of drums pounding, this group prepares to march under the flag in the air... 17th century Dutch Republic It is quite common to make group portraits of civilian militias in Turkey. What is extraordinary and unique in this painting is Rembrandt's setting of a moving scene, in which the members of the unit are arranged in a certain order and positioned according to their rank in accordance with the historical narrative, instead of giving equal space and importance to each. Officially made guards paid a fee for this, and their names were written on the plaque in the background. By emphasizing the light falling on the faces of the figures, their hoods and helmets and their weapons, Rembrandt gave the scene a dramatic effect by creating luminous intervals within the dark spaces." (Farthing, 2012, p. 226).

Especially, the beginning of canvas painting in Europe's Renaissance Period (15th-16th century AD), will lay the groundwork for the spread and development of this painting technique in the following years. As a result of technical and formal applications (oil painting technique, central perspective understanding, compositional principles, light-shadow, movement, harmony, etc.) on a flat canvas fabric stretched on a hoop (canvas frame),

Rembrandt, one of the Baroque Period artists, in his painting 'The Night Watch'. reveals the 'art object'. In short, this means that Rembrant adds value to the plain canvas fabric. On the other hand, the artist's depiction of the soldiers in this work according to their institutional positions (rank), while pointing to the representation power of the painting, ensures that it receives the value of 'representational object'. In other words, the soldiers in the painting gain the value of 'representational object' with the features that represent the political and military structure of the Dutch Republic of the 17th century, and this event, which the artist portrays with a canvas painting, contains information about the visual and social culture of a period. The technical, formal and contextual effects of the Night Watch on the art organizations of the Netherlands in particular, and all of Europe and the world in general, from the date of its creation and its aftermath to the present, point to its 'art that adds value to the object'. Because, by showing this painting as an example, many art history studies, researches, books and articles about the technical development of Renaissance and Baroque painting and the history of the 17th century Netherlands have contributed to the art literature.

CONTEMPORARY ART MAKES OBJECT VALUE

Contrary to the understanding of 'art adding value to the object' that took place in the process from the beginning of the historical story to the middle of the 21st century (Modernism), today's Postmodernist contemporary art organizations have problematic relations with the object. In the approach of contemporary art to the object, questioning, judging, criticizing, vilifying, breaking, breaking, burning, 'shearing', destroying, plundering, scattering, drawing, scribbling, etc., from both formal and content aspects. actions prevail. As early as 1917, the French artist Marcel Duchamp's display of the 'Fountain' (Urinal) by turning it upside down shows a pioneering example of this aggressive attitude towards the object. These aggressive and threatening attitudes gain new dimensions in the sense of rendering the object worthless, with the rise of criticism of Modernism in the contemporary art world in the 1960s and later, and the introduction of Postmodernism into the agenda.

The contemporary artist of this period uses the 'anything is possible' discourse of the French philosopher Jean-François Lyotard, the author of the book 'Postmodern Situation' (1979), as a form of understanding that raises the freedom of his work but threatens the object. After that, for the Postmodern artist, besides all the technological objects produced by the rapidly advancing, globalizing and capitalist world, nature itself, cities and the architectural elements in them, all visual and auditory materials, some animals and the human body, and even the artist's own body are pushed into the object position. The postmodern artist, who considers 'scratching' all the objects in the world worthy of himself, considers it his duty to work on plans and projects to make the object worthless and to develop strategies for this. The motivations of postmodern theorists and practitioners within the framework of this sense of duty lead to the emergence of Poststructural (deconstruction) thought in the aforementioned process.

The theoretical foundations of structuralism, which is the opposite of deconstructionism, were laid especially by linguists (Charles Sanders Peirce/1839-1914, Ferdinand de Saussure/1857-1913) in the late 20th century Modernism. (Smith and Riley, 2016, pp. 145-148). Deconstructionism, on the other hand, is handled by the postmodern philosophers of the 1960s and later. “Deconstruction is a term coined by the French philosopher Jacques Derrida (1930-2004) in the late 1960s to present a reading style that is sensitive to the plural meanings of the text. Rather than attempting to find the right meaning, a coherent point of view, or a unified message in a given work, a deconstructive reading carefully scrutinizes, in Barbara

Johnson's words, the 'warring forces of meaning' that are at play and waiting to be read in what might be called the textual unconscious. Deconstructionist strategy, then, as a style of reading that shows the internal differences of a text and draws attention to its suppressed contradictions or existing weaknesses in its structure, is intrusive, and therefore deconstruction is political despite many claims to the contrary. (Sim, 2020, p. 450). French art critic Claude Gintz writes the following in the introduction to the text about Michael Asher, one of the artists who produce works in the deconstruction approach of Postmodern art, in his book called 'Other Place & Another Form'. “Just like Marcel Broodhaers or Daniel Buren, Michael Asher's attitude is not aimed at producing objects, but at creating interference in the space (space, a museum or a historical architectural unit) where these objects acquire a certain meaning during the course of an exhibition.” (Gintz, 2010, p. 52). In other words, Michael Asher's aim in his postmodern 'works' is not to produce objects, but to create parasites.

While constructivism creates meanings in terms of linguistics; It makes the idea that there should be a regular, consistent, balanced and harmonious relationship with equal duties and responsibilities between the sign (object, work, work, form), signifier (subject, artist) and signified (meaning, content) as its mainstay. However, in order to create meaning, deconstructionists aim to disrupt the 'ought harmony' between sign (object), signifier (subject) and signified (content). According to Lyotard, while all major narratives ('macro history', civilization, mythology, tradition, etc.) should be viewed with suspicion and questioned, small narratives ('micro-history', local history, personal narrative, personal memory, memory, etc.) are also important. It reinforces what it can be with the motto "everything is possible" For a deconstructive attitude, Derrida, Lyotard and their followers aim to interfere with the coherence of meaning that the structuralists talk about and to disrupt this balance. Postmodern theorists overemphasize the sign (object) during this intervention; They aim to minimize the signifier (subject), neutralize it, de-identify it, and give too much responsibility over the signified (content).

On the other hand, contemporary art practitioners of the Postmodern period exhibit or present works that reflect the deconstructionist (poststructural, deconstruction, deconstruction) understanding. Contemporary artists trying to build art on the theoretical foundations of postmodernism; They try to distribute the semantic coherence between the sign, the signifier, and the signified. Contemporary artists, acting in line with this purpose, push the sign, which is also described as an 'art object' or 'representational object', from the position of a 'value-adding purpose' to a 'depreciation tool'. Sign in contemporary art; It is a simple, featureless and ordinary object that can be found everywhere, accessible to anyone at any time. In this respect, exaggerating, irony, manipulating, etc. these simple objects in the position of indicators. Making it an 'art object' with interventions means making it worthless. Likewise, diminution on the signifier (artist, subject); Contemporary artist, who puts too much load on the signified (content), wants to upset the balance of structuralism.

Today's postmodern artists employ many contemporary art forms (painting, sculpture, conceptual art, performance art, installation/installation, video art, photography, digital art, land art, etc.) and strategies (postproduction, projection, reformating, metaphor, pastiche, parody). , irony, manipulation, appropriation, jactaposition, simulation, abjection, coincidence, serendipity, difference, violence, chaoticism, shock situations, etc.) on the basis of deconstructionist understanding The postmodern artist can interfere with multiple objects while using one or more contemporary art forms or strategies. In other words, the contemporary artist may consciously cause the devaluation of a large number of objects in his work in line with the goal of the sign (object). In this context, a sculpture by Damien Hirst,

one of today's British artists, and an installation by Chinese artist Ai Weiwei will be evaluated through contemporary art that renders the object worthless.

One of the contemporary British artists of our time, Damien Hirst's (1965-) 2007 sculpture named 'For the Love of God' (Image-5), is an example of the poststructural (deconstructionist) understanding that renders the object worthless. "Hirst's 2007 sculpture 'For God's sake' clearly demonstrates that the artist is a master of the Craig-Martin-supported model of the 'enterprising artist as a manager' and positions wealth as a creative tool in its own right. Consisting of 8,601 diamonds perfectly engraved on a platinum die from an 18th-century skull, 'For God's sake' showcases a 'commercial drama' unique to Hirst: the piece reportedly cost £14m to manufacture. Displayed for the first time under the spotlight in a darkened room at the White Cube in London, the work is priced at a staggering £50 million. As a result, the confusion and controversy surrounding its sale to a union of which the artist is a member, some commentators argue that the true artistic value of the work is determined by the 'false information wave' that started with the reflection of this event in the media." (Wilson, 2015, p. 190).

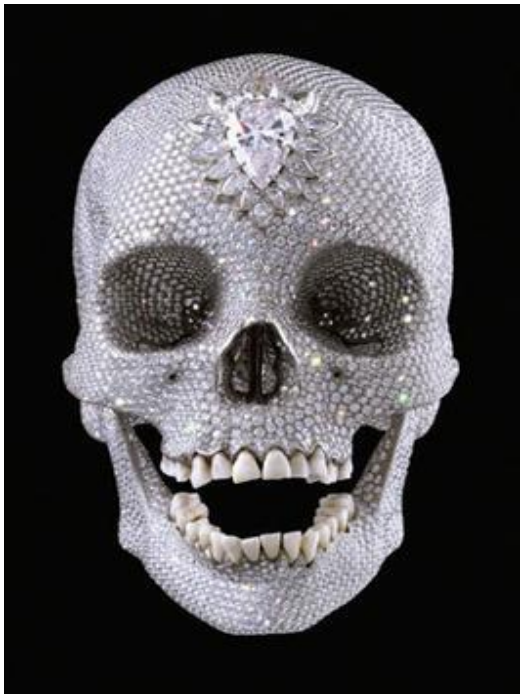


Image-5, Damien Hirst, 2007, 'For God's sake', (Love Of Good), Sculpture, Platinum, Diamond and Human Tooth, 17.1x12.7x19.1 cm., White Cube Art Gallery, London, England.

Contemporary artists of postmodern times, while exaggerating the object (sign) in their deconstructive attitudes, they also manipulate it. The contemporary artist's application of a manipulation strategy to the object, from another point of view, means that the value of the object in its unprocessed and raw form is formally reduced. In other words, a contemporary art understanding that devalues the object rather than adds value to the object is seen here. On the other hand, the different metaphorical meanings that the contemporary artist attributes to the object or objects that he plays with value in his work cause the work in question to be rendered worthless in terms of content. British contemporary artist Damien Hirst exaggerates and presents the sign of deconstruction (object) while manipulating an 18th century human skull in his sculpture 'For God's sake'. However, this ostentation does not allow the object to be valued, but rather devalued by manipulation pressure. Hirst first casts a replica mold of the

skull with platinum material; then he mounts thousands of diamonds engraved on it and newly produced teeth on the skull. Thus, the artist devalues the historical value of an 18th century skull by means of manipulations (plating diamonds on it, adding new teeth, etc.) and manipulations. This situation creates an example of contemporary art that renders the object worthless. In addition, Hirst pursues a semantic (content) paradox by placing diamonds, which is the most expensive stone in the world, on a skull mold that looks 'bad, ugly, poor' in his sculpture named 'For God's sake' and wanting to show it 'good, beautiful, rich'. So the artist is against ingrained (grand narrative) ideas tries to voice a contradictory thought with the aim of surprise. The artist's turning a bad-looking skull into a good-looking and even laughing facial expression points to the irony strategy of this work. These intense semantic dimensions that Hirst imposes on an ordinary historical skull, on the other hand, reflect that the signified (content) in deconstruction is not an element of balance, but an element that disrupts the balance. Therefore, the contemporary work of art called "For the Love of God" creates a situation that renders the object worthless both in terms of form and content.

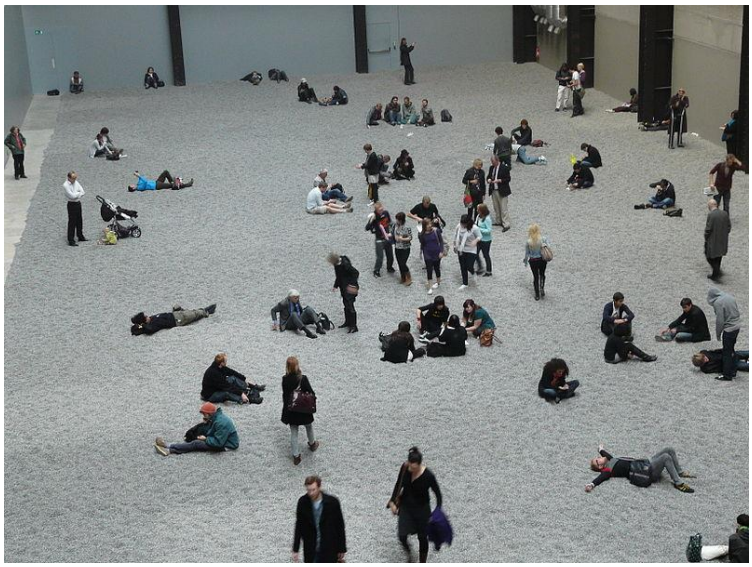


Image-6, Ai Weiwei, 2010, 'Sunflower Seeds', (Sunflower Seeds), Installation, 100 Million Painted Porcelain, Tate Modern Turbine Hall, London, England.

One of the contemporary Chinese artists of the Postmodern Period, Ai Weiwei's (1957-) 2010 installation titled 'Sunflower Seeds' (Visual-6) exemplifies the deconstructionist attitude within the context of contemporary art that renders the object worthless. “In October 2010, Ai made the installation 'Sunflower Seeds' in the Turbine Hall of Tate Modern in London. The incredible variability of this statue consisted of 100 million cores made of porcelain and hand-painted to be lifelike by artisans in the Chinese town of Jingdezhen. While placing these seeds in the large exhibition area, Ai wanted the audience to walk on the work and experience it fully (but this was later banned by the museum due to health risks due to the danger of ceramic powder.)... (...) 'Sunflower Seeds' it makes visible the problems of overpopulation and overproduction, the 'invisibility' of physical workers, the results of 'violent change' in scale or numbers. (...) 'Sunflower Seeds' questions what it means to be underestimated or overlooked by the phenomenon of 'manufacturing in China', as well as people's specialist skills and mastery of traditional crafts.” (Wilson, 2015, p. 22).

Contemporary Chinese artist Ai Weiwei, in his installation titled 'Sunflower Seeds', subjects the sunflower seed as an object to a strategy of manipulation. Weiwei enables the production of 100 million sunflower seeds in life-size ceramics, with the help of artisans working in the

ceramic field of China's Jingdezhen town, and by guiding them in their own will. By making ceramic copies of the natural sunflower reproduced in large numbers, the artist transforms it into a formally ordinary material for contemporary art work and renders the natural object, the sunflower seed plant, worthless. This situation can also be understood as exaggerating, exaggerating, inflating and multiplying the sign (object) element of the deconstructive attitude in Postmodern art. Weiwei, in the face of art's ideas of 'uniqueness', 'originality' or creating a single sunflower seed form, leads to the act of making the object worthless by producing 100 million sunflower seeds. In this respect, the contemporary art installation in question reveals a situation that devalues the object in terms of form. On the other hand, the artist causes a deconstructionist attitude based on the signified (content) element by attributing many metaphorical meanings (overpopulation and overproduction problems, the lack of identity of physical workers, the worthlessness of traditional art producers, etc.) in this installation called "Sunflowers". In this respect, this contemporary art work called 'Sunflowers' is instrumental in situations that render the object worthless both in terms of form and content.

EVALUATION AND CONCLUSION

In this study, titled "From Art Adding Value to the Object to Contemporary Art that Makes the Object Worthless", the process of art from the very beginning to the second half of the 21st century is 'art that adds value to the object'; Today's Postmodern art, on the other hand, is discussed in the "contemporary art that renders the object worthless". In the introduction to the subject, the equivalents of the terms object, value and worthlessness in social science literature (philosophy, sociology, linguistics, aesthetics, etc.) have been reached and their situations in art and contemporary art have been discussed.

The term object, in terms of its relation to art, is a physical (concrete, material, object, item) or existential element that has not been processed in nature before; imitation (mimetic, artificial, processed, synthetic) or formal object which is then processed by human and turned into an art object; then it was evaluated as a 'representational object' due to the semantic (content) dimensions attached to the material that was transformed into an 'art object'. The close relevance of the term value to art has been examined in the context of aesthetic criteria, criteria and principles that tell how a 'good, beautiful, useful' work of art should be. However, during the close contact of the term value with art, it has been determined that it creates differences in terms of its relative structure based on human, society, culture, space, space, geography and civilization. The relevance of the term worthlessness to art, especially by drawing on the context of contemporary art; depreciation, emptiness, nothingness, uselessness, uselessness, 'ugliness', transience, etc. focused on meanings.

The art part of this work, which adds value to the object, is a limestone bust from the Ancient Egyptian Civilization Period (Image-1), a terracotta sculpture group from the Chinese Empire Civilization Period (Image-2), a marble sculpture from the Antiquity Period. (Image-3) and a canvas painting (Image-4) of Rembrant, the European Baroque Period artist. The basic materials (limestone and marble) used in the works of art belonging to the Ancient Egyptian Civilization and Antiquity Periods draw attention as the rich raw material resources of these geographies. In this respect, the people of Ancient Egypt and Antiquity performed 'art that adds value to the object' by providing easy access to abundant materials. The artists of the Civilization Period of the Chinese Empire preferred terracotta, which is the technical material used by many civilizations; Baroque Period artists, on the other hand, prefer canvas, a technical painting material developed in the European geography they are in, and engage in 'art that adds value to the object'. In fact, all these processes based on civilization, geography,

raw materials, space and time lead to the production of an 'art object' that adds formal value to the object. Later, the fact that each work of art contains historical, cultural, political, social messages, information and representational elements of the period in which it is lived enables it to become a "representation object" in the context of its semantic aspect. That is, every work of art that has a tangible (formal) feature also has an abstract (contextual) discourse, and this leads to art that adds value to the object in two ways. Therefore, here, the process of 'art adding value to the object' can be observed by transforming the raw material into an 'art object' with a formal quality and the art object into a 'representation object' with a contextual quality

Here, contemporary art, which renders the object worthless, is discussed through a sculpture by the British artist Damien Hirst of the Postmodern Period (Image 5) and an installation by Chinese artist Ai Weiwei (Image-6). The postmodernist paradigm engages in a struggle for existence with the deconstructive understanding it produces against structuralist thought. In deconstructionist art, as an understanding used by contemporary artists, studies are carried out to devalue the indicative object with manipulative strategies and this process still continues. The event is not limited to this, it is aimed to try to destabilize or destroy the value between the sign, the signifier and the signified. In other words, the structure (sign, signifier, signified) is pushed into the activities of corruption (manipulation, irony, post-production, metaphor, pastiche, parody, selfing, jactaposition, simulation, abjection, etc.) both individually and in the context of the whole. The manipulation of the structural genes of the objects they use in Damien Hirst's 'For God's sake' and Ai Weiwei's 'Sunflower Seeds' is a result of the 'Postmodern Situation'. Hirst's placing of 'precious' diamonds on a 'worthless' molded skull or Weiwei's reproduction of 100 million copies of an ordinary sunflower seed plant with ceramic material means that the structural properties of objects are disrupted in terms of form. On the other hand, the intense metaphorical and ironic semantic dimensions attributed to these contemporary works of art show that their structural features have been destroyed in terms of content. In other words, the signified (meaning) has been burdened too heavily and a structural imbalance has been created.

As a result, in the 'art that adds value to the object' part of this study, the concepts of object and value were subjected to both formal and contextual readings through selected artwork samples. As a result of this reading, it was seen that the structuralist understanding prevailed in the works that were revealed in the process from the very beginning to the second half of the 21st century. In other words, it has been determined that the works show a mutual, balanced and smooth communication in terms of sign (object), signifier (subject) and signified (meaning) aspects and gain the identity of 'art that adds value to the object'. In the section of contemporary art that renders the object worthless, today's postmodernist art examples are examined. Here, it has been observed that contemporary art producers especially try to make the object (sign) worthless in line with the poststructural understanding, and they make deconstructionist practices with contemporary strategic games on the signifier (subject) and the signified (content). Therefore, in this study, it has been seen that the structuralist approach affects 'art that adds value to the object', and 'contemporary art that makes the object worthless' in the deconstructionist understanding.

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Görsel5:https://en.wikipedia.org/wiki/File:Hirst-Love-Of-God.jpg (Erişim Tarihi: Haziran 2021).

Görsel6:https://commons.wikimedia.org/wiki/File:%27Sunflower_Seeds%27_by_Ai_Weiwei,_Tate_Modern_Turbine_Hall.jpg (Erişim Tarihi: Haziran 2021).

INVESTIGATION OF THE RELATIONSHIP BETWEEN CYTOCHROME P4501A1 (CYP1A1) A5360C (rs 2606345) GENE VARIATION AND SERUM SELENIUM LEVELS IN COLORECTAL CANCER DEVELOPMENT

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Abstract

Colorectal cancer is one of the common cancer types that is among the causes of serious morbidity and mortality. The pathogenesis of colorectal cancer has not been fully elucidated, but genetic and environmental factors play a role together in the pathogenesis of the disease. The CYP1A1 gene is a gene that is effective in colorectal cancer susceptibility due to various exogenous factors. The CYP1A1 gene consisted of 7 exons and 6 introns is localized on chromosome 15 (15q22-q24). The CYP1A1 A5360C (rs 2606345) gene variation is characterized by an adenine / cytosine base substitution at position 5360 of the gene. Enzyme activity may change due to this genetic variation. Trace elements are necessary for various metabolic pathways of cells and tissues. Imbalances in trace element levels have been associated with the development and progression of various types of cancer such as colorectal cancer. The aim of this study is to investigate of the relationship between cytochrome CYP1A1 A5360C (rs 2606345) gene variation and serum selenium levels in the development of colorectal cancer. Our study consists of a patient group diagnosed with colorectal cancer and a healthy control group not diagnosed with colorectal cancer. Real-Time Polymerase Chain Reaction method was used to determine the genotype distributions of CYP1A1 A5360C (rs 2606345) gene variation. Serum selenium levels were determined using the atomic absorption spectrophotometer method. In our study, serum selenium levels were found to be significantly lower in colorectal cancer patients carrying the AA homozygous and AC heterozygous genotypes of the CYP1A1 A5360C (rs 2606345) gene variation compared to healthy controls with the same genotypes ($p<0.05$). The significant difference was not detected in terms of serum selenium levels between patients carrying the CC genotype of the CYP1A1 A5360C (rs 2606345) gene variation and controls ($p>0.05$). In our study, it was concluded that the evaluation of CYP1A1 A5360C (rs 2606345) gene variation and serum selenium levels together is extremely important in terms of early diagnosis, prognosis and progression of colorectal cancer. Determining the significant biomarkers in our study are important in terms of developing of new therapeutic strategies in colorectal cancer treatment.

Keywords: Colorectal cancer, CYP1A1 A5360C (rs 2606345) gene variation, trace elements levels, serum selenium levels, Real-Time polymerase chain reaction, atomic absorption spectrophotometer

INTRODUCTION

Colorectal cancer is known as a neoplastic process occurring in colon tissue (Rašić et al., 2018). CRC is a multifactorial disorder in which genetic and environmental factors are influential, affecting the quality of life of individuals and causing serious morbidity and mortality (Tavassoli et al., 2014; Buyukdogan et al., 2009; Kaya, 2008). CRC is a heterogeneous disease occurring in the complex series of molecular events and has been

reported to be the second leading cause of death (Rašić et al., 2018). CRC is known as one of the most common cancers in the world. According to World Health Organization (WHO) statistics, 1.2 million CRC cases and 608,700 deaths performed worldwide in 2008. It is estimated that the CRC is approximately 33% of the disease-specific mortality in developed countries (Zhao et al., 2016). The incidence of the CRC, which is responsible for about 700,000 deaths each year, has increased significantly in most of the developing countries (Zhao et al., 2016). In the Western, the CRC ratio, which is known as one of the major causes of death due to cancer, has increased dramatically in the East and other Asian countries in recent years. It is known that the incidence of this disease is more than 1% and its etiology is not clearly understood (Ribeiro et al., 2016; Sohrabi et al., 2018).

Cytochrome P450 (CYP), one of the genetic factors known to be effective in the pathogenesis of CRC, is a large family of proteins that found in animals, plants and microorganisms. Cytochrome P450 is one of the Phase I enzymes that metabolize endogenous and exogenous substances such as polycyclic aromatic hydrocarbons, heterocyclic amines, aromatic amines and N-nitrosamines. CYP450 enzymes act as catalysts in the oxidation of various endogenous and exogenous compounds. Some of these metabolites interact with DNA by gaining electrophilic properties (Altunkol et al., 2018). Metabolic enzymes, including Phase I and Phase II enzymes, are effective in the activation and detoxification of xenobiotics, which play an important role in the pathogenesis of CRC (Nebert, 1991). CYP1A1 and CYP1B1 are important members of the CYP1 family. Phase 1 enzyme CYP1A1 is participated into the aryl hydrocarbon hydroxylase activity. In addition, CYP1A1 activates procarcinogens (Zhu et al., 2019). The human CYP1A1 gene plays an important role in the genetic predisposition for some types of cancer by participating in the activation of procarcinogens (Altunkol et al., 2018). Thus, CYP1A1 is an enzyme that plays important role in CRC susceptibility due to various exogenous factors (Murtaugh et al., 2005; Wang et al., 2008).

Various single nucleotide variations that occur in the CYP1A1 gene and localized on chromosome 15q22 have been identified. This gene variations play an important role in predisposition to various types of cancer, such as breast cancer, prostate cancer, bladder cancer, cervical cancer, colorectal cancer (Zhu et al., 2019; Naif et al., 2018; Ding et al., 2018). CYP1A1 protein consisting of a total of 512 amino acids contains CYP1A1 * 2A, * 2B, * 2C, * 3, * 4, * 5, * 6, * 7, * 8, * 9, * 11 alleles. The CYP1A1 gene is localised on chromosome 15 (15q22-q24) and it consisted of 7 exons and 6 introns (Zamanı and Yıldırım, 2014). CYP1A1 A5360C (rs: 2606345) gene variation is characterized by base substitution of Adenine / Cytosine (A/C) at position 5360 (Zamanı and Yıldırım, 2014; Sivaraman et al. 1994). Some of the isoforms of CYP450 activate the pro carcinogens to carcinogens (Elfaki et al., 2018). Trace elements are environmental factors and play in the pathogenesis of CRC. Trace elements are essential elements in biological processes for carrying out cofactor functions such as activity of antioxidant enzymes, cell division and differentiation. Trace elements that play an important role in enzymatic and hormonal activities in cell stabilization may have different roles in different types of cancer. Angiogenesis and oxidative stress also play an important role in the pathogenesis of colorectal cancer. Superoxide dismutase, glutathione reductase, glutathione peroxidase and lipid peroxidation products in cancer tissues were determined associated with trace element levels. Cell damage, DNA injuries and mutagenesis occur as a result of changes in trace element concentrations. There are also studies showing that carcinogenesis may also affect trace element levels (Sohrabi et al., 2018).

Se is an important trace element and prevents the chromosomes of blood cells from being damaged and thus it decelerates the tissue aging process. There are studies showing that the risk of CRC increase in the absence of Se (Fotherby et al., 1993). The trace elements required for the various metabolic pathways of cells and tissues can be toxic when they are received in

excess concentrations. Excessive intake or lack of trace elements is effective in the development or progression of certain cancers such as CRC (Cavusoglu et al., 2008; Cobanoglu et al., 2010).

A limited number of studies have been performed to determine the relationship between CYP1A1 gene variations or serum trace elements in CRC development. However, the studies have not been performed to investigate the relationship between genotype distributions of CYP1A1 gene variations and levels of serum Se levels in CRC patients in Thrace population of Turkey. Thus, the aim of our study is to investigate the relationship between CYP1A1 A5360C (rs 2606345) gene variation genotype distributions and serum Se levels in patients with CRC.

MATERIALS AND METHODS

CRC Patient and Healthy Control Subjects

Our study was performed with 165 CRC patients and 171 healthy controls. The CRC patient and healthy control groups were selected from Edirne and the surrounding areas. The patient group included adult patients diagnosed with colorectal The healthy control group consisted of healthy volunteers who were not diagnosed with colorectal cancer. Patients that are younger than 19 years and that have a history of malignancy or pregnant and breastfeeding women were excluded from our study.

DNA Isolation

The patient with CRC and healthy control DNAs were isolated from peripheral blood containing Ethylenediaminetetraacetic Acid (EDTA). Invitrogen DNA blood kits were used for DNA isolation of patient with CRC and healthy control groups. Purity and quality for isolated DNAs' were determined with nanodrop spectrophotometer (Allsheng Nano-200) and also patient with CRC and healthy control DNA samples were checked by 0.8% agarose gel electrophoresis (Minicell primo EC 320, Cleaver Scientific for electrophoresis tank and EC-105, Cleaver Scientific MP-300V for power source).

Polimerase Chain Reaction method

Genotype distributions of CYP1A1 gene variations were determined between patients with CRC and healthy control groups by using Applied Biosystems 7500 fast Real-time PCR method. In real-time PCR, TaqMan SNP assay probes labeled with fluorochromes were used at the 5 'and 3' ends.

RT-PCR conditions for CYP1A1 A5360C rs2606345:

Initial	60˚C, 51 minutes	
	95˚C, 10 minutes	
	95˚C, 15 seconds	40 Cycle
	60˚C, 1 minutes	
	Reading	
Termination	60˚C, 1 minutes	

Determination of Se Trace Element Levels

Trace element levels measurements were performed in Trakya University Faculty of Medicine Department of Biophysics. For serum trace element level measurements, blood obtained from patients with CRC and from healthy control groups were centrifuged at 5000 rpm for 5 minutes and serum was obtained from the blood. Distilled water was added to the obtained serum samples and total volume was completed of 7 ml. In addition, the total mixture was homogenized by vortexing. 10 ppm, 20 ppm, 40 ppm and 80 ppm standard solutions were

prepared for graphite measurement at Atomic Absorption Spectrophotometer (Shimadzu AA-6800) for Se levels measurements. Concentration-calibration curve was drawn according to Se trace element standards (Figure 1). After the palladium stock and mix were prepared, 800 µl was taken from the mixture, 200 µl of serum (x5) was added and Se levels measurements were performed.

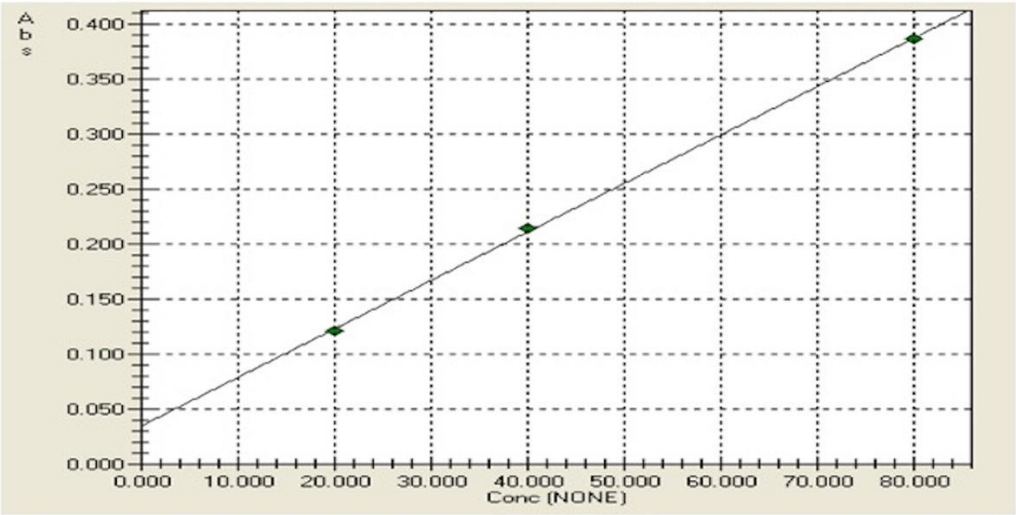


Figure 1. Selenium (Se) calibration curve

Statistical analysis

Student's t test was used to compare length, weight and body mass index values between CRC patient and control groups. Chi-square (Pearson, Yates) test was used (As applicable Fisher's test) to comparison of categorical variables (family cancer history, hypertension, diabetes mellitus, cholesterol, smoking and alcohol). The comparison of CYP1A1 A5360C (rs: 2605345) gene variation genotype distributions according to Se levels was carried out by Mann Whitney U test. The results were expressed as number (percentage) or mean ± standard deviation. Statistical significance was accepted as p <0,05. The statistical analysis of the data obtained in our study was performed using SPSS 20.0 (Statistics Package of Social Science) statistical program.

RESULTS

In our study, the significant difference was determined between CRC patient and control groups in terms of age, height, weight, body mass index (BMI) variables, family cancer history, diabetes mellitus, hypertension, smoking and alcohol variables (p<0,05). The significant difference was not determined between patient and control groups in terms of cholesterol (p>0.05) (Table 1).

Table 1. Clinical parameters of patient and control groups

Patient and control parameters	**Patient Group (n=165)**	**Control Group (n=171)**	**p**
Age	57,40 ± 9,78	52,10 ± 9,15	**<0,001**[a*]
Length (m)	1,66 ± 0,09	1,69±0,08	**<0,001**[a*]
Kilo (kg)	74,51 ± 14,85	83,33 ± 15,33	**<0,001**[a*]
Body Mass Index (kg/m^2)	27,00 ± 5,23	28,97 ± 4,96	**<0,001**[a*]
Familial history of cancer	38 (23,0%)	25 (14,6%)	**0,048**[a*]
Diabetes Mellitus	25 (15,2%)	14 (8,2%)	**0,046**[a*]
Hypertension	48 (29,1%)	32 (18,7%)	**0,026**[a*]
Cholesterol	18 (10,9%)	15 (8,8%)	0,510[a]
Smoking	73 (44,2%)	63 (36,8%)	**<0,001**[a*]
Alcohol	68 (41,2%)	55 (32,2%)	**<0,001**[a*]

In our study, serum selenium levels were found to be significantly lower in colorectal cancer patients carrying the AA homozygous and AC heterozygous genotypes of the CYP1A1 A5360C (rs 2606345) gene variation compared to healthy controls with the same genotypes ($p<0.05$). The significant difference was not detected in terms of serum selenium levels between patients carrying the CC genotype of the CYP1A1 A5360C (rs 2606345) gene variation and controls ($p>0.05$) (Table 2).

Table 2. Comparison of genotypes of CYP1A1 A5360C (rs: 2605345) gene variation genotype distribution and serum Se levels

CYP1A1 A5360C (rs:2606345)	**Genotype Distributions**	**Trace Elements**	**Patient Group**	**Control Group**	**p**
	AA	Se (ng/ml)	37,28±14,39	44,07±15,78	**0,02**[a*]
	AC	Se (ng/ml)	39,02±15,53	49,17±14,43	**<0,001**[a*]
	CC	Se (ng/ml)	41,00±16,00	46,83±14,67	0,223[a*]

AA: Adenin-Adenin; **AC:** Adenin-Cytosine; **CC:** Cytosine-Cytosine; **Se:** Selenium

DISCUSSION

CRC represents 9.7% of all cancer deaths. Despite the reduced incidence of CRC in developed western countries, this rate is still continue to increase in developing countries. Development and pathogenesis of CRC is still not fully understood, but genetic factors such as gene variations in the pathogenesis of CRC and environmental factors such as trace elements may play a role together (Ferlay et al., 2010; Cunningham et al., 2010; Markowitz et al., 2009; Fearon et al., 2011).

In a study performed with Japan population, CYP1A1 (rs 4646903) and CYP1A1 (rs 1048943) gene variations were found to have no effect in CRC development (Hamachi et al., 2013). In studies performed in California, it has been reported that CYP1A1 gene variation is not associated with colon and rectum cancer (Slattery et al., 2004). In a study carried out in Caucasian population, it has been proven that there is no effect of CYP1A1 gene variation in CRC patients who were smokers or consuming red meat (Ishibe et al., 2000). In a study carried out in Scotland, the significant was not determined relationship between CYP1A1 gene variation and CRC development (Little et al., 2006). In a study performed with Japan populattion, CYP1A1 (rs 4646903) and CYP1A1 (rs 1048943) gene variations have been

associated with CRC development (Nisa et al., 2010). In the studies comparing phase I and phase II metabolism enzyme variations, it has been reported carcinogenic effects of aromatic amine metabolism of CYP1A1 genes in patients with CRC (Landi et al., 2005). As seen in these studies, the combinations of gene variations have been examined and results have been reported that do not overlap with each other in different populations. There are not many studies performed to investigate colorectal cancer and CYP1A1 gene variations. However, the relationship between the various types of cancer and the CYP1A1 gene variations was investigated and different results were obtained in different populations. In a study performed with an Iraqi population, the C and G alleles of CYP1A1m1 (T6235C) and CYP1A1m2 (A4889G) gene variations have been determined as genetic risk factors for increased breast cancer in women. T and A alleles play an important role as protective against this disease (Naif et al., 2018). In a meta-analysis study performed with cervical cancer patients, the C allele of CYP1A1 MspI variation and Val allele of Ile462Val variation have been associated with risk of development of the cervical cancer (Ding et al., 2018). In another meta-analysis study performed with prostate cancer patients, the variations of rs1048943 and rs4646903 of the CYP1A1 gene have been determined as genetic risk factors for the development of prostate cancer (Zhu et al., 2019). In a Turkish population study, a significant relationship was determined between risk of bladder cancer development and CT genotype of CYP1A1 c.*1189T> C variation (Altunkol et al., 2018).

Taking inadequate or excessive amounts of trace elements that regulate cell transplantation and gene expression, which are effective in the regulation of various biological events in organism, can affect the development of various types of cancer such as CRC by impairing body resistance (Hamachi et al., 2013; Sarmıs, 2010; Ekmekci et al., 2008).

In a study performed with Spain population, the significant difference was determined between the Se levels of patients in the gastrointestinal, gynecologic, hematologic and lung cancer malignancy group and the Se levels of the healthy controls. In another study, the relationship between was detected increased risk of CRC and low Se levels between patient with CRC and healthy control groups. In another study, Se levels were determined in patients with CRC significantly lower compared to healthy controls (Majid et al., 1999; Saner, 2002). In a study performed with the Malaysian population, it was shown that different trace element levels were determined in serum and tissue samples of CRC patients compared to healthy controls. In the same study, trace element deficiency and excess have been associated with CRC development (Nawi et al., 2019). In another study performed with the Iranian population, the alteration in trace element concentrations may play a role in the malignant transformation of normal colon mucosa (Sohrabi et al., 2018).

In our study, serum selenium levels were found to be significantly lower in colorectal cancer patients carrying the AA homozygous and AC heterozygous genotypes of the CYP1A1 A5360C (rs 2606345) gene variation compared to healthy controls with the same genotypes ($p<0.05$). The significant difference was not detected in terms of serum selenium levels between patients carrying the CC genotype of the CYP1A1 A5360C (rs 2606345) gene variation and controls ($p>0.05$).

CONCLUSION

Several limited studies were performed in terms of relationship between CYP1A1 gene variations and CRC development risk. Studies have also been performed to investigate the relationship between trace elements and development of CRC. Different results were obtained in these studies which were carried out with different races and populations. In our study, serum selenium levels were found to be significantly lower in colorectal cancer patients carrying the AA homozygous and AC heterozygous genotypes of the CYP1A1 A5360C (rs 2606345) gene variation compared to healthy controls with the same genotypes. Also, it is

thought that evaluating the relationship between CYP1A1 gene variations and trace element levels in patients with cancer risk such as CRC may contribute to early diagnosis and progression of the CRC disease. In our study, it was concluded that the evaluation of CYP1A1 gene variations and serum trace element levels parameters together in cancer development such as CRC is extremely important in terms of CRC diagnosis, prognosis and progression.

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Conflict of interest
The authors declare that they have no conflict of interest.

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IMPACT OF OXIDATIVE STABILIZATION OF JUTE FIBERS PRIOR TO CARBONIZATION AND ACTIVATION: TGA AND FT-IR ANALYSIS

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Abstract

The effects of sodium metasilicate pentahydrate and urea incorporation and oxidation on the structure and characteristics of jute fibers were investigated in the air environment at temperatures up to 245 °C for oxidation periods ranging from 25 to 175 min. The findings of thermogravimetric analysis (TGA) and Fourier transform infrared (FT-IR) spectroscopy studies revealed that variation of oxidation periods had a considerable impact on the structure and characteristics of oxidized jute fibers. As part of the concurrently proceeding dehydrogenation and dehydration reactions, FT-IR spectra indicated a progressive and continual loss of intramolecular and intermolecular hydrogen bonds. The infrared analysis also revealed that when the oxidation period is increased for the fixed temperature range, the cellulose II crystalline structure was fragmented. The infrared spectra confirmed the development of C=C bonds due to the formation of crosslinked ladder-like structure. TGA thermograms showed a continuous increase of char yields with increasing stabilization time. TGA investigations revealed that jute samples oxidized at 245 °C for 175 min in a multistep annealing procedure had desired thermal stability, and are ready to withstand higher temperatures in further carbonization and activation processes.

Keywords: Jute Fiber, Multistep Annealing, Thermogravimetric Analysis, FT-IR Spectroscopy.

INTRODUCTION

In recent times, activated carbon fibers (ACF) have attracted a great deal of interest as an adsorbent for cleaning contaminated gaseous and aqueous streams. Some research (H.; Heintz Marsh (EA; Rodríguez-Reinoso et al., 1997; Ryu, 1990) have reported on their production, characterization, and use, showing that the porosity of ACF is influenced by the activation conditions, such as temperature, time (Oshida et al., 1995), and surrounding environment utilized (Alcaniz-Monge et al., 1994). ACF adsorption rates are 2–50 times

quicker than granular activated carbon, according to certain studies (Baudu et al., 1991). This is because the fibers' tiny diameter provides a higher exterior surface area in contact with the fluid than granules. Additionally, their ability to remove microorganic contaminants such as phenols (Petkovska and Mitrovic, 1989), pesticides, dyes, taste-related chemicals (Tajima and Tanaka, 1996), and trichloroethylene (Suzuki, 1991) from water has been shown.

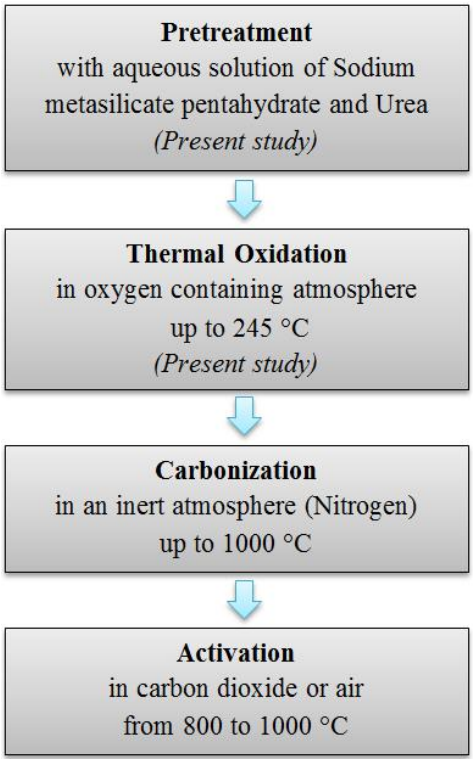


Figure 1: Production flow chart of jute-based activated carbon fiber.

Carbonization is followed by an activation phase with CO_2 or steam at a higher temperature to create fibrous activated carbons from natural or synthetic precursors (Kasaoka, 1987; Ryu, 1990). Polyacrylonitrile, polyphenol, polyethyletherphthalate, rayon, monocarboxycellulose, cellulose phosphate, and pitch have all been utilized as precursors of fibrous activated carbons since 1970 (Pastor et al., 1999; Ryu, 1990). Each has its own set of applications and restrictions. Although synthetic fibers are typically expensive, finding low-cost precursors from local material resources would be noteworthy.

Simple preparative techniques may be employed to produce extremely porous activated fibers from jute. Jute is a naturally abundant fiber made from the stem of the Corchorus olitorius plant that contains 58–63 % cellulose, 20–22 % hemicellulose, 12–15 % lignin, around 2% protein, 1% mineral content, and trace amounts of organic and inorganic pigments (Sinha and Rout, 2008). The objectives of this paper was to reveal how sodium metasilicate pentahydrate integration influenced the molecular structure of jute fiber during the thermal stabilization stage before carbonization and activation.

MATERIALS AND METHODS

Jute fiber was used as a precursor fiber for the thermal oxidation procedure in this study. Prior to the oxidation process, the precursor fibers were pretreated with sodium metasilicate pentahydrate. When employed under suitable experimental circumstances, sodium metasilicate pentahydrate has the ability to accelerate the oxidation phase. Chemical integration was accomplished by dipping the jute yarns in a water solution containing 5% sodium metasilicate pentahydrate and 6% urea for 60 minutes. A multistep oxidation process was carried out in the air at temperatures between 150 and 245 °C for oxidation durations ranging from 25 to 125 minutes.

The TGA profiles of the pristine and oxidized PAN were obtained using a Perkin Elmer TGA scheme. The maximum temperature in the TGA studies was 1000°C, and a sample weight of approximately 5-6 mg. Temperature scaling of TGA was completed employing melting point benchmarks of gold, indium, aluminum, zinc, and tin.

Infrared analysis was carried out in absorbance mode using a Perkin Elmer FT-IR spectrometer. The average value was calculated using 50 interferograms and a Norton-Beer apodization algorithm. Every single sample spectrum was ratioed by retaining constant device settings in comparison to a conforming number of background scans. Finally, all of the spectra were examined where possible using curve fitting techniques and the SPECTRUM program.

RESULTS AND DISCUSSIONS

Thermogravimetric Analysis (TGA)

TGA was used extensively in this study to characterize the oxidative thermal stability of untreated and sodium metasilicate pentahydrate impregnated jute fibers that were oxidized in an air environment. TGA can be employed to quantify the influence of sodium metasilicate pentahydrate impregnation on the pyrolysis behavior of jute fibers oxidized in air at various temperatures. To examine the relative yields of the carbonization phase as a function of oxidation temperature, weight loss and char yields can be used. The degradation of structural components such as cellulose, hemicellulose, and lignin causes weight loss in jute fibers in TGA scanning (Kabir et al., 2013).

The TGA thermograms of original and oxidized jute fibers for various oxidation durations are shown in Figure 2. At 100 °C, TGA thermograms indicated weight loss, indicating moisture evaporation owing to bonded water in the fibers. Up to 300°C, there was no substantial weight loss in the untreated jute sample.

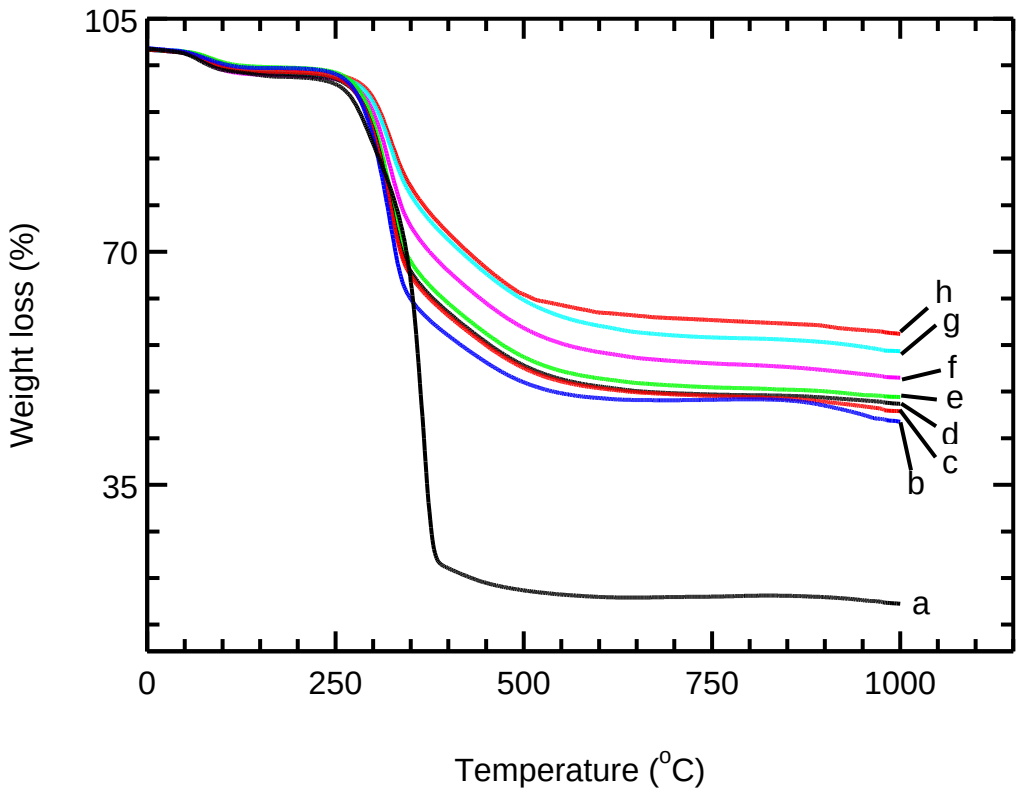


Figure 2: TGA thermograms of original (a) and sodium metasilicate pentahydrate impregnated and oxidized jute fibers for different oxidation periods. (b) 25 min, (c) 50 min, (d) 75 min, (e) 100 min, (f) 125 min, (g) 150 min, (h) 175 min.

The TGA traces of the oxidized jute fibers indicated reduced weight loss as the oxidation temperatures increased. Higher carbon yields result in more cross-linking and aromatization processes inside the cellulose structures, according to this study. Due to the creation of a ladder-like structure by these processes, oxidized jute fibers lost weight across a wide temperature range, whereas pure jute fibers lost weight over a narrow temperature range.

FT-IR Spectroscopy Analysis

IR spectroscopy was utilized extensively in this study to track and analyze the chemical changes that occurred throughout the oxidative thermal stabilization procedure. The intensity and spectroscopic variations as a function of oxidation temperature were investigated. Figure 3 depicts the IR spectra of untreated and oxidized materials corresponding to the 4000–2000 cm^{-1} area as a function of oxidation period.

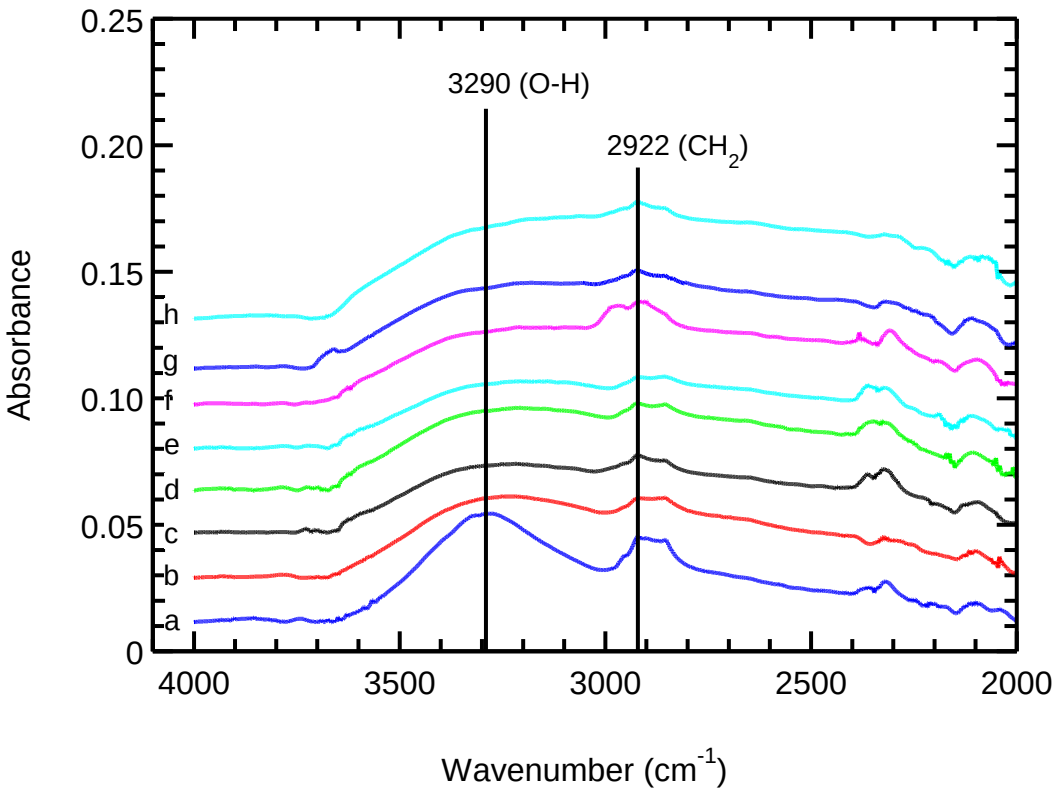


Figure 3: IR bands in the range between 4000 and 2000 cm^{-1} of original (a) and sodium metasilicate pentahydrate impregnated and oxidized jute fibers for different oxidation periods. (b) 25 min, (c) 50 min, (d) 75 min, (e) 100 min, (f) 125 min, (g) 150 min, (h) 175 min.

Intermolecular and intramolecular hydrogen-bonded OH group spectra are thought to be responsible for the IR area between 4000 and 3000 cm^{-1}. The OH groups in cellulose's molecular structure readily form intermolecular and intramolecular H-bonds, resulting in the formation of crystalline areas (Dumanlı and Windle, 2012; Khan et al., 2005; Kondo, 1997; Mwaikambo and Ansell, 2002). The stretching vibrations of methine (C-H) and methylene (CH_2) are allocated to the 3000-2000 cm^{-1} area in the infrared spectra of cellulose. The vibrations of cellulose, hemicellulose, and lignin may be seen in the IR spectra of pure jute fiber (Khan et al., 2005).

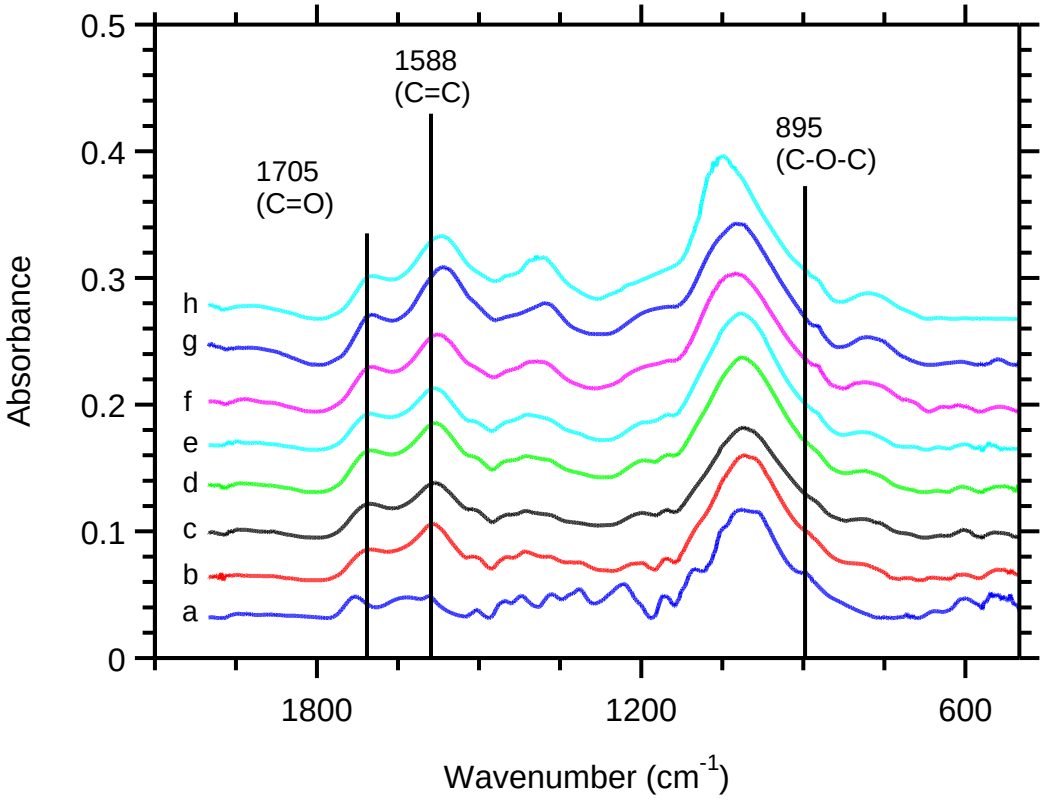


Figure 4: IR bands in the range between 2000 and 500 cm^{-1} of original (a) and sodium metasilicate pentahydrate impregnated and oxidized jute fibers for different oxidation periods. (b) 25 min, (c) 50 min, (d) 75 min, (e) 100 min, (f) 125 min, (g) 150 min, (h) 175 min.

Figure 4 shows the infrared vibrations between 2000 and 500 cm^{-1} range for original and SMSPH incorporated-stabilized jute fibers at different oxidation times. The cellulose infrared band's wavenumber range of 2000-500 cm^{-1} is the most valuable component from a quantitative and qualitative standpoint. CH_2 bending vibrations are attributed to the 1500-1200 cm^{-1} area. Crystallinity spectra are defined as vibrations at 1422, 1162, 1102, and 895 cm^{-1}. Carbonyl (C=O) intensity increases with increasing oxidation time, according to IR spectra. This result implies that during the heat treatment, oxygen-containing functional groups are generated.

CONCLUSIONS

The results show that pretreatment with sodium metasilicate pentahydrate improves the oxidation time and speeds up the formation of the cyclized structure. As a result of the oxidation process in the air, jute samples undergone considerable physical and structural alterations. When the oxidation time was increased, infrared measurements revealed a faster cyclization and dehydrogenation process. The oxidation duration has a substantial influence on the structure and characteristics of oxidized jute fibers, according to IR spectroscopy. The TGA thermograms demonstrated that the thermal stability of the sodium metasilicate pentahydrate impregnated jute fibers improved with increasing stabilization times, as indicated by the rise in carbon yield.

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HESAPLAMALI AKIŞKANLAR DİNAMİĞİ (CFD) VERİLERİ KULLANAN BİR ROKET UÇUŞ ANALİZİ PROGRAMI GELİŞTİRİLMESİ
DEVELOPMENT OF A ROCKET FLIGHT ANALYSIS PROGRAM USING COMPUTATIONAL FLUID DYNAMICS (CFD) DATA

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Özet

Modern dünyada roketçilik, hem askeri hem de bilimsel anlamda çalışmalar yürütülen bir mühendislik alanıdır. Özellikle devletler ve özel şirketler tarafından yürütülen çalışmalar, ilginin giderek artması sonucu amatör roketçilik faaliyetleri ile çok geniş bir yelpazeye yayılmıştır. İster profesyonel ister amatör olsun, roketin geliştirilmesindeki en kritik nokta, fırlatma öncesi yapılacak aerodinamik tasarım ve bu tasarımın doğruluğudur. Bu projede, temel roketçilik faaliyetleri üzerine bir simülasyon programı yazılmıştır ve bu programın doğruluğu üretilen model roketlerin uçuş verilerinin kaydedilmesi ile teyit edilmiştir. Benzer simülasyon programı çalışmaları dünya genelinde geçmişte yapılmış ve bu programların ses hızı altında çalışan (subsonik) roketlerde doğru sonuçlar verdiği gözlemlenmiştir. Fakat, mevcut bu programlar ses hızı üstünde çalışan roketlerde doğru sonuçlar verememektedirler. Projede, ses hızının üstünde (süpersonik) çalışabilecek roketleri de simüle edilebilecek bir simülasyon programı geliştirilmiştir. Ayrıca, geliştirilen program kendi içinde roket tasarımı zorunluluğuna neden olmayıp, kullanıcılardan Computational Fluid Dynamics (CFD) verisi talep etmektedir. Böylelikle, kullanıcılar kendi tasarladıkları roketin Computer Aided Design (CAD) modelini Computational Fluid Dynamics (CFD) programları ile analiz edip, herhangi bir tasarım kısıtı olmaksızın programa aktarabilmektedirler. Geliştirilen program için öncelikle, uçuş verileri alınacak model roketin mekanik ve elektronik tasarımı yapılmıştır. Devamında ise, temel akışkanlar mekaniği kuralları baz alınarak hesaplamalar yapılmış ve roketin uçuşu hakkında genel bilgi elde edilmiştir. Çeşitli noktalarda yapılan Computational Fluid Dynamics (CFD) analizleri ile, tasarlanan program için gerekli veriler elde edilmiştir. Geliştirilen programda, elde edilen veriler ışığında irtifa, hız, ivme ve yatay sürüklenme (direnç) bilgileri hesaplanabilmektedir. Geliştirilen program çıktısı veriler, model roketçilik alanında yaygın olarak kullanılan Open Rocket programı ile karşılaştırılmıştır.

Anahtar Kelimeler: Roket, Model Roket, Hesaplamalı Akışkanlar Dinamiği, Uçuş Bilgisayarı, Roket Simülasyonu.

Abstract

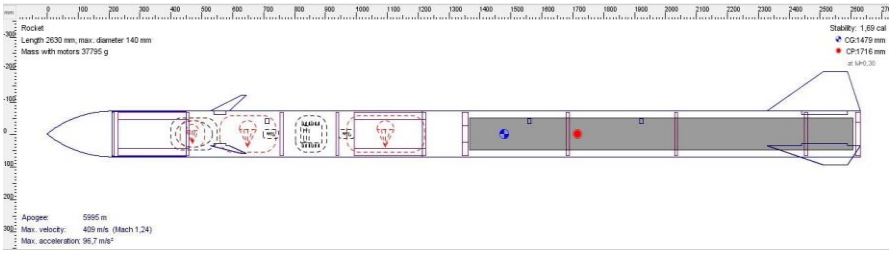
In the modern world, rocketry is an engineering field that carries out both military and scientific studies. Studies carried out especially by states and private companies have spread to a wide range with amateur rocketry activities as a result of the increasing interest. The most

critical point in the development of the rocket, whether professional or amateur, is the aerodynamic design to be made before launch and the accuracy of this design. In this project, a simulation program was written on basic rocketry activities and the accuracy of this program was confirmed by recording the flight data of the launched model rockets. Similar simulation program studies have been carried out around the world in the past and it has been observed that these programs give accurate results in rockets operating slower than speed of sound (subsonic). However, these existing programs can not give accurate results in rockets operating above the speed of sound. In the project, a simulation program has been developed that can also simulate rockets that can operate above the speed of sound (supersonic). In addition, the developed program does not require rocket design in itself and requests Computational Fluid Dynamics (CFD) data from users. Thus, users can analyse the Computer Aided Design (CAD) model of the rocket they designed with Computational Fluid Dynamics (CFD) programs and transfer them to the program without any design restrictions. For the developed program, first of all, the mechanical and electronic design of the model rocket, whose flight data will be obtained, was made. Afterwards, calculations were made based on the basic fluid mechanics rules and thus general information about the flight of the rocket was obtained. With the Computational Fluid Dynamics (CFD) analyses made at various points, the necessary data for the designed program were obtained. In the developed program, altitude, velocity, acceleration and horizontal displacement information can be calculated according to flight data.

Keywords: Rocket, Model Rocketry, Computational Fluid Dynamics, Flight Computer, Supersonic Rocket Simulation.

GİRİŞ

Roketler ve model roketler, aerodinamik kıstaslara göre tasarlanmaktadır. Bu tasarım yapılırken; roketin ulaşacağı maksimum hız, maksimum ivme, mekanik gereksinimler gibi birçok faktör göz önünde bulundurulur. Yapılan tasarımlar, belirli uçuş simülasyonu programlarında değerlendirilme ihtiyacına sahiptir. Böylelikle, roketin atıştan önce, atış anındaki davranışları simüle edilebilir. Literatürde yaygın olarak kullanılan bir roket simülasyon programı görseli Şekil 1'de gösterilmiştir.



Şekil 1 OpenRocket roket simülasyon programı arayüz görseli

Günümüzde roket uçuş simülasyonu yapabilen az sayıda paket program bulunmaktadır. Bu programlar arasından, OpenRocket açık kaynak kodlu olması sebebi ile yaygın olarak kullanılmaktadır. OpenRocket, Helsinki Teknoloji Üniversitesinde, Sampo Niskanen tarafından 2009 yılında yüksek lisans tezi kapsamında geliştirilmiştir (Niskanen, 2009). OpenRocket'in, yapılan denemelerde 10-15% oranında hata ile sonuç verdiği anlaşılmıştır. Bu hata oranı, ticari paket programların hata oranlarına yakındır.

OpenRocket, aerodinamik modeli; genel olarak James Borrowman'nın 60'lı yıllarda yaptığı bir çalışmada önerilen tahmin yöntemlerini kullanarak oluşturmaktadır (Barrowman, 1966). OpenRocket'te Borrowman'ın yöntemleri, ses üstü hızlar ve yüksek türbülans durumlarda daha iyi sonuç alınması için geliştirilmiştir. Fakat OpenRocket, Borrowman'nın metotlarında geliştirme ve iyileştirme yapılmış olsa da, özellikle ses üstü hızlarda ve yüksek hücum açılarında güvenilir sonuç vermemektedir. Bu sorunun önüne geçmek için, tahmin metotları yerine, roket üzerinde farklı tasarım noktalarında yapılan hesaplamalı akışkan dinamiği (CFD) analizlerinin sonuçlarını interpolasyon veya regresyon metotları ile kullanan bir program geliştirilebilir. Günümüzde CFD analizlerinden alınan verilerin doğrudan uçuş simülasyonunda kullanılmasını sağlayan roket simülasyonu için özelleştirilmiş bir paket program bulunmamaktadır.

Roket uçuş simülasyonu için kullanılan ticari paket programlardan biri olan RockSim programı, OpenRocket'e ek olarak, roket dinamiklerinden ve atmosferik koşullardan kaynaklanan belirsizlikleri, Monte Carlo yöntemi ile belirli güven aralıklarında sonuca yansıtabilen bir eklentiye sahiptir. Fakat dağıtımda bu eklenti, sadece Amerikan vatandaşlarının kullanımı ile sınırlı tutulmuştur. Cambridge Üniversitesinden Williem J. Earland ve arkadaşları, bu konuda bir çalışma yapmıştır (Earland ve diğerleri, 2017). Yapılan çalışma sonucunda açık kaynak kodlu olan OpenRocket geliştirilmiş ve uçuş esnasındaki belirsizlikleri de hesaba katabilecek hale getirilmiştir. Fakat geliştirilen bu programın, kullandığı C++ temelli kütüphanelerden ötürü, dağıtımında ve paylaşımında sorunlar yaşanmaktadır.

Bahsedildiği üzere, roket uçuş simülasyonu konusunda; uluslararası alanda saygın kabul edilen kurumlarda çalışmalar yapılmış ve bu çalışmalar sonucunda programlar geliştirilmiştir. Fakat dünyada, CFD analizlerinden alınan verileri kullanarak uçuş simülasyonu yapabilen bir program bulunmamaktadır. Proje kapsamında, CFD analizlerinden alınan verilerin uçuş simülasyonunda kullanılmasına olanak tanıyan ve belirsizliklerin sonuca olan etkisini gösterebilen açık kaynak kodlu roket uçuş simülasyonu programı geliştirilmiştir (Özdamar ve diğerleri, 2021).

Geliştirilen program; maksimum irtifa aralığı ve ortalama uçuş süresi bilinen bir model roketin, CFD analizi yapılıp analiz çıktıları programda kullanılarak incelenmiştir.

MODEL ROKETİN TASARLANMASI

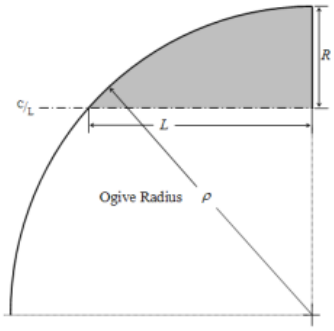
Çalışmada kullanılacak model roket, Tablo 1'de yer alan tasarım parametreleri kapsamında oluşturulmuştur. Roketin aerodinamik davranışında büyük rol oynayacak olan "tanjant ogive" burun geometrisi, Denklem 1-2'de verilen ogive denklemleri kullanılarak Şekil 2'de yer alan şekile göre çizilmiştir. Solidworks programı aracılığıyla roketin üç boyutlu modeli Şekil 3'de gösterildiği gibi oluşturulmuştur. Solidworks ile yapılan model, CFD (HAD) analizinde kullanılmak üzere ".step" formatına dönüştürülmüştür.

Tablo 1 Model roket tasarım parametreleri

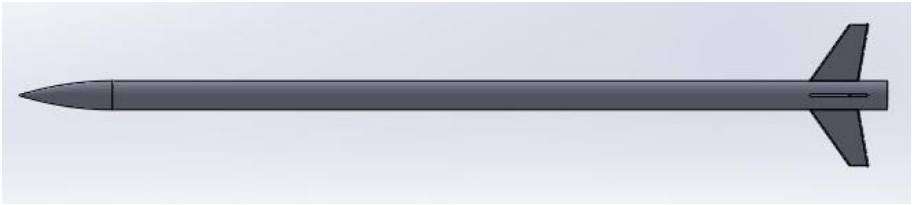
Parça	Boyut
Gövde Çapı	25 mm
Uzunluk	750 mm
Ağırlık	107 gr

$$\rho = \frac{L^2+R^2}{2R}$$ (Denklem 1)

$$y = \sqrt{\rho^2 - (L-x)^2} + R - \rho \, , 0 \leq x \leq L$$ (Denklem 2)



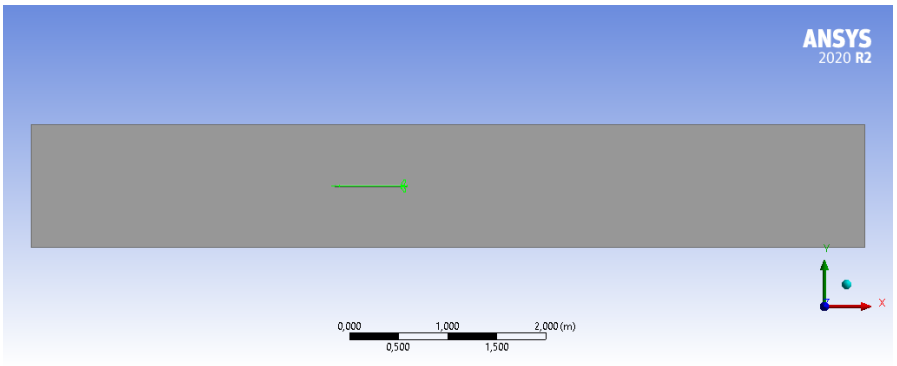
Şekil 2 Tangent ogive burun geometrisi gösterimi



Şekil 3 Model roket tasarımı üç boyutlu gösterimi

HESAPLAMALI AKIŞKANLAR DİNAMİĞI İLE MODEL ROKETİN ANALİZİ

Üç boyutlu modelin oluşturulmasından sonraki aşama, çalışmaya temel olacak CFD analizinin yapılması ve analiz sonuçlarının tutarlılığına karar verilmesidir. CFD analizi için Fluent modülü kullanıldı. Analiz, geliştirilen program isterleri gereği, atak açısı ve hız değerleri için parametrik olarak yapıldı. Analizin ilk aşamasında, geometri "import" edilip Design Modeler yardımıyla meshe hazır hale getirildi. Bu aşamanın temel taşı, aerodinamik analizlerin genelinde hava tüneli yaratmak adına yapılan, hava tüneli(enclosure) oluşturulması oldu. Referans çalışmalarda kabul edilen oranlar baz alınarak -roket XY düzlemine yerleştirildiğinde- roketin burnunun önüne roket boyunun 4 katı kadar, motor kısmının arkasına ise roket boyunun 6 katı kadar olacak büyüklükte bir enclosure oluşturuldu. Aynı zamanda Y düzleminde roketin bu düzlemdeki uzunluğunun beşer katı olacak şekilde enclosure genişletildi.



Şekil 4 Enclosure görünümü

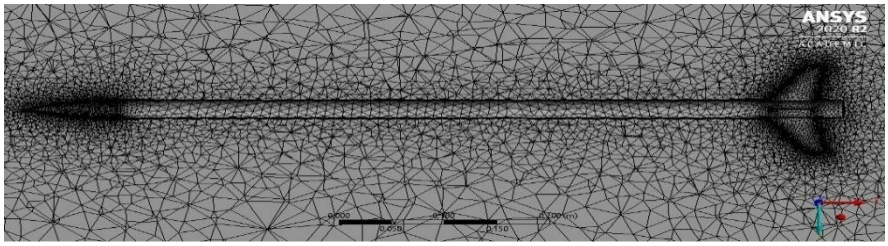
Bu aşamada önem taşıyan bir diğer kısım ise, atak açısını belirlemek adına, X düzlemi ile roket gövdesi arasındaki açının parametrik olarak seçilmesi oldu.

Details View

Details of Rotate1	
Rotate	Rotate1
Preserve Bodies?	No
Bodies	1
Axis Definition	Selection
Axis Selection	Plane Normal
P FD9, Angle	0 °

Şekil 5 Atak açısının parametrik seçilmesi

Mesh (ağ) aşamasında, oluşturulan enclosure içinde roket geometrisindeki sınır tabakanın verimli sonuçlar vermesi adına roket çevresinde "inflation" oluşturuldu. Oluşturulan sınır tabakaların optimum boyutları için gerekli hesaplamalar yapıldı. Bu işlemin ardından "Ortogonal Quality" değerinin 0.1'in altında kaldığı veya "Skewnes" değerinin 0.95'in üzerinde kaldığı hücreler tespit edildi. Bu hücrelerin çoğunlukta bulunduğu burun konisi ve kanatçık bölgelerinde "sizing" işlemi yapılarak kalite değerleri istenen ölçülere çekildi.



Şekil 6 Mesh oluşturulmuş yapı

Fluent aşamasında; sınır şartları, akışkanın özellikleri, türbülans modeli ve duvar fonksiyonu programa girildi. Akışkanın özellikleri, program altyapısındakilerle aynı değerlerle, hava seçildi. Sınır şartları girilirken, hız faktörü parametrik olarak seçilip roketin ulaşabileceği hız aralıklarında (10-75 m/s) çoklu değer girildi. Türbülans modeli olarak; ters basınç gradyanlarında, akış ayrılmalarında ve shear flow'ları çözmekteki başarısından dolayı "SST k-w" seçildi. Üç boyutlu dış akış analizlerinde sıkça kullanılan bu yöntem, yüksek Reynolds sayılarında tercih edilmekte olan en gelişmiş yöntemlerden biridir. "Standart k-w" kadar giriş şartlarına bağlı değildir. Duvar fonksiyonu olarak, az hassasiyetli duvar dibi çözümü sunan Standart Duvar Fonksiyonları seçildi. Çözüm metodu, akış tipine uygun "Coupled" olarak tercih edildi. Ayrıca bu noktada roketin direnç (sürüklenme) katsayısı, roketin total alan değeri baz alınarak tespit edilmiştir. Bulunan sonuçlar, benzer çalışmalar ve geometrilerle karşılaştırıldığında analizin doğru olduğu kanısına varılmıştır.

Tablo 2 Model roket CFD analiz sonuçları

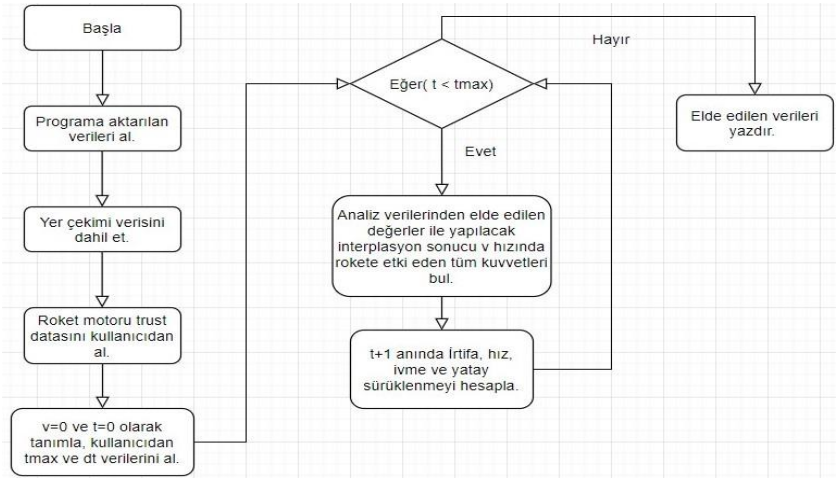
Hücum Açısı (Derece)	Giriş Hızı (m/s)	Direnç (N)	Kaldırma (N)	Cd (-)	Tork (J)
0	10	0,0179796	0,000488075	0,00414214	5.76E+00
0	20	0,0754216	0,00295527	0,00443439	0,000517492
0	30	0,175108	0,00749005	0,00448237	0,00129491
0	40	0,318745	0,0179198	0,00458953	0,0034928
0	45	0,406665	0,0203862	0,00462654	0,00386109
0	50	0,505376	0,0219729	0,00465713	0,00433341
0	55	0,614588	0,0315031	0,00468061	0,00607181
0	60	0,734842	0,0425946	0,00470258	0,00861919
0	65	0,865975	0,0423173	0,00472197	0,00872947
0	70	1,00881	0,0476092	0,00474307	0,00968523
0	75	1,1621	0,0461046	0,00475953	0,00881441
2	10	0,0189549	0,0349133	0,00436315	0,00677136
2	20	0,0795444	0,141435	0,00457749	0,0275469
2	30	0,184327	0,322022	0,00471438	0,0627434
2	40	0,33394	0,572116	0,00480425	0,11144
2	45	0,425726	0,722932	0,0048393	0,14063
2	50	0,528409	0,895215	0,00486528	0,174162
2	55	0,642788	1,07705	0,00489125	0,209025
2	60	0,768009	1,28416	0,00491067	0,249261
2	65	0,904286	1,49991	0,0049267	0,290528
2	70	1,05225	1,74423	0,0049431	0,338189

2	75	1,21211	2,00608	0,00496016	0,389001
4	10	0,0218416	0,0705663	0,00502558	0,0137639
4	20	0,0899073	0,281621	0,00517175	0,0551582
4	30	0,205139	0,634494	0,00524453	0,124262
4	40	0,369921	1,12669	0,00531975	0,220861
4	45	0,470246	1,42103	0,00534322	0,278667
4	50	0,582867	1,75319	0,00536453	0,343748
4	55	0,707712	2,12311	0,00538311	0,416497
4	60	0,845551	2,52411	0,0054043	0,495148
4	65	0,994566	2,96147	0,00541638	0,580769
4	70	1,15602	3,4322	0,00542837	0,672891
4	75	1,32983	3,9417	0,00543971	0,77289
6	10	0,0275143	0,106423	0,00633048	0,020102
6	20	0,112543	0,422076	0,00647345	0,0799415
6	30	0,254934	0,951924	0,00651724	0,180718
6	40	0,457251	1,69049	0,00657526	0,321316
6	45	0,581932	2,13433	0,00661189	0,405512
6	50	0,720749	2,63883	0,00663319	0,502145
6	55	0,872836	3,17585	0,00663874	0,603216
6	60	1,04314	3,80145	0,00666681	0,722639
6	65	1,22828	4,46787	0,00668882	0,849775
6	70	1,42748	5,1885	0,00670272	0,987353
6	75	1,64147	5,95602	0,00671413	1,13339
8	10	0,0345588	0,136041	0,00795231	0,0245435
8	2	0,14	0,5489	0,008	0,1006

	0	2487	13	19691	13
8	30	0,323955	1,24399	0,00828278	0,229781
8	40	0,579893	2,20863	0,00833993	0,408633
8	45	0,736204	2,79372	0,0083658	0,517105
8	50	0,912712	3,45298	0,00840094	0,639511
8	55	1,1066	4,16758	0,00841784	0,771644
8	60	1,31952	4,96413	0,00843429	0,919905
8	65	1,55012	5,82612	0,00844255	1,07984
8	70	1,80026	6,76412	0,008454	1,25471
8	75	2,06543	7,76281	0,00844933	1,44021

YAZILIMIN GELİŞTİRİLMESİ

Çalışma kapsamında geliştirilen programda kullanılacak yazılım dili, yaygınlığı ve paket programın dağıtımı sırasında yaşanabilecek sorunları en aza indirmesi sebebiyle Python olarak belirlenmiştir. Programın geliştirilmesi, Şekil 6'de gösterilen program akış diyagramı (flowchart) planına göre gerçekleştirilmiştir. Bu doğrultuda yazılım geliştirilmesi yapılarak ANSYS üzerinden hesaplanan HAD verileri kullanılarak yazılım geliştirme çalışmaları tamamlanmıştır.



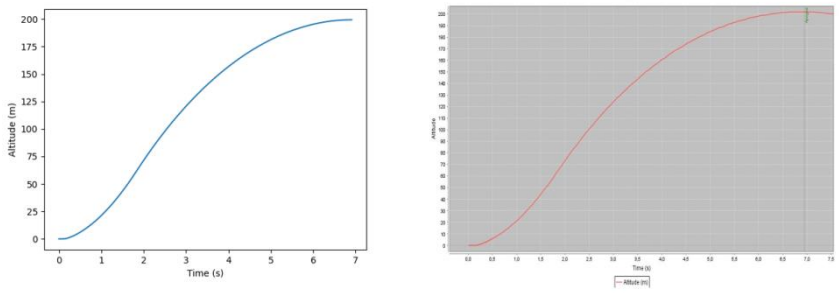
Şekil 7 Roket analiz programı akış diyagramı

Geliştirilen programın CFD verileri kullanarak çalışması hedeflenmiştir. Çalışma kapsamında yapılan CFD analiz verileri, yer çekimi ve literatürde paylaşılan roketin sahip olduğu motor itki (trust) verileri programda baz alınmıştır. Program başlangıcında süre ve hız verileri sıfır olarak alınmış süreye bağlı olarak başlangıçta programa aktarılan verilen interpolasyon işlemine tabii tutulmuştur. İnterplasyon sonucu rokete etki eden kuvvetler

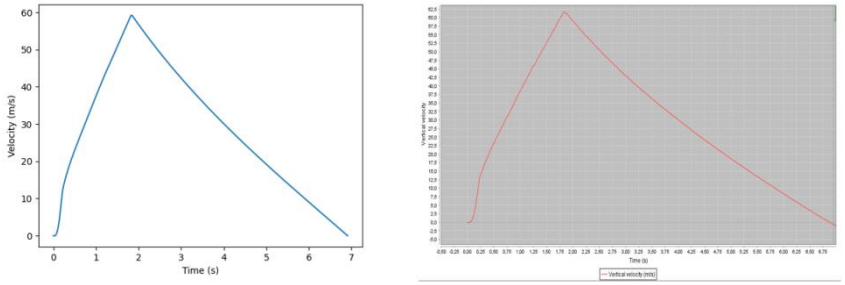
bulunarak irtifa, hız, ivme ve sürüklenme (direnç) çıktıları ve grafiklerini sunan bir roket analiz programı geliştirilmiştir.

SONUÇ VE KARŞILAŞTIRMA

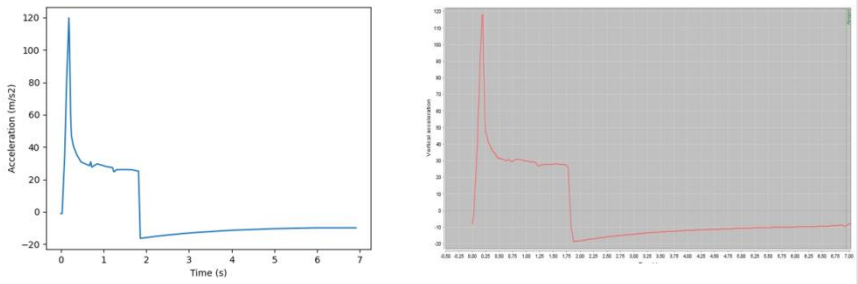
Çalışma kapsamında hedeflenen program geliştirilerek irtifa, hız, ivme ve direnç (sürüklenme) verileri, tasarlanan ve hesaplamalı akışkanlar mekaniği hesaplamaları yapılan model roket baz alınarak hesaplanmıştır. Şekil 8-11'de görüleceği üzere, geliştirilen programın çıktıları, belirlenen bir model roket kullanılarak, Openrocket programı ile karşılaştırılmıştır.



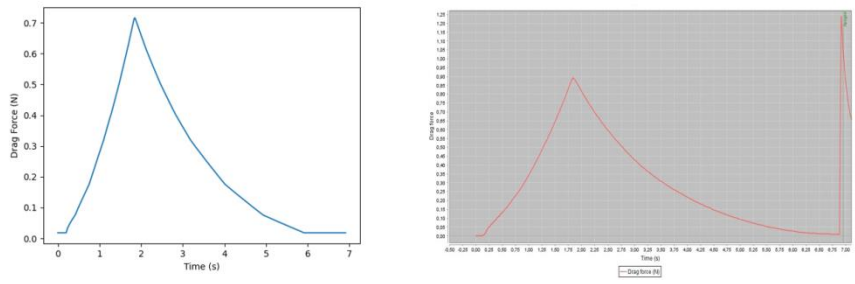
Şekil 8 Geliştirilen program irtifa grafiği (solda) Open Rocket irtifa grafiği (sağda)



Şekil 9 Geliştirilen program hız grafiği (solda) Open Rocket hız grafiği (sağda)



Şekil 10 Geliştirilen program ivme grafiği (solda) Open Rocket ivme grafiği (sağda)



Şekil 11 Geliştirilen program sürüklenme (direnç) grafiği (solda) Open Rocket sürüklenme (direnç) grafiği (sağda)

Şekil 8-11'deki veriler kıyaslandığında, bu çalışma kapsamında geliştirilen roket uçuş programı sonuçları ile Open Rocket Programı sonuçlarının yakın olduğu anlaşılmaktadır. Roket uçuş programı ile,

- Tasarım noktalarında özgürlük sağlayan,
- CFD ile bütünlük kurabilen,
- Ses üstü hızlarda doğru sonuçlar verebilecek

bir program çalışma kapsamında geliştirilmiştir.

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THE TREND OF USING TEXT MINING TECHNIQUES IN HISTORICAL TEACHING AND RESEARCH: AN ANALYSIS OF DOCUMENTS ON LAND OWNERSHIP IN THE MEKONG DELTA FROM 1955 TO 1975

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Abstract

In today's digital era, Text Mining technique is widely used in scientific research in general and especially, in History. In historical research and teaching, land ownership is one of the important issues in many agricultural countries like Vietnam. Through the application of Text Mining techniques in data analysis and extraction of information from documentary sources on land ownership at the National Archives Center, the paper will clarify specific values about ownership and land-related historical issues in the Mekong Delta, a region of Vietnam, for 20 years (1955 – 1975). The research results not only provide an important source of reference data for teaching history, but also serve as the basis for research and planning of socio-economic development strategies in the Mekong Delta nowadays.

Key words: History, Text Mining, Land Ownership, Mekong Delta

1. INTRODUCTION

Today, the great development in the application of information technology in most fields has made the amount of digital data stored more and more large. Traditional data mining methods do not respond appropriately to the new demands and challenges of life. Therefore, knowledge mining and discovery techniques in databases have become an inevitable trend to solve data mining problems for human life. One of the most commonly used techniques is Text Mining – a text analysis technique. Typically, Tuan et al (2019) used Text Mining to analyze the poem Divan of Hafiz in order to calculate the number of words and classify important keywords in the poem. In the study of Grobelnik et al (2002) used Text Mining technique in publishing to increase the number of customers to reach. According to Jalali et al (2020), the emergence of online documents today, especially big data, has made traditional data analysis methods difficult to handle. So, the development of tools to support data mining such as: NVivo, ATLAS.ti, Quirkos, Hyper Research are programs that support research into qualitative analysis methods by encoding input data. With many different engineering and software approaches, of which the ATLAS.ti application, a German software, is widely used thanks to its flexibility and open access, has allowed users to explore many research papers at the same time, reducing the time and number of mistakes. Because of that useful feature, ATLAS.ti applied in teaching and research in higher education institutions will bring many practical effects.

From the reality of history research and teaching at Can Tho University, it shows that historical documents are one of the decisive factors for the content of historical research

works and affect the quality of history teaching in higher education institutions. According to Nguyen et al (2010), historical document one of the most important concepts of historical science. In addition, history becomes a real science when it is built on complete, comprehensive and systematic knowledge. This knowledge must be determined by the historian for its reliability and authenticity, through careful analysis and examination of historical documents. From that requirement, this study proceeds to apply the outstanding features of ATLAS.ti software in supporting the analysis of historical documents, case studies of land documents in the Mekong Delta (1955 - 1975) by the Government of the Republic of Vietnam promulgated. From the results of this study, it will guide the expansion of all other historical research topics to serve history teaching at Can Tho University.

2. LITERATURE REVIEW

2.1 Text Mining

Text mining, also known as text data mining, is the process of processing and extracting meaningful information in text by applying advanced analytical techniques and algorithms. This process includes activities such as text summarization, document retrieval, document clustering, text classification, language recognition, identification of phrases, phrase and key phrase structure, and export and output data such as data name information, date information and abbreviations, identify acronyms and their definitions (Witten et al., 2004).

Mining information presented in the form of patterns, trends, ordinal orders is extracted through rules or through a learning process based on statistical patterns. Some researchers have applied text mining to qualitative research projects as a possible qualitative research method (Camillo et al., 2005; Hong, 2009; Janasik et al., 2009; Yu et al., 2011; Mahmoudi & Abbasalizadeh, 2019; Rajman & Besançon, 1998). Text mining is a part of text analysis in data mining that is conducted through basic steps such as preprocessing, model learning, judgment, analytic synthesis and presentation of results. Gaikwad et al (2014) proposed a text mining process consisting of steps (Fig.1)

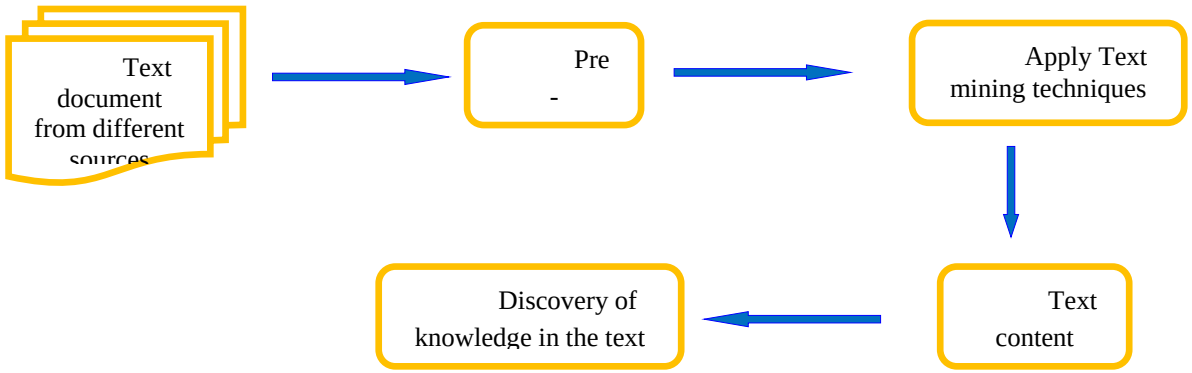


Fig. 1 Text mining process

The goal of text mining is to discover information that is unknown or not specifically written down. Therefore, the text mining process begins with a collection of documents from different data sources. A text miner will access the document and preprocess it by checking the text format and the characters in the text. The document is then moved to the text analysis stage. Text analysis is semantic analysis to obtain high-quality information from text. Many text analysis techniques are available, and depending on the organization's goals, a combination of techniques can be used (Gaikwad et al., 2014).

One of the effective text mining techniques is data clustering with the aim of finding and detecting clusters, latent and important data patterns from large data sets, thereby providing

information and knowledge for decision making. Data clustering is the division of large databases into groups of data with similar objects. According to Nguyen (2009), Data clustering is the organization of objects in a text into groups where the objects in each group are similar according to a certain property. According to Nguyen (2011), The strength of data clustering is to provide useful structures or clusters of objects found directly from the data without any knowledge base.

2.2 ATLAS.ti Sofware

According to Friese (2019), ATLAS.ti is a leading software for qualitative data analysis that provides the big picture and appreciates the details of data. The purpose of ATLAS.ti is to help us discover and analyze the complex problems underlying unstructured data. The software also allows to locate, encode and annotate hidden findings within data to analyze and evaluate them, and uncover complex relationships to find cause and effect in the data. ATLAS.ti helps users conveniently and quickly navigate through large data sets used in many fields including anthropology, art, architecture, media, science education, management research, market research, psychology, sociology... The essence of ATLAS.ti is an exploratory approach to theory building by segmentation, coding and retrieval interspersed with building concepts concepts and text structures, it reveals meanings and relationships that allow users to make their findings in the data.

One thing to note is that ATLAS.ti does not replace thinking, it cannot do mental work because only humans can think, the analyst is the one who has to do the real analysis. Project management requires care because external database systems are constantly changing and need to be backed up more carefully when using ATLAS.ti. The first version of ATLAS.ti was developed by Thomas Muhr at the Technical University in Berlin in the context of the ATLAS project 1989 – 1992 (Smit (2002)). Currently ATLAS.ti has versions for Windows, Mac, Android and iPad operating systems.

2.3 Introduction to the land issue in South Vietnam

The historical research of land issues is an important topic in many countries such as the United States (Freyfogle, 1984), India (Gadgil & Guha, 1993), Namibia (Werner, 1993), Australia (Butzer & Helgren, 2005), Mongolia (Fernandez-Gimenez, 2006), Europe (Couch et al., 2008), … The land issue is also one of the issues of special significance for an agricultural country like Vietnam. Because land is not only a necessary means of production for the development of the economy, but also plays a decisive role in the process of forming regional economic relationships. This is the driving force promoting or inhibiting the socio-political development of Vietnam over historical periods. Therefore, the existence of each state or political institution in the nation's history is often associated with the resolution of land problems posed by society itself.

Since the Geneva Agreement (1954), the land issue in the South in general and the Mekong Delta in particular became a core issue in the Vietnam War. During the 20 years of war in South Vietnam (1955-1975), the government of the Republic of Vietnam always focused on land issues through many different management policies. They considered the land issue as the top focus, decisive to the victory or defeat of the war. Along with that, farmers and rural areas became objects and areas of fierce competition between the warring parties during this long and fierce war. Therefore, land is both a combat area and a strategic weapon of the government of the Republic of Vietnam.

Research on land issues in this historical period is quite diverse in form and content. Le (1967) raised the importance of external aid for southern agriculture and made an initial assessment of the impact of this external aid. Thereby, the land issue suggests new development orientations for more efficient ownership, management and farming according to the agricultural economic development strategy of the government of the Republic of Vietnam. Hoang (1972) presented an overview of the trend of land reform as well as mentioned land reform in Vietnam through the periods. Following the land survey during the Republic of Vietnam, Do (1966) synthesized the natural conditions and agricultural production situation under the management of the Government of the Republic of Vietnam. Clear layout and specific analysis, the study raised the issues of land management organization that set the stage for many land reforms during this period. According to Cao (1976), the land reform policy of Diem - Thieu was reactionary, deceptive, malicious. That policy, along with many other policies, made agriculture - farmers in the South heavily dependent on USA aid. Lam (1985) mentioned the policies and results of the land revolution of the Vietnam Communist Party during the war in South Vietnam, and criticized the land reform of the Republic of Vietnam under President Ngo Dinh Diem (1955 – 1963) and President Nguyen Van Thieu (1967 – 1975).

Another study by Tran (1993) systematically and objectively analyzed, added some new data on the process of changing land ownership regime and class relations between classes in rural areas in the Mekong Delta. With specific documents, the author has clarified the causes and characteristics of the process of change in land ownership regimes and land management regimes under the influence of the land management policy of the country of the Republic of Vietnam in rural Mekong Delta from 1955 to 1975. In addition, a study by Nguyen (2013), presented an overview of land ownership in Vietnam in the period from 1945 to 1975, through which an objective analysis of the land ownership situation was presented and agricultural production in the Mekong Delta during the Republic of Vietnam (1955-1975). Lam's study (2014), which studies land policy in the South of Vietnam, points out the differences between the land management policies of the two South and North Vietnam after 1954 and analyzes the impact and the consequences of that policy for the development requirements of Vietnam's national history.

In particular, in the years 1955 - 1956, the US government sent an advisory mission led by expert on land reform W. Ladejinsky to help the Republic of Vietnam draft and implement the policy on field management in South Vietnam. The content of land reform under the President Ngo Dinh Diem focused on four edicts:

- No. 2 (January 8, 1955) stipulates the maximum rent (land rental price) and the interest rate that landlords can apply. The maximum rate of rent is from 10 to 15% of the rice harvested for one season/year; The maximum rent is from 15% to 25% for the main harvest of the field with 2 seasons/year.
- No. 7 (February 5, 1955) stipulates that the lease of land must have a tenant contract. Contract term is 5 years, renewable. Tenants have the right to return the land and must notify the landowner 6 months in advance. The landowner who wants to take back the land must give the tenant 3 years notice. Contracts are divided into 3 types:

+ Type A: for fields under cultivation by owners

+ Type B: for unoccupied fields

+ Type C: for deserted fields (Commune Council signs contracts with farmers on behalf of land owners)

- No. 28 (April 30, 1956) regulations on land tenants
- No. 57 (October 20, 1956) owner's regulations. Each address is allowed to keep 100

hectares of cultivated fields and 15 hectares of traditional family fields. The land without owner will be resold to the landless, each household does not exceed 5 hectares, the buyer will pay for a period of 6 years. During that time the land remained under the ownership of the government. For the next 10 years, people could not distribute the fields to m or sell them. Land owners will be compensated 10% in cash, the rest will be paid back by bonds for 12 years, 5% each year.

After Tet Mau Than in 1968, the USA had to de-escalate and switch to the strategy of Vietnamizing the war. A large rural area in South Vietnam was under the control of the National Front for the Liberation of South Vietnam, which forced the governments of the USA and the Republic of Vietnam to change their plans to regain control of land in rural South Vietnam. After many agendas between the parties, the President of the Republic of Vietnam at that time Nguyen Van Thieu signed Decree 003/60, on March 26, 1970 in Can Tho on the promulgation of the Law on Farmers Having Land with basic content:

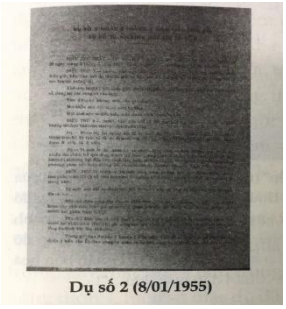
- The law stipulates that land not cultivated by landlords is necessarily expropriated and must be adequately compensated according to the time value. Landowners are compensated 20% in cash and 80% in bonds with an interest rate of 10%/8 years. The value of the specified farmland is 2.5 times the price of paddy yield from that plot.
- Expropriated land is prioritized and allocated free of charge to tenant farmers (3 ha in the South and 1 ha in the Central Coastal Highlands). Landowners directly cultivating can only keep a maximum of 15 hectares in the South or 5 hectares in the Central. However, this Law does not apply to land owned by religious organizations and land owned by people's families. The objective of this reform is to grant 1,500,000 hectares of rice fields to 80,000 farmers for free and to issue certificates of land ownership to farmers. The law also stipulates that the person receiving the land under the Farmers Having Land program cannot transfer or resell that land for 15 years.

In addition, the land policy has three new points put into practice:

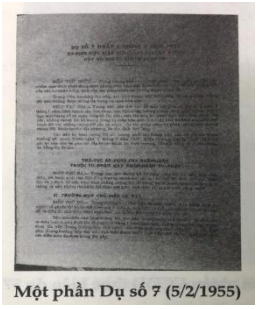
+ Landlords do not have the right to force tenants to pay rent from previous years.

+ Farmers who receive fields from Viet Minh are also exempted from tax for a limited time.

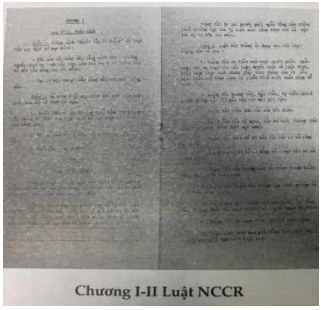
+ Farmers owning fields granted by Viet Minh will be officially contracted to own the fields.



Dụ số 2 (8/01/1955)



Một phần Dụ số 7 (5/2/1955)



Chương I-II Luật NCCR

Fig. 2 Some images of the Land Law of the Republic of Vietnam from 1955 to 1975

After that, the article will present a method of analyzing land data by text mining techniques based on clustering with the help of ATLAS.ti software to clarify the values of historical issues related to the data land in the Mekong Delta, a region of Vietnam, for 20 years (1955 – 1975).

3. RESEARCH METHODS AND RESULTS

3.1 Research methods

National archives are a source of documents containing many important values of each country, and the information on these documents has authentic value on many issues and events in all areas of life society. Therefore, historical research based on national archival materials both ensures scientific authenticity and exploits valuable historical research information. In addition, historical documents should also change into digital forms for using in teaching and research (Chen et al., 2007).

Therefore, the research process of the paper went through the following phases**:**

Phase 1: Extracting historical documents at the National Archives Center II, Ho Chi Minh City (Fig.3)



Fig. 3 The National Archives Center II, Ho Chi Minh City

Phase 2: Select, digitize and format documents from image files to Word or Pdf.

Phase 3: We use the tools in ATLAS.ti 9 and analyze the qualitative data in the document text according to the process (Bui et al., 2020) (Fig.4)

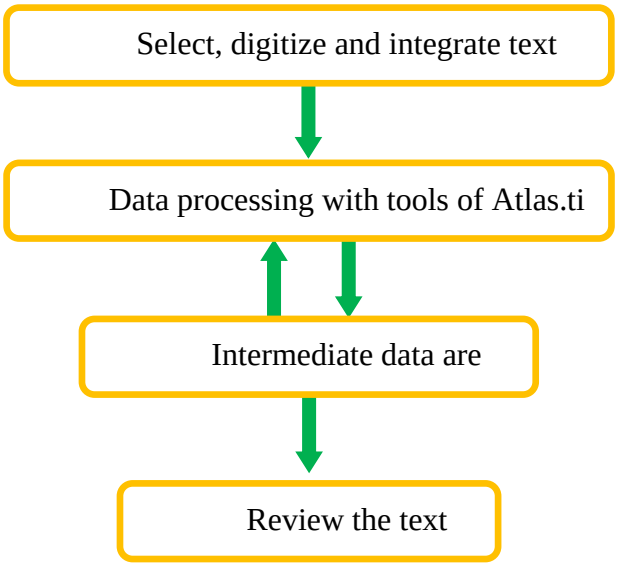


Fig. 4 Process of qualitative data analysis using ATLAS.ti software

+ First, create a project with the name "Mekong Delta" in ATLAS.ti, the files are included in the project by the Add Document function on the toolbar.

+ Second, use Word Cloud / Word List tool for files to know the frequency of all words in each document. On the toolbar, click on the Word List/Word Cloud item in the Document section (Fig.5).

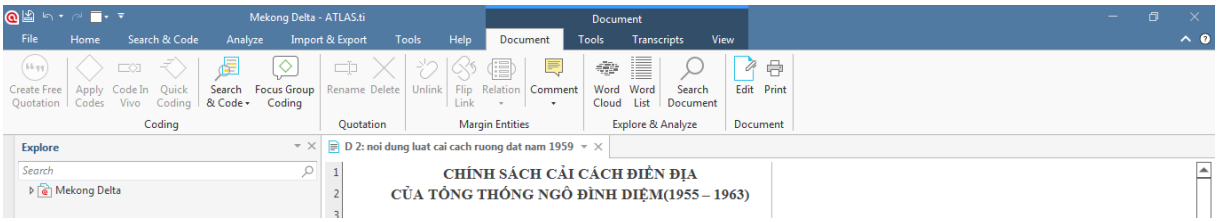


Fig. 5 Toolbar of ATLAS.ti

+ Third, create a Network to look at the visual relationship of words/phrases in a document (Fig.6).

Fig. 6 New Code(s) creation function on the toolbar

Phase 4: We summarize the performance and look at the relationships between the contents of the documents. Develop key topics around the content of the land reform law in the period from 1955 to 1975. On that basis, we use historical research methods to analyze the content and compare it similarities, differences and consequences of land reform programs of the Republic of Vietnam.

3.2 Research results and discussion

Some representative results are shown through the analysis of documents on the land reform program of the Government of the Republic of Vietnam using ATLAS.ti 9.1.3.0:

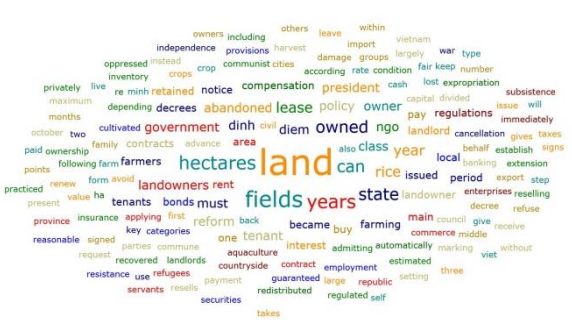

land
hectares
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landowners
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diem
dinh
ngo
abandoned
lease
policy
owner
president
compensation
notice
retained
decrees
depending
regulations
pay
landlord
cancellation
class
year
rice
issued
period
can
local
farmers
contracts
area
cultivated
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expropriation
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aquaculture
countryside
contract
employment
guaranteed
redistributed
regulated
republic
large
setting
payment
resells
servants
securities
takes
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insurance
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points
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ownership
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Fig. 7 Word Cloud results for the land reform of (a) President Ngo Dinh Diem (1955 - 1963), and (b) President Nguyen Van Thieu (1967 - 1975)

+ In Fig. 7a, the Word List and Word Cloud results show the frequency of the prominent words “land” (15 times), “fields” (8 times), “hectares” (6 times), years (6 times), “owned” (5 times)…(Table 1). In Word Cloud, there are words with large to small sizes corresponding to the frequency of occurrence along with different colors, creating a vivid visualization. That shows that the content of the land reform program under President Ngo Dinh Diem focused on solving the land problem between the relationship between landlords and tenants in society.

Table 1. Statistical table of the frequency of occurrence of important keywords in the Land Reform document (1959 - 1963)

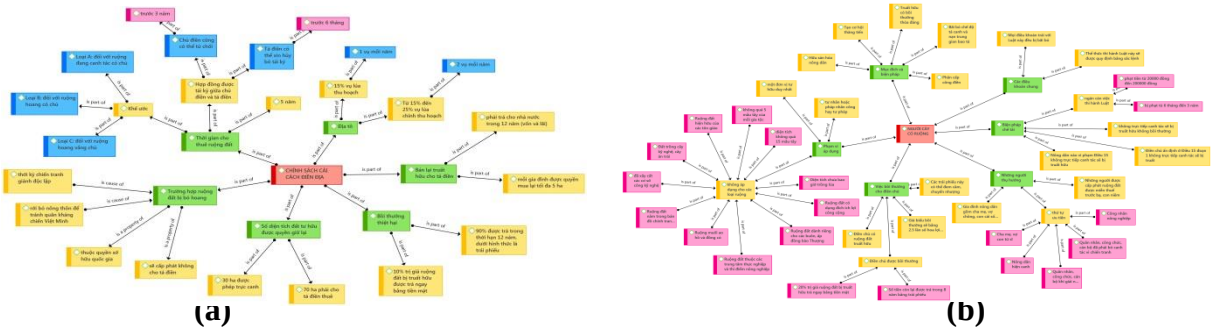
	Word	**Length**	**Land Reform 1959-1963**		**%**	**Total**		**%**
	can	3	5		10.00%	5		10.00%
	fields	6	8		16.00%	8		16.00%
	hectares	8	6		12.00%	6		12.00%
	land	4	15		30.00%	15		30.00%
	owned	5	5		10.00%	5		10.00%
	state	5	5		10.00%	5		10.00%
	years	5	6		12.00%	6		12.00%
	Total		**50**		**100.00%**	**50**		**100.00%**

+ In Fig. 7b, the Word List and Word Cloud results show the frequency of the prominent words "land" (38 times), "Article " (27 times), "law" (16 times), "will" (14 times), "farmers" (9 times), “compensation” (8 times)…(Table 2). The content of the land reform program under President Nguyen Van Thieu also focused on solving the land problem between the relationship between people who owned a lot of land and those who owned little or no land.

Table 2. Statistical table of the frequency of occurrence of important keywords in the Land Reform document (1967 - 1975)

	Word	Length	Land reform 1967-1975	%	Total	%
	allocated	9	6	3.85%	6	3.85%
	article	7	27	17.31%	27	17.31%
	chapter	7	6	3.85%	6	3.85%
ation	compens	12	8	5.13%	8	5.13%
	family	6	5	3.20%	5	3.20%
	farmers	7	9	5.77%	9	5.77%
	farming	7	6	3.85%	6	3.85%
	fields	6	6	3.85%	6	3.85%
g	followin	9	6	3.85%	6	3.85%
	land	4	38	24.36%	38	24.36%
	law	3	16	10.26%	16	10.26%
	shall	5	9	5.77%	9	5.77%
	will	4	14	8.97%	14	8.97%
	Total		**156**	**100.00%**	**156**	**100.00%**

The results of the Network of Words/Phrases contained in the document show branches around the main themes of "field" and "land". These phrases represent the content of the land reform program implemented by the Government during the period from 1955 to 1975. Network has helped build the core content of the document to become more intuitive and attractive about land issues to be solved such as purposes and methods, implementation time, compensation for acquired land, area owner, owner...



(a) (b)

Fig. 8 Network results of the land reform of (a) President Ngo Dinh Diem (1955 - 1963), and (b) President Nguyen Van Thieu (1967 - 1975)

On the basis of words and phrases extracted from ATLAS.ti 9.1.3.0, the text content is further analyzed with the following issues:

President Ngo Dinh Diem's land reform program was prominent through 4 Decrees: No. 2 (January 8, 1955), No. 7 (February 5, 1955), No. 28 (January 30, 1955) and No. 57 (October 20, 1956). In particular, Decree No. 2 is essentially a copy with some adjustments from Decree No. 20 issued by the Head of State Bao Dai (1953), changing the rent level is divided into two classes depending on depending on the type of field and can range from 15-25% (Bao Dai stipulates the common rent rate for all types of fields is 15%); The head of the settlement of land dispute settlement is chaired by the Governor… Decree No. 7 further regulates the signing of contracts (land lease contracts) between landlords and tenants with a minimum term of 5 years with renewal depending on the two subjects; Land lease contracts are divided into 3 types: Type A for fields currently under cultivation with owners, Class B for uncultivated fields with owners, and Class C for deserted fields with owners. Therefore, in essence, Decrees No. 2 and No. 7 passed regulations on making tenant contracts, which forced tenant farmers to legally recognize land ownership rights of landlords not only in the area of land owned by the owner, even the parts of land they were allocated by Viet Minh during the resistance war against the French colonialists. According to Pham (1998), this means that farmers have to return to the status of tenant farmers with increasing common rents. Many landowners in the resistance war against the French colonialists had to flee to the city, and now return to the countryside to claim land, increase rents, and even prosecute them for years they did not get. Decree No. 57 regulates the expropriation of land by landlords, each landowner can own 100 hectares of arable land and 15 hectares of family land. The expropriated land was compensated by President Ngo Dinh Diem to landlords by the method of 10% of the value in cash, the remaining 90% of the value is paid by government bonds with an interest rate of 5%/year and paid in 12 years. The area of land expropriated by landlords will be resold by the Government to households lacking cultivable land but not exceeding 5 ha/household, payment for 6 years and after that period will be given back ownership (Vo, 1995).

Legally, President Ngo Dinh Diem's Decree No. 57 clearly stipulates that landowners are entitled to own 115 hectares. However, in the contemporary historical situation in the Mekong Delta after the resistance war against the French colonialists, the number of people who owned several tens of hectares of land to collect rent as the main source of income was already wealthy landlords, the The Government of the Republic of Vietnam (1955 - 1963) allowed individuals to own land with a land area of 115 hectares, which meant maintaining the great landlord class in society to exploit the landlords of the peasants. Thereby, it shows that, through the land reform program of President Ngo Dinh Diem, in essence, it contributed to the restoration and maintenance of the large number of landlords as an economic support for the current government.

According to Tran (1991), in the 4 months after this program was launched, 2,600 landowners declared that they owned 1,075,000 ha, an average of 413 ha/person, but in 1970, after 14 years of implementation, the number The land expropriated to be sold to farmers is only 298,347 ha, accounting for 28% of the declared area. And also according to Tran (1991), in 1967 in the Mekong Delta there were 2,000,000 landless farmers.

According to Vo (1995), it shows the scale of ownership of arable land of households in the Mekong Delta in the years 1960-1961 as follows (Table 3): The number of households owning more than 5 hectares of land has the rate of 7.16%/total farming households but owns 40.65% of the total area. In which, households owning 5-10 hectares, accounting for 5.69% of the total number of households, but owning 25.14% of the cultivated area, households owning 10-15 hectares of land. the rate is 1.44%/total households but owns 13.76% of the arable land. Thereby reflecting the higher the disparity rate in the scale of ownership of arable land, the greater the exploitation nature of farmers' wage labor.

Table 3. Statistics of cultivated land area in South Vietnam in 1960 – 1961

Area scale	Number of farmer households	%	Area of cultivated land	%
≤ 0,1 hectares	168.805	14,26%	5.127	0,30%
0,1 - 0,5 hectares	161.173	13,61%	37.613	2,23%
0,5 - 1 hectares	166.333	14,05%	107.522	6,37%
1 - 2 hectares	300.031	25,34%	385.747	22,86%
2 - 3 hectares	168.538	14,24%	355	0,02%
3 - 5 hectares	134.240	11,34%	465.102	27,56%
5 - 10 hectares	67.363	5,69%	424.330	25,14%
10 - 50 hectares	17.017	1,44%	232.293	13,76%
50 - 100 hectares	258	0,02%	17.647	1,05%
> 100 hectares	71	0,01%	11.875	0,70%
Total	**1.183.829**	**100%**	**1.687.611**	**100%**

However, after the coup on November 1, 1963 to overthrow the First Republic of Vietnam by President Ngo Dinh Diem carried out by a group of military generals, the state of the Republic of Vietnam went through a period of time weakened and dependent on all aspects of the United States (Miller, E., 2013). During the period of military rule full of instability and loss of power control (1963 - 1967), successive governments were replaced so that they could not create and formulate a new policy on land land until President Nguyen Van Thieu built the Second Republic of Vietnam in 1967.

On March 26, 1970, President Nguyen Van Thieu promulgated the Law on Farmers Having Land with fields in Can Tho, which is considered a key strategic law in winning the

support of the people of the South. This Code consists of 6 chapters, 22 articles focusing on solving land issues in the relationship between landlords and tenants. Text mining shows that the basic content of this Law is to abolish the landlord class and the tenant farming system and create conditions for the transformation of landowners into a capitalist business model more effective than the exploitation of rent from tenant farmers. If President Ngo Dinh Diem's land reform program forced farmers to sign land lease contracts with landlords and they had to buy expropriated land from the Government by installment payment method with interest within a period of time. After 6 years, the Law on Farmers Having Land has specified that the beneficiaries of expropriated land are farmers without paying any costs. Accordingly, the Government of the Republic of Vietnam under President Nguyen Van Thieu grants a maximum of 3 ha/household in the Mekong Delta and 1 ha/household in the Central part.

Compared with the land reform program of President Ngo Dinh Diem (1955 - 1963), the Law on Farmers Having Land promulgated by President Nguyen Van Thieu has made a significant step forward. This law abolished the farming system, abolished feudal production relations along with the unsuitable method of rent exploitation, and issued a certificate confirming the ownership of land by farmers in legal terms. The important purpose of this law was to create a large number of small farmers in the southern countryside with a reasonable farming scale, in which the family farm is considered the basic business unit. Through the strategy of solving the land problem satisfactorily for farmers in relation to landlords, the President Nguyen Van Thieu hopes to exert great influence among the people of South Vietnam, especially farmers in the Mekong Delta.

Basically, the policy on the issue of land - agriculture - farmers implemented by the government of the Republic of Vietnam and the aid of the United States has contributed to transforming the rural economic landscape of South Vietnam in general and the Mekong Delta in particular:

+ The land policy of President Nguyen Van Thieu has accelerated the process of central farming associated with the abolition of the landlord class and tenant system, along with the method of exploiting feudal rent. Through that, the contemporary government has built a middle peasant class that plays a decisive role in agricultural production. According to Tran (1991), the survey data from the Southern Agricultural Rehabilitation Committee carried out in 1978 showed that in the Mekong Delta: middle farmers accounted for 70% of the rural population, 74.5% of the labor force, and 80% of the fields, 60% of total mechanical energy, over 70% of small mechanical machines, 93% of cattle pulling power.

+ The Law on Farmers Having Land along with the implementation of rural modernization policies in the early 70s of the 20th century have contributed to the creation of the agricultural economy of the Mekong Delta with development new, rice productivity and output are improved, farmers' lives are improved. According to Tran (1991), the implementation of the green revolution with the introduction of new varieties into agriculture since 1969 has decisively contributed to the change in quality of smallholder farmers in the Mekong Delta. In 1968, the cultivated area of rice fields was 41,000 hectares, by 1973 it had increased to 830,000 hectares. The southern countryside in general, especially the Mekong Delta, has formed a credit banking system that includes both government and private investment in agriculture. It can be said that, before 1975, the rural appearance of the Mekong Delta was really transformed when the middle peasant class became the central figure, not only accounting for a large proportion in terms of number, labor force, scale. owning land, but also representing a new mode of production in the countryside, playing a key role in agricultural and commodity production.

However, the land policy promulgated under President Nguyen Van Thieu also has many limitations in the implementation of The Law on Farmers Having Land. In fact, the decentralization of land to farmers had many obstacles due to the overlapping of land control

rights between the two countervailing forces, the Government of the Republic of Vietnam and the Viet Cong.

4. CONCLUSION

Historical resources are important to the study and teaching of history. So, research and application of Text mining techniques have made many important contributions to creating a method of content mining historical documents from basic to advanced levels. The results of this study show the importance of applying technology in historical research and teaching in the university environment. This is a valuable study and an active reference to develop historical research methods in the digital age and improve student learning content to be more in-depth with rich sources to be exploited.

The results of case study on land issues in the Mekong Delta (1955 - 1975) open up a new development direction for the improvement of history research and teaching activities in Can Tho University and many other universities of Asia. In future, researchers can use advanced digital technologies such as Mobile technologies, Augmented Reality, … to build digital learning resources for both historical teaching and research.

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BİTKİSEL YAĞ İLE YAPILAN ISIL İŞLEMİN KARAÇAM ODUNUNUN FİZİKSEL ÖZELLİKLERİ ÜZERİNE ETKİSİ

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Özet

Odun, rutubet içeriğine bağlı olarak, bulunduğu ortamdan rutubet alır veya rutubet verir. Odun rutubet aldıkça genişler ve rutubet verdikçe daralır. Birçok ağaç türünün odunu biyolojik olarak dayanıklı değildir. Bu nedenlerle, odunun bu istenmeyen özelliklerini iyileştirmek için odun modifikasyon yöntemleri geliştirilmiştir. Isıl işlem modifikasyon yöntemi bu yöntemlerden birisidir. Farklı ülkelerde farklı ısıl işlem metotları uygulanmaktadır. Bu ısıl işlem uygulamalarında sıcak buhar, sıcak hava, inert gaz veya sıcak bitkisel yağlar ısı taşıyıcı araç olarak kullanılmaktadır. Isı taşıyıcı olarak bitkisel yağların kullanıldığı metot OHT (Oil Heat Treatment) olarak bilinmektedir ve Almanya'da kullanılan bir metottur. Bu çalışmada, ısı taşıyıcı araç olarak bitkisel yağ kullanılarak karaçam (Pinus nigra) odun örneklerine ısıl işlem uygulanmıştır. Test örnekleri 2x2x3 cm ölçülerinde hazırlanmıştır. Her grup için 24 adet test örneği hazırlanmıştır. Isıl işlem, normal atmosfer şartlarında 160, 180 ve 200°C sıcaklıkta ve 2 saat süre ile uygulanmıştır. Isıl işlemde Ayçiçek yağı kullanılmıştır. Isıl işlemden hemen sonra test örnekleri soğutulmuş ve yağ alma yüzdeleri belirlenmiştir. Daha sonra test örnekleri suya batırılmış ve 2 hafta suda bekletilmiştir. Bu sürenin sonunda test örnekleri sudan çıkarılmıştır. Test örneklerinin teğet genişleme, radyal genişleme, boyuna genişleme, hacmen genişleme, genişleme anizotropisi, lif doygunluk noktası ve su alma yüzdesi belirlenmiştir. Test örneklerinin genişleme yüzdelerinin belirlenmesinde TS 4084 ve 4086 numaralı standartlar, su alma yüzdesinin belirlenmesinde TS 2471 numaralı standart ve tam kuru yoğunluk miktarının belirlenmesinde ise TS 2472 numaralı standart kullanılmıştır. Elde edilen verilere göre; test örneklerinin ısıl işlem sıcaklığına bağlı olarak yağ alım yüzdelerinin değiştiği, genişleme yüzdelerinin azaldığı, genişleme anizotropisinin azaldığı belirlenmiştir. Su alma yüzdesinin ise, yağ alımına ve ısıl işlem sıcaklığına bağlı olarak değişiklik gösterdiği belirlenmiştir.

Anahtar Kelimeler: Karaçam, fiziksel özellikler, ısıl işlem, bitkisel yağ

THE EFFECT OF HEAT TREATMENT WITH VEGETABLE OIL ON THE PHYSICAL PROPERTIES OF BLACK PINE WOOD

Abstract

Depending on the moisture content, wood takes or gives moisture from the environment it is in. Wood expands as it gets moisture and contracts as it gets moist. The wood of many tree species is not biologically durable. For these reasons, wood modification methods have been developed to improve these undesirable properties of wood. The heat

treatment modification method is one of these methods. Different heat treatment methods are applied in different countries. In these heat treatment applications, hot steam, hot air, inert gas or hot vegetable oils are used as heat transfer agent. The method in which vegetable oils are used as a heat carrier is known as OHT (Oil Heat Treatment) and is a method used in Germany. In this study, heat treatment was applied to pine (Pinus nigra) wood samples using vegetable oil as a heat transfer agent. Test samples were prepared in the dimensions of 2x2x3 cm. 24 test samples were prepared for each group. Heat treatment was applied at 160, 180 and 200°C under normal atmospheric conditions and for 2 hours. Sunflower oil was used in heat treatment. Immediately after the heat treatment, the test samples were cooled and the oil uptake percentages were determined. Then the test samples were immersed in water and kept in water for 2 weeks. At the end of this period, the test samples were removed from the water. Tangential swelling, radial swelling, longitudinal swelling n, volume swelling, swelling anisotropy, fiber saturation point and water uptake percentage of the test samples were determined. Standards numbered TS 4084 and 4086 were used to determine the swelling percentages of the test samples, standard numbered TS 2471 was used to determine the percentage of water uptake, and standard numbered TS 2472 was used to determine the oven-dried density. According to the data obtained; it was determined that the oil uptake percentages of the test samples changed depending on the heat treatment temperature, the swelling percentages decreased, and the swelling anisotropy decreased. It was determined that the percentage of water uptake varies depending on the oil uptake and the heat treatment temperature.

Keywords: Black pine, physical properties, heat treatment, vegetable oil

1. Giriş

Ahşap, yüksek mukavemet-ağırlık oranına sahip biyopolimerlerden oluşan hücre duvarlarından oluşan gözenekli bir ağ yapısı ile karakterize edilir (Sun ve Sun 2002). Hidroksil grupları, ahşabın hücre duvarında selüloz, hemiselüloz ve lignin şeklinde en bol bulunan fonksiyonel gruplardır (Chen ve ark., 2018) ve genel olarak higroskopik bir karaktere sahiptir, bu da suya maruz kaldıktan sonra zayıf özelliğe sahip ahşap ile sonuçlanmasına neden olur (Adebawo ve ark., 2016).

Termal modifikasyon sayesinde dayanıklılık ve boyutsal kararlılık, ağaç türüne ve işlem yoğunluğuna bağlı olarak arttırılır (Militz ve Altgen 2014). Hemiselülozlarda asetil gruplarının varlığı, asetik asit oluşumuna yol açar, böylece polisakkaritlerin asit katalizli bozunmasıyla sonuçlanır (Kučerová ve ark., 2016). Selüloz, ısıl işlem sırasında kimyası, kristalliği ve mikro yapısında büyük değişikliklere uğrar (Dumanli ve Windle 2012) ve amorf bölgeler, kristal faza kıyasla termal bozunmaya karşı en kararsız bölgelerdir (Kučerová ve ark., 2016). Hücre duvarı polimerlerinin termal stabilitesi hemiselüloz, selüloz ve lignin sırasıyla artar, ancak uzun süreli ısıl işlemle, selülozun polimerizasyon derecesinin (DP) azalmasıyla sonuçlanan bir selüloz zincir bölünmesi meydana gelir (Kučerová ve ark., 2011; Kučerová ve Výbohová 2014). Polisakkaritlerin bozunması, odundaki lignin içeriğinin göreceli olarak artmasına yol açar. Bir kaç çalışmada, ligninin kütle değişikliklerinin düşük sıcaklıklarda daha az önemli ölçüde etkilendiğini, ancak daha yüksek sıcaklıklarda kimyasal yapısının lignin oto-yoğuşma reaksiyonları ve çapraz bağlı lignin-karbonhidrat komplekslerinin oluşumu ile önemli ölçüde değiştiğini bildirilmiştir (Inari ve ark., 2006; Tjeerdsma ve ark., 1998; Sivonen ve ark., 2002; Wikberg ve Maunu 2004; Bhuiyan ve Hirai 2005).

Yağlı ısıl işlem, ahşapta etkin ve eşit ısı transferi sağlayan ve Almanya'da kullanılmaya başlanan bir işlem yöntemidir (Sidorova 2008). Yağlı ısıl işlem, koruyucu kullanmadan ahşabın işlenmesinde başka bir alternatif yoldur ve bu işlem, verimli, çevre dostu ahşap işleme yöntemi olarak kabul edilir (Stamm 1964). Buna ek olarak, ahşap üretimi için bir enerji girişi gerekli olsa bile ısıl işlem çevre korumaya katkı sağlamaktadır (Hill 2006). OHT işlemi kızgın yağda yapıldığı için diğerlerinden çok farklıdır. İşlemdeki sıcaklık 180 ila 260 °C arasında değişir ve süre birkaç saattir. İşlem, Sailer ve Rapp (2001) tarafından patentlenmiştir. Bu işlem kullanıldığında, sıcak yağ, ahşap ve oksijen arasındaki teması engeller. Bu nedenle kızgın yağda ısıl işlemin mekanik özellikler üzerinde sıcak havaya göre daha az etkisi vardır (Sailer ve Rapp 2001).

Awoyemi ve ark., (2009) tarafından, termal modifikasyon sonunda yağda soğutulan ahşabın bazı özelliklerini değerlendirmiş ve ahşabın şişmesinin azalması ve su geçirmezliğinin artması gibi bazı önemli sonuçlar elde edildiği bildirilmiştir. Benzer şekilde Bal (2015) tarafından yapılan çalışmada ısıl işlem sonrası yağda soğutma işleminin yağ alımını artırdığı rapor edilmiştir. Bal (2016) tarafından yapılan çalışmada ise bitkisel yağ ile yapılan ısıl işlem muamelesi sonrası göknar odunun fiziksel özelliklerinde iyileşmeler meydana geldiği belirtilmiştir.

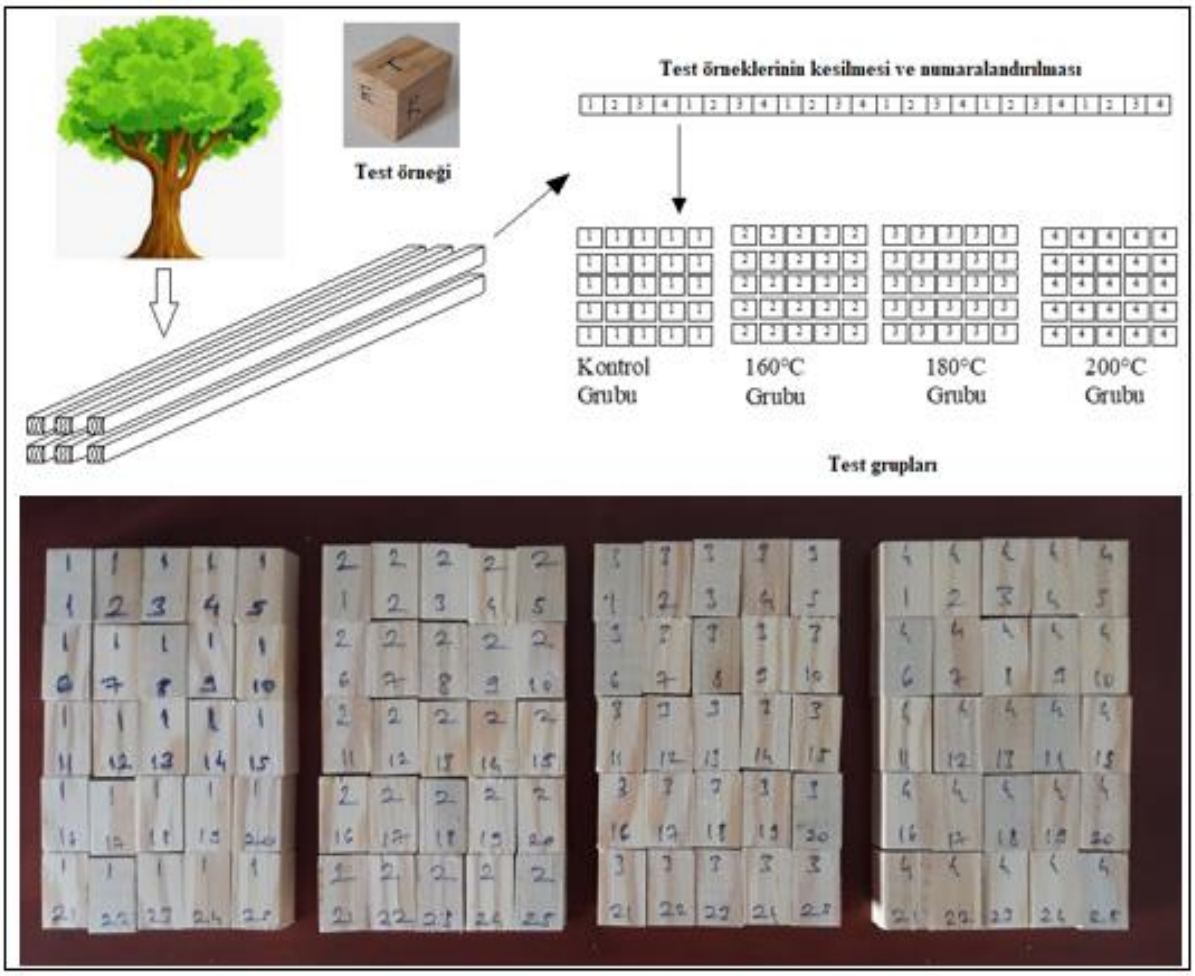
Karaçam (Pinus nigra) odununda; sıcak su çözünürlüğü %4.18, soğuk su çözünürlüğü %2.11, holoselüloz %71.53, alfa selüloz %50.41, lignin %26.74, %1'lik NaOH çözünürlüğü %12.76 (Sarıusta 2007), hava kurusu yoğunluğu 508.00 kg/m^3, dinamik eğilme (şok) direnci 0.416 kgm/cm^2, eğilme direnci 118.70 N/mm^2, liflere paralel basınç direnci 57.00 N/mm^2, elastikiyet modülü 9789.00 N/mm^2 (Bal ve Ayata 2020), shore D sertlik 66.00 (Sahin ve Mantanis, 2011), ses iletim kaybı 26.16 dB (Çavuş ve Kara 2020) ve ısı iletkenlik değeri 0.143 W/m.K (Çavuş ve ark., 2019) olarak belirlenmiştir.

Bu çalışmada, karaçam odununun, bitkisel bir yağ ile ısıl muamelesi sonucunda, fiziksel özelliklerinde meydana gelen değişikliklerin belirlenmesi amaçlanmıştır.

2. Materyal ve Metot

2.1. Materyal

Bu çalışmada materyal olarak karaçam (Pinus nigra) odunu kullanılmıştır. Test örneklerinin hazırlanmasına yönelik görüntü Şekil 1'de verilmiştir. Test örneklerinin hazırlanmasında 6 adet farklı çıta kullanılmıştır. Bu çıtalardan test örnekleri her bir çıtadan art arda kesilen test örnekleri farklı bir gruba dâhil edilmiş ve böylece homojen deney grupları oluşturulmaya çalışılmıştır. Her bir grup için 24 adet test örneği hazırlanmıştır.



Şekil 1. Kontrol grubu örnekleri ile ısıl işlem öncesi hazırlanmış olan test örneklerinin görüntüsü

Diğer ısıl işlem yöntemleri ile yapılan bilimsel çalışmalarda, sıcaklık arttıkça su alma yüzdesinde azalma olduğu belirlenmiştir (Bal 2013a; Bal 2013b). Bunun nedeni; ısıl işlemin bir etkisi olarak odunun higroskopisitesinin azalmasıdır. Bu durum su alma yüzdesini azaltmaktadır. Ancak, yağ ile yapılan ısıl işlem sonrasında test örneklerinin su alma yüzdesini yağ alım miktarı daha fazla etkilemektedir.

2.2. Metot

2.2.1. Yağ Ortamında Isıl İşlemin Uygulanması

Her grup için 24 adet test örneği hazırlanmıştır. Hazırlanan test örnekleri, 103±3°C sıcaklıkta kurutulmuştur. Bu durumdaki ölçüleri ve ağırlığı alınmıştır. Sonra, deney örneklerine 160°C, 180°C ve 200°C sıcaklıklarda 2 saat süre ile ayçiçeği yağı içerisinde ısıl işlem uygulanmıştır. Deney örnekleri 1 no'lu grup: kontrol, 2 no'lu grup: 160^{o}C'de 2 saat, 3 no'lu grup: 180^{o}C'de 2 saat ve 4 no'lu grup: 200^{o}C'de 2 saat olacak şekilde hazırlanmıştır.

2.2.2. Fiziksel Testlerin Belirlenmesi

Isıl işlem sonrası, test örnekleri yağ emilimini azaltmak için, yağın soğuması beklenmeden, dışarı alınmıştır. Test örneklerinin yüzeyleri bir bez parçası ile silinmiş ve ağırlıkları tekrar alınmıştır. Böylece, yağ alım miktarı belirlenmiştir. Test örnekleri sonra su içerisine bastırılmıştır. Suya batık halde bir hafta süre ile bekletilmiştir. Bu sürenin sonunda

sudan çıkarılmış ve ölçüleri ve ağırlığı tekrar alınmıştır. Bu verilerle, genişleme yüzdeleri TS 4084 ve TS 4086'ya göre belirlenmiştir. Ayrıca, ağırlık artışı ve lif doygunluk noktası gibi değerler ölçülmüştür. Rutubet testleri TS 2471 ve yoğunluk testleri TS 2472 Türk standartlarına göre yapılmıştır. Ağırlık artışı (AA) ise aşağıdaki Formül 1'e göre hesaplanmıştır.

$$AA\ (\%) = [(M_1-M_2)/M_1] \times 100 \qquad (1)$$

Burada;
AA: ağırlık artışı (%),
M_1: ısıl işlem öncesi test örneği ağırlığı (g),
M_2: ısıl işlem sonrası test örneği ağırlığı (g).

2.3. İstatistiksel Analiz

Testlere ait elde edilen bulgular istatistiksel olarak bir SPSS programında varyans analizleri ve One-Way ANOVA ile değerlendirilmiş, testlere ait varyasyon katsayıları, minimum ve maksimum değerleri, ortalamaları, standart sapmaları ve homojenlik grupları ile ısıl işlem sonrası meydana gelen % değişim oranları tabloda verilmiştir.

3. Bulgular ve Tartışma

160°C, 180°C ve 200°C sıcaklıklarda 2 saat süre ısıl işlem görmüş ve görmemiş (kontrol) karaçam odununa ait yoğunluk, teğet genişleme, radyal genişleme, boyuna genişleme, hacmen genişleme, genişleme anizotropisi, lif doygunluk noktası ve su alma yüzdesi testleri için varyans analizi sonuçları Çizelge 1'de gösterilmektedir.

Çizelge 1'e göre, yoğunluk, radyal genişleme, boyuna genişleme, genişleme anizotropisi testleri için ısıl işlem uygulaması anlamsız olarak belirlenirken, teğet genişleme, hacmen genişleme, lif doygunluk noktası, su alma yüzdesi ve ağırlık artışı (yağ alımı) testleri için ısıl işlem uygulaması anlamlı olarak elde edildiği görülmektedir.

Çizelge 1. Bütün fiziksel testlere ait belirlenmiş olan varyans analizi sonuçları

Test	Varyans Kaynağı	Serbestlik Derecesi	Kareler Toplamı	Ortalama Kare	F Değeri	α ≤0.05
Yoğunluk	Isıl işlem Uygulaması	3	0.003	0.001	0.687	0.562**
	Hata	92	0.144	0.002		
	Toplam	96	31.583			
	Düzeltilmiş Toplam	95	0.147			
Teğet Yönde Genişleme	Isıl işlem Uygulaması	3	39.697	13.232	5.543	0.002*
	Hata	92	219.613	2.387		
	Toplam	96	5764.			

			820			
	Düzeltilmiş Toplam	95	259.310			
Radyal Yönde Genişleme	**Isıl işlem Uygulaması**	3	5.802	1.934	1.217	0.308**
	Hata	92	146.216	1.589		
	Toplam	96	2035.300			
	Düzeltilmiş Toplam	95	152.018			
Boyuna Yönde Genişleme	**Isıl işlem Uygulaması**	3	0.212	0.071	2.494	0.065**
	Hata	92	2.608	0.028		
	Toplam	96	22.080			
	Düzeltilmiş Toplam	95	2.820			
Genişleme Anizotropisi (T/R)	**Isıl işlem Uygulaması**	3	0.390	0.130	0.697	0.556**
	Hata	92	17.179	0.187		
	Toplam	96	325.020			
	Düzeltilmiş Toplam	95	17.570			
Hacmen genişleme	**Isıl işlem Uygulaması**	3	81.191	27.064	4.665	0.004*
	Hata	92	533.788	5.802		
	Toplam	96	15485.260			
	Düzeltilmiş Toplam	95	614.978			
Lif Doygunluk Noktası (LDN)	**Isıl işlem Uygulaması**	3	275.948	91.983	9.993	0.000*
	Hata	92	846.792	9.204		
	Toplam	96	45973.000			
	Düzeltilmiş Toplam	95	1122.740			
Su Alma Yüzdesi	**Isıl işlem Uygulaması**	3	29380.708	9793.569	234.806	0.000*
	Hata	92	3837.250	41.709		
	Toplam	96	253060.000			

	Düzeltilmiş Toplam	95	33217.958			
Ağırlık Artışı (Yağ Alımı)	**Isıl işlem Uygulaması**	2	39813.395	19906.698	375.697	0.000*
	Hata	69	3656.038	52.986		
	Toplam	72	150106.750			
	Düzeltilmiş Toplam	71	43469.433			
***: Anlamlı, **: Anlamsız**						

Çalışma sonunda elde edilen, tam kuru yoğunluk, ağırlık artışı (yağ alımı), teğet yönde genişleme, radyal yönde genişleme, boyuna yönde genişleme, genişleme anizotropisi, hacmen genişleme, lif doygunluk noktası ve su alma yüzdelerine ait veriler Çizelge 2'de verilmiştir.

Çalışmada hazırlanmış olan 4 adet grubun yoğunluk bakımından homojen olduğu söylenebilir. Ağırlık artışı yüzdeleri incelendiğinde sıcak yağ ile işlem gören gruplardan 160°C'de işlem gören grup %66 ile en fazla yağ alımı yapan grup olmuştur. İşlem sıcaklığı yükseldikçe yağ alım yüzdesinin azaldığı görülmektedir. Ayrıca, burada çalışılan 3 farklı sıcaklıkta işlem yapılırken yağın akışkanlığı da değişmektedir. İlk işlem yapılan 160°C'de yapılmış olan grubunda taze bitkisel yağ kullanılmış ve yağın akışkanlığı fazla olması nedeniyle yağ alımı yüksek olmuştur. Aynı yağ ile diğer grupların işlemleri yapılırken yağın akışkanlığında azalma meydana gelmiş ve yağ alım yüzdesi azalmıştır. Genişleme yüzdeleri incelendiğinde, genel olarak teğet yönde, radyal yönde ve boyuna yönde genişleme yüzdelerinin azaldığı görülmektedir. Bu genişleme yüzdelerine paralel olarak genişleme anizotropisinde de sıcaklık arttıkça azalma meydana gelmiştir. Lif doygunluk noktası yüzdeleri incelendiğinde yine sıcaklık arttıkça azalmanın meydana geldiği görülmektedir. Sıcak yağ ile işlem gören tüm grupların su alma yüzdeleri kontrol grubundan daha düşüktür. Ancak, işlem sıcaklığı arttıkça su alma yüzdesi de artmıştır. Bunun en önemli nedeni yağ alımının sıcaklık arttıkça azalmasıdır. Daha önce yapılan çalışmalarda da yağ ile yapılan ısıl işlem sonrası yüksek sıcaklıklarda işlem gören grupların daha az yağ aldığı belirlenmiştir (Sailer ve ark., 2000; Kumar ve ark., 2012; Bal 2016).

Çizelge 2. Fiziksel özelliklerine ait SPSS sonuçları

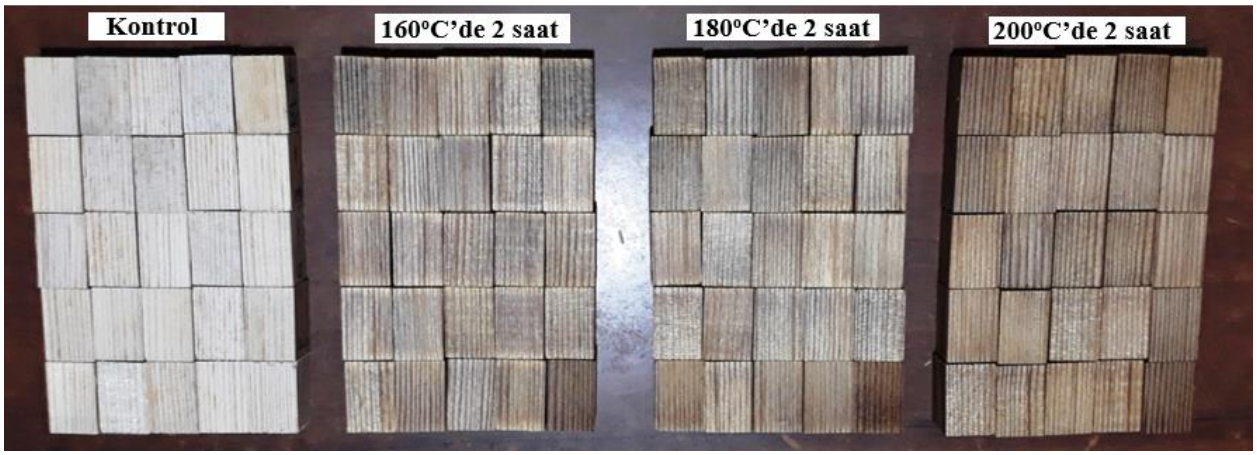
Test	**Isıl İşlem Uygulaması**		**X**	**G**	**Değişim %**	**Standart Sapma**	**Minimum**	**Maksimum**	**COV**
Yoğunluk (g/cm³)	**Kontrol**	**4**	0.575		-	0.04	0.514	0.644	6.96
	160°C'de 2 saat	**4**	0.562	**	↓2.26	0.04	0.514	0.635	7.12
	180°C'de 2 saat	**4**	0.575		0	0.04	0.514	0.628	6.96
	200°C'de 2 saat	**4**	0.577	*	↑0.35	0.04	0.519	0.641	6.93
Teğet Yönde Genişleme	**Kontrol**	**4**	8.59	*	-	1.46	6.10	10.90	17.00
	160°C'de 2 saat	**4**	7.49		↓12.81	1.57	4.90	10.60	20.96
	180°C'de		7		↓1	1.	4	1	2

(%)	e 2 saat	4	.41		3.74	66	.00	0.60	2.40
	200°C'd e 2 saat	4	6.80	**	↓20.84	1.48	4.10	8.90	21.76
Radyal Yönde Genişleme (%)	Kontrol	4	4.71	*	-	1.30	2.80	7.20	27.60
	160°C'd e 2 saat	4	4.52		↓4.03	1.34	2.20	7.10	29.65
	180°C'd e 2 saat	4	4.45		↓5.52	1.32	2.60	6.80	29.66
	200°C'd e 2 saat	4	4.04	**	↓14.23	1.06	2.20	5.90	26.24
Boyuna Yönde Genişleme (%)	Kontrol	4	0.50	*	-	0.21	0.10	0.90	4.00
	160°C'd e 2 saat	4	0.43	B	↓14.00	0.14	0.20	0.60	32.56
	180°C'd e 2 saat	4	0.48	B	↓4.00	0.18	0.10	0.80	37.50
	200°C'd e 2 saat	4	0.38	**	↓24.00	0.14	0.20	0.70	36.84
Genişleme Anizotropisi (T/R)	Kontrol	4	1.88	*	-	0.26	1.30	2.40	13.83
	160°C'd e 2 saat	4	1.82		↓3.19	0.69	0.70	4.40	37.91
	180°C'd e 2 saat	4	1.75		↓6.91	0.37	0.70	2.10	21.14
	200°C'd e 2 saat	4	1.71	**	↓9.04	0.26	1.00	2.00	15.20
Hacmen Genişleme (%)	Kontrol	4	13.81	*	-	2.54	10.00	18.30	18.39
	160°C'd e 2 saat	4	12.44	B	↓9.92	2.15	9.40	17.60	17.28
	180°C'd e 2 saat	4	12.32		↓10.79	2.58	8.30	17.00	20.94
	200°C'd e 2 saat	4	11.22	**	↓18.75	2.35	7.00	15.00	20.94
Lif Doygunluk Noktası (LDN)(%)	Kontrol	4	23.92	*	-	2.89	19.00	29.00	12.08
	160°C'd e 2 saat	4	22.00		↓8.03	2.67	18.00	28.00	12.14
	180°C'd e 2 saat	4	21.38		↓10.62	3.50	16.00	27.00	16.37
	200°C'd e 2 saat	4	19.17	**	↓19.86	3.02	13.00	24.00	15.75
Su Alma Yüzdesi (%)	Kontrol	4	71.13	*	-	6.20	64.00	87.00	8.72
	160°C'd e 2 saat	4	26.08	**	↓63.33	3.35	17.00	32.00	12.85
	180°C'd e 2 saat	4	36.92		↓48.10	6.49	27.00	53.00	17.58
	200°C'd e 2 saat	4	57.29		↓19.46	8.67	40.00	68.00	15.13
Ağırlık Artışı (Yağ	Kontrol		-		-	-	-	-	-
	160°C'd e 2 saat	4	66.83	*	-	9.07	51.00	84.20	13.57

Alımı) (%)	**180°C'de 2 saat**	**4**	3 9.38		-	8. 33	2 0.10	5 5.10	2 1.15
	200°C'de 2 saat	**4**	9 .25	**	-	2. 72	6 .10	1 5.70	2 9.41
N: Örnek Sayısı, X: Ortalama, HG: Homojenlik Grubu, COV: varyasyon Katsayısı, *: En yüksek değeri ifade etmektedir, **: En düşük değeri ifade etmektedir									

Diğer ısıl işlem yöntemleri ile yapılan bilimsel çalışmalarda, sıcaklık arttıkça su alma yüzdesinde azalma olduğu belirlenmiştir (Bal 2013a; Bal 2013b). Bunun nedeni; ısıl işlemin bir etkisi olarak odunun higroskopisitesinin azalmasıdır. Bu durum su alma yüzdesini azaltmaktadır. Ancak, yağ ile yapılan ısıl işlem sonrasında test örneklerinin su alma yüzdesini yağ alım miktarı daha fazla etkilemektedir.

Çalışma kapsamında yapılan ısıl işlem sonrası test örneklerinin radyal yüzey görüntüsü aşağıda Şekil 2'de verilmiştir. Şekil incelendiğinde kontrol grubuna göre ısıl işlem görmüş olan gruplarının renginin değiştiği ve koyulaştığı açık bir şekilde görülmektedir. Ancak 160°C grubundaki bu renk değişiminin nedeni aldığı fazla yağ ve diğer gruplardaki renk değişimin nedeni ise odunun yüksek sıcaklık dolayısıyla renginin değişmesidir.



Şekil 2. Isıl işlem sonrası test örneklerinin radyal yüzeylerinin görüntüsü

4. Sonuç ve Öneriler

Bu çalışmada, bitkisel yağ ile farklı sıcaklıklarda ısıl işlem uygulanmış olan karaçam odununun fiziksel özellikleri tespit edilmeye çalışılmıştır. Elde edilen verilere göre aşağıdaki sonuçlar söylenebilir.

- Bitkisel yağ kullanılarak yapılan ısıl işlemde odun örneklerinin yağ alımı (ağırlık artışı) kullanılan yağın akışkanlığına göre değişmektedir.
- Genel olarak sıcaklık arttıkça yağ alımı azalmaktadır.
- Test örneklerinin su alma yüzdeleri ısıl işlem esnasında aldıkları yağ miktarına göre değişmektedir.
- Isıl işlem uygulanmış olan test örneklerinin genişleme yüzdeleri, lif doygunluk noktası ve genişleme anizotropisi azalmıştır.

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BOOK-TAX CONFORMITY AND ITS INFLUENCE ON FIRMS' CAPITAL STRUCTURE

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Abstract

This study analyses the impact of book-tax conformity (BTC) on firms' capital structure in G-20 countries. Based on the Pecking Order Theory (POT) and based on the premise that BTC influences the informational environment, we examined the direct effect of BTC on leverage through hierarchical modelling. Through structural equation, the indirect effects are mediated by the cost of capital. The BTC is not significant in explaining accounting leverage but has a negative association with market leverage. Furthermore, evidence that this effect occurs only due to mediation by the cost of capital. The evidence suggests that the results are driven by market expectations, indicating that the market leverage is lower due to the lower return required by investors in countries that need more excellent proximity between accounting and tax rules.

Keywords: Book-tax conformity; Capital structure; Leverage; Cost of capital.

1. INTRODUCTION

This study aimed to examine the effects of book-tax conformity (BTC) on firms' leverage in G-20 countries.

The link between financial and tax rules to determine accounting and taxable income, called book-tax conformity, generates costs and benefits for accounting information quality. Based on informativeness, BTC proponents argue that the more excellent proximity between accounting and taxable profit would increase the relevance and quality of information and consequently restrict discretion and earnings management (EM) (Desai, 2005; Whitaker, 2005). In turn, opponents of the BTC argue that this proximity would deteriorate earnings informativeness, generating costs for earnings quality, as there would be a loss of data for the capital market (Hanlon et al., 2005; Hanlon et al., 2008).

Accounting earnings and taxable earnings provide incremental information to the capital market that predicts future earnings (Hanlon & Shevlin, 2005; Tang, 2006). Besides, the discretion allowed by the lowest BTC level can increase the informativeness of earnings as managers can use it to signal private information about the company's performance (Dechow, 1994). Thus, conforming to both profit measures would reduce the ability to forecast future earnings and make discretionary use opportunistically to minimize profit and pay fewer taxes (Blaylock et al., 2017). In this way, investors would lose relevant information about the company's current and future performance.

Given the above, BTC could improve or deteriorate the quality of the information disclosed to the capital market, depending on the trade-off between the costs of information

loss and the benefits of reduced EM. This impact of BTC on the quality of accounting information and, therefore, on information asymmetry, can affect the capital structure of companies, either directly or indirectly, through the influence on the cost of capital (Bhattacharya et al., 2012a; Blaylock et al., 2017).

Lower quality of earnings can result in differentially informed investors, exacerbating informational asymmetry (Bhattacharya et al., 2012b). The Pecking Order Theory (POT) predicts that an environment of more significant informational asymmetry stimulates debt financing and, indirectly, leads to higher risk premiums, increasing cost of capital, and making companies seek more financing of debt (Hughes et al., 2007).

In this context, Blaylock et al. (2017) argue that the information loss about earnings would mainly affect shareholders, who depend on quality information to make their investment decisions. By losing relevant accounting information from the higher BTC, investors would seek higher risk premiums, increase the cost of capital, and encourage more significant leveraging levels. Consistent with this idea, the authors find evidence that companies that face a higher level of BTC tend to substitute equity financing for debt financing in the USA, increasing their level of leverage.

Similarly, Pinto and Costa (2019) observed that the smaller the difference between accounting profit and taxable profit (BTD), that is, the higher the BTC, Brazilian companies tend to increase leverage, showing a preference for financing by debt. Marques et al. (2017) found that Brazilian companies with larger BTDs have a larger share of equity in their capital structures. This evidence suggests that BTC would reduce accounting information quality since the lower indebtedness is related to lower risks and information asymmetry.

In short, greater conformity between tax and financial rules affects information quality and asymmetry, mainly through its impact on earnings informativeness. Following Blaylock et al. (2017), we assumed that this impact is pessimistic that the BTC deteriorates the information's quality. In this case, there would be an increase in information asymmetry, affecting the cost of capital and the choice of capital structure. Thus, our first hypothesis is that companies located in countries with greater book-tax conformity have a higher financial leverage level, while the second hypothesis predicts that firms' **cost of equity mediates the relationship between** book-tax conformity **and financial leverage.**

This study brings some contributions to the literature. First, it differs from previous research in that it assesses several countries simultaneously and considers the mediating effect of cost of capital. The studies on the topic are carried out in specific countries and do not consider a more comprehensive BTC measure related to the standards. Second, it contributes to the capital structure literature by indicating BTC as an institutional factor explaining variations at the country level in the capital structure. In contrast, previous studies have analysed the differences between accounting and tax profit at the firm level. Finally, it contributes to the BTC literature, providing evidence for the discussion related to the quality of information and its impact on business choices. At this point, Hanlon and Heitzman (2010) highlight the lack of studies on how tax rules affect business choices, such as investment and financing decisions, and highlight the debate on whether tax rules provide incentives for debt financing.

2. METHODOLOGICAL PROCEDURES

2.1. Sample Selection

As the BTC is an institutional variable – each country individually establishes the fiscal and financial laws that companies must follow by companies in determining accounting and taxable profit –, the research makes an international analysis with companies located in the

countries that make up the G-20: Africa Korea, Germany, Saudi Arabia, Argentina, Australia, Brazil, Canada, China, United States, France, India, Indonesia, Italy, Japan, Mexico, United Kingdom, Republic of Korea, Russia, Turkey and the European Union (EU). The EU is composed of 28 Member States, with some components of the G-20 individually. As the study addresses the level of BTC in each nation, treating EU countries singularly, resulting in a population of 43 nations.

We collected consolidated accounting information in a local currency from non-financial companies listed on the principal Stock Exchange of each country during the period from 2006 to 2016. The inclusion of a country had a minimum requirement of 35 firm-year observations after the following exclusions: firms with net profit before taxes equal to or less than zero and tax on negative profit; and with negative equity, as this would affect leverage.

The sample totals 22 countries: South Africa, Germany, Argentina, Australia, Belgium, Brazil, Canada, China, South Korea, Spain, USA, Finland, France, Greece, Netherlands, India, Indonesia, Italy, Japan, UK, Russia, and Turkey. We observed 13,266 non-financial companies totalling 145,926 company-year observations over the 11 years evaluated (2006 to 2016).

2.2. Description of Variables

We collected the data relating to the companies' accounting information from Thomson Reuters DataStream. From the World Bank and Global Competitiveness Index (GCI) database provided by the World Economic Forum (WEF) we obtained the institutional and macroeconomic variables. Among the variables, two are of particular interest: Book-Tax Conformity (BTC), which tests hypothesis H1, and the Cost of Equity (COE), which tests hypothesis H2.

2.2.1. Dependent and mediator variables

Our dependent variable is leverage, considering both accounting (LEVC) – the ratio of total liabilities (TL) to total assets (TA) – and market leverage (LEVM) – TA minus equity book value plus market equity value. Our mediator variable is Cost of Equity (COE), estimated by the implicit cost of capital according to the Easton (2004) model.

We adopted the method suggested by Easton (2004) to measure the cost of equity, based on the model by Ohlson and Juetnner-Nauroth (2000), which defines the cost of equity according to Eq. (1):

$$COE = \sqrt{\frac{eps_{t+1}}{P_t}.growth_{t+2}}, \quad (1)$$

where COE is the cost of equity; eps_{t+1} refers to the earnings per share forecast for t+1; P_t it is the closing price of the share in year t; and $growth_{t+2}$ is the growth rate between the periods t+1 e t+2.

2.2.2. Independent variables

Our main independent variable at the country-level is Book-Tax Conformity (BTC) which is the measure of BTC of country i over period t, on a scale of 0 to 1. Other country-level independent variables based on previous studies were GDP growth (GDP) and Stock market development (STK) (De Jong et al., 2008; Kayo e Kimura, 2011) – obtained from the World Bank – and Financial system development (FMD) (Bernardo et al., 2018; De Jong et al., 2008) – obtained GCI/WEF. All variables, except BTC, have negative expected signal.

We also include firm-level control variables: Profitability (PROFIT), Size (SIZE), Growth opportunities (GROW), Tangibility (TANG), Tax protection not arising from the debt (EFTAX) and Risk (RISK). The expected signal according to Pecking Order theory (+ or -) and the description of the firm-level variable capture are presented. PROFIT (-) is calculated as EBIT by total assets in t-1; SIZE (+ or -) is natural logarithm of net sales revenue; GROW (+ or -) is market-to-book index, represented by Reuters price-to-book value; TANG (+) is the ratio of net fixed assets to total assets; EFTAX (-) is the ratio of depreciation expenses by total assets; and RISK (-) is standard deviation from ROA. EFTAX variable has no theoretical forecast in the POT.

2.2.3. Book-Tax Conformity Measure

The estimated BTC level, according to Tang (2014), in which the developed measure for each country and each year obtained an index that varies between and within countries over time. Therefore, we apply Eq. (2) in each country-year, with cross-sectional data:

$$BTD_{i,t} = \theta_0 + \theta_1 DACC_{i,t} + \theta_2 TP_{i,t} + \theta_3 DACC*TP_{i,t} + \varepsilon_{i,t} \quad (2)$$

Therefore:

$BTD_{i,t}$ = total book-tax differences of firm i in period t, calculated as the earnings before income tax (EBIT) multiplied by the statutory tax rate established by the government of each country (STR) minus taxes on profit (TI). The total assets (TA) scaled the results. The Corporate Tax Rates Table developed by KPMG obtained the STR;

$DACC_{i,t}$ = discretionary accruals of the company i in year t, measured by the residuals of the Kothari, Leone and, Wasley (2005) model with panel data and fixed effects;

$TP_{i,t}$ = tax avoidance measure for the company i in year t, calculated as the STR minus the current effective tax rate (ETR), which is the relationship between TI and EBIT;

BDT developed the BTC measure, as greater conformity means fewer differences between accounting and taxable income. However, BTD can originate both from regulatory issues arising from divergences between sets of accounting and tax rules (normal BTD), as well as from opportunistic issues resulting from earnings management and tax avoidance (abnormal BTD) (Tang & Firth, 2011). Eq. (2) uses the abnormal BTD portion to explain the differences between accounting and taxable profit. The regression cannot explain – the root of the mean square error (RMSE) – refers to the normal BTD. Given that normal BTD represents the gap between accounting and tax rules, the study uses this proxy to construct the BTC measure.

A higher (lower) RMSE indicates higher (lower) normal BTD and, therefore, lower (higher) BTC. Thus, every year the RMSEs obtained in each country were classified in descending order and received values from 0 to n-1, such that the highest RMSE in the year is equal to 0 and the lowest is n-1, where n is the number of countries included in that year. Subsequently, we divided the ranks by n-1 to build a continuous conformity index ranging from 0 (the country with the lowest BTC in the year) to 1 (the country with the highest BTC in the year). Thus, BTD regulatory sources bases on the BTC measure that is a relative measure between country-years.

2.3. Models to Test H_1: Hypothesis: Linear Hierarchical Models (MLH) of Three Levels with Repeated Measures

We can group the determinants of capital structure into three levels: level 1 (time), level 2 (company) and level 3 (country), with the characteristics of lower levels being influenced by those of higher levels (Kayo & Kimura, 2011). Because of the multilevel nature of our data,

we proceed to an appropriate hierarchical linear modelling (HLM) – or multilevel analysis – with maximum likelihood estimation to test our hypotheses.

We used the three-level hierarchical model with repeated measures – as in Kayo and Kimura (2011) and Bernardo et al. (2018) – which involves a series of nested regressions that are defined interactively through maximum likelihood estimation (Fávero & Confortinni, 2010). For the application of MLH, we have developed two models: the empty model and the model with random intercepts.

Our study begins with the empty model, in which we do not include any independent variables. The model focuses on random effects and estimates each level's relative importance in leverage variation. Equations (3a), (3b) and (3c) specify our empty model.

Eq. (3a) presents the specification of the first level of analysis (time), in which leverage (LEV_{tjp}) of year t, of company j, within-country p, is a function of the average leverage β_{0jp} of company j within-country p, plus a random error (e_{tjp}), which represents the variance over time, normally distributed with mean zero and variance σ^2.

$$LEV_{tjp} = \beta_{0jp} + e_{tjp} \quad \text{(3a)}$$

Eq. (3b) specifies the second level of analysis (company), in which the average β_{0jp} of leverage over company j within-country, p is a function of the average leverage (y_{00p}) of companies j in country p, plus a random error (r_{0ip}) representing the variation between companies.

$$\beta_{0jp} = y_{00p} + r_{0jp} \quad \text{(3b)}$$

The third level of analysis (country) is presented in Eq. (3c), with the average y_{00p} of leverage of companies j in country p a function of the random variable of the large average of the sample (δ_{000}) plus a random error (u_{00p}) of the third level, referring to countries.

$$y_{00p} = \delta_{000} + u_{00p} \quad \text{(3c)}$$

The consolidation of Eqs. (3a), (3b), and (3c) results in the first model of analysis, presented in Eq. (3d), in which the explained variable is a function of large average plus the random errors referring to the country, the company, and the time.

$$LEV_{tjp} = \delta_{000} + u_{00p} + r_{0jp} + e_{tjp} \quad \text{(3d)}$$

We used the Eq. (3d) model as a starting point for verifying the relative importance of the country, the company, and the time in the capital structure. Comparing the empty model with the model among predictors allows the verification of the evolution in terms of improvement or worsening of the results.

After the decomposition of the leverage variance by the empty model, the second model was developed, with the inclusion of the variable ($YEAR_{tjp}$) – which represents each year of the analysis period – in the first level, and explanatory variables of the leverage companies, at the second level, as determinants of random interceptions.

The determinants at the company level included in the second level of the model were: profitability ($PROFIT_{tjp}$), size ($SIZE_{tjp}$), growth opportunities ($GROW_{tjp}$), tangibility

($TANG_{tjp}$), benefits tax shield ($EFTAX_{tjp}$) and risk ($RISK_{tjp}$). Thus, the second model of analysis is given by Eq. (4):

$$LEV_{tjp} = \delta_{000} + y_{01p}(PROFIT)_{jp} + y_{02p}(SIZE)_{jp} + y_{03p}(GROW)_{jp} + y_{04p}(TANG)_{jp} + y_{05p}(EFTAX)_{jp} + y_{06p}(RISK)_{jp} + \beta_{1jp}(YEAR)_{tjp} + r_{0jp} + u_{00p} + e_{tjp} \quad (4)$$

Then we added to the analysis of explanatory variables related to the country at the third level, which leads to the third analysis model. Country-level determinants include a macroeconomic determinant – GDP growth $(GDP)_p$ – and three institutional determinants – financial system development $(FMD)_p$, stock market development $(STK)_p$, and, finally, the principal variable of interest, book-tax conformity $(BTC)_p$. The development of Eq. (5) occurs by including the predictor variables at the country level as explanations of the intercept of the second level (y_{00p}). Thus, adding to the previous model by replacing the y_{00p}, represented by Eq. (3c), we have Eq. (5), which we use to test the hypothesis H_1:

$$LEV_{tjp} = \delta_{000} + \delta_{001}(GDP)_p + \delta_{002}(FMD)_p + \delta_{003}(STK)_{\mathrm{p}} + \delta_{004}(BTC)_p + y_{01p}(PROFIT)_{jp} + y_{02p}(SIZE)_{jp} + y_{03p}(GROW)_{jp} + y_{04p}(TANG)_{jp} + y_{05p}(EFTAX)_{jp} + y_{06p}(RISK)_{jp} + \beta_{1jp}(YEAR)_{tjp} + r_{0jp} + u_{00p} + e_{tjp} \quad (5)$$

2.4. Hypothesis Testing Method H_2

The effect of BTC on leverage can occur indirectly through its impact on cost of capital, making it a mediating variable. We use path analysis to test this mediation, a case of Structural Equation Modelling (SEM). Thus, we propose the mediation analysis in which leverage can be affected directly by the level of book-tax conformity and indirectly by impacting cost of capital – the coefficients of association between the variables representing the paths. Thus, the total effect of BTC on leverage, tested by Eq. (5), is the sum of its direct and indirect effects. We used SEM with observed variables to test these effects, estimated using the maximum likelihood method.

3. RESULTS

3.1. Descriptive Statistics

Preliminarily, all firm-level variables were winsorized by 1% and 99% to mitigate possible outliers. Based on the winsorized data, we made a brief presentation of the main descriptive statistics of the firm-level variables. The accounting leverage's general average was around 49.62%, and the market leverage 41.39%. The results on market leverage are similar to Bernardo et al. (2018), who estimate 50.04% for accounting leverage and 42.63% for market leverage. When assessing the cost of capital, with only 3,960 observations for all countries, the average cost of capital for the 22 countries analysed was 13.53%, which is close to that observed by Cao et al. (2017) (13.2%), and similar to Hail and Leuz (2006) (12.09%) and Gao and Zhu (2012) (12%).

With respect to country-level variables, we found an average GDP growth equal to 3.32% per year, ranging from -9.13% to 14.23%. For the financial system development variable (FMD), countries had an average score of 4.75 out of 7.0, indicating relatively developed financial systems. Market capitalization concerning GDP (STK), which measures the stock market's development in a more specific way, was around 85.44. This measure was larger dispersed, with a maximum value of 321.00 for South Africa and a minimum of 6.27 for Argentina. Finally, the variable of interest BTC presented an average of 0.49, with a minimum of 0 and a maximum of 1 due to its construction form. In specific years for

Australia and the United States of America obtained the BTC variable's minimum. In contrast, Argentina, China, Finland, Greece, Korea, Holland, Spain obtained the maximum value – also in specific years.

3.2. Results of MLH Modelling and H_1 Hypothesis

3.2.1. Analysis of the variance decomposition in the Null Model

Table 1 presents the hierarchical linear regression results for the null model, which considers all 22 countries in the sample.

Table 1
Variance decomposition analysis of leverage in the Null Model

Intraclass Correlation Coefficient (ICC) and verifiability test				
Level 3 (country)	0.113		0.131	
Level 2 (firm)	0.766		0.779	
Level 1 (time)	0.120		0.090	
Verifiability test	chi2	Prob	chi2	Prob
Likelihood Test x Linear Regression Linear - chi2	120000	0,000	120000	0,000

For application purposes, we used the model with maximum likelihood. Sig. level: ***1%, **5% e *10%.

The null model indicates that the company's characteristics were responsible for a significant part of the capital structure decisions. Its estimated ICC represents 76.6% of the variance in accounting leverage. As for market leverage, this share increases to 77.9%. The percentage found is compatible with Bernardo et al. (2018), which indicate influences of 78.4% and 75.4% on accounting and market leverage, respectively. The high importance of firms' characteristics in leverage may reflect management's tendency to focus on internal factors to define corporate policies (Kayo & Kimura, 2011).

Following previous studies, the results suggest that the variations over time, after the characteristics of the companies, are the most significant sources of variations in accounting leverage, with an ICC of 12.0%. This percentage reflects, for example, the influence of temporal macroeconomic shocks and contradicts studies that show that the capital structure is stable over time. In terms of market leverage, the importance of time in changing leverage has decreased to 9.01%.

The influence of the country level, in turn, was 11.3% and 13.1% on accounting and market leverage, in this order, higher than previous studies, which, in general, have indicated representativeness of the differences among countries of up to 4.6% (Kayo & Kimura, 2011; Bernardo et al., 2018) on the variance of leverage. This finding is relevant, especially in the context of this research, in which the variable of interest, BTC, is of an institutional level.

3.2.2. Random intercept model

In the random intercept model, the results in Table 2, countries with data for the covariables included in the model in at least one of the study period's years remained in the analysis.

Table 2

Results of HLM with the inclusion of firm and country variables, Random Intercept Model

Panel A: No. of observations by group	Accounting leverage		Market leverage	
Country	21		21	
Firm	8893		8864	
Total of comments	86007		80429	
Panel B: Results of Fixed Effects	Coefficient	P(z)	Coefficient	P(z)
Intercept	0.123		0.080	
YEAR	-0.001	***	0.003	***
PROFIT	-0.180	***	-0.377	***
SIZE	0.034	***	0.048	***
GROW	0.004	***	-0.008	***
TANG	0.033	***	0.090	***
EFTAX	0.350	***	-0.390	***
RISK	-0.151	***	-0.387	***
FMD	-0.037		-0.067	
GDP	-0.022	**	-0.038	***
STK	0.000		-0.001	
BTC	-0.152		-0.300	**
Panel C: Random Effects Parameters and Verifiability Tests Estimators (Variance)				
Country	0.011		0.014	
Firm	0.026		0.036	
Time	0.013		0.019	
Verifiability tests	chi2	prob	chi2	prob
Wald test - chi2	2160,02	0,000	3631,59	0,000
Likelihood Test x Linear Regression - chi2	7427 3,4	0,000	69347,7	0,000

We excluded Finland from the model due to the lack of data for the institutional variable STK for the entire period, which reduced the sample to 21 countries. For application purposes, we used the model with maximum likelihood. Significance level: *** 1%, ** 5% and * 10%.

In Panel B, it appears that all the determinants of the capital structure were significant and showed signs consistent with the Pecking Order Theory, both for accounting and market leverage, except tax protection not arising from the debt.

Concerning country covariates, it can be seen in Panel B that only GDP growth was statistically significant to explain both leverages. Additionally, the BTC variable was significant to explain the level of leverage at market value. It is also noteworthy that characteristics indicated in the literature as institutional determinants that affect the leverage

of firms were not statistically significant in this study, such as the development of the financial system (FMD) and the development of the stock market (STK).

Regarding the signs obtained for the GDP, as in Kayo and Kimura (2011) and Bernardo et al. (2018), a negative relationship between GDP growth and leverage was revealed, as expected. It is possible to infer that in phases of economic growth in the country companies, they would generate more resources internally to self-finance. Given the asymmetry of information in the market, they would prefer equity as a source of financing, which is consistent with the Pecking Order Theory.

Combined with the representativeness found for the country level in the null model (Table 1), the results seem to suggest that there are other latent characteristics of the countries captured by the country factor in the multilevel regression model that we did not incorporate as covariables in the model used, as cultural factors and different economic measures adopted in post-crisis periods.

Concerning hypothesis H1 of the study, we expected that in countries with a higher BTC, there would be an increase in informational asymmetry due to the loss of information quality (Hanlon et al., 2005; Hanlon et al., 2008), which it would lead to an increase in the return required by investors and a consequent increase in borrowing as a cheaper financing option. Contrary to expectations, Table 2 shows that the BTC level was not statistically significant to explain companies' financing decisions in terms of accounting leverage. However, it was significant at the 5% level to explain the variance in market leverage. The BTC's negative and significant (-0,300) coefficient suggests that firms tend to have less market leverage in countries with a higher level of book-tax conformity. This result implies the rejection of the first hypothesis. It contrasts with the results of research that consider individual countries, such as Blaylock et al. (2017) in the American environment and Nakao and Costa (2017), and Pinto and Costa (2019) in Brazil. On the other hand, the result corroborates the proponents of BTC, who defend higher quality due to the reduction of the aggressiveness of reported profits and, therefore, of information asymmetry.

As the tests conducted using the accounting leverage and the market leverage showed different results, it is possible to infer that changes in stock prices, which direct the denominator of market leverage, also drive the statistical significance of BTC. On the other hand, this finding may indicate an increase in the quality of information and a consequent reduction in asymmetry. In light of the Pecking Order theory, leverage would be greater in environments with more significant information asymmetry. Investors could be better with conformity if there was a sufficiently large reduction in earnings management (Blaylock et al., 2015) when accounting and taxable income are conformed, even with the possibility of information loss. In this sense, the benefit of conformity would be greater than its costs in terms of information, which would increase the quality of accounting information and explain BTC's negative association with market leverage.

3.3. Hypothesis H_2 Results

To better understand the impact of book-tax conformity on firms' capital structure, Table 3 decomposes the total effect of BTC in terms of its direct and indirect effect on leverage, which is through mediation by cost of capital.

Table 3
Cost of capital as a mediating variable

	Accounting leverage			Market leverage		
	Coefficient	Z	Value-p	Coefficient	z	Value-p
Direct path						
p (BTC, LEV)	-0,017	-1,56	0,120	-0,005	-0,43	0,667
Percent	81,57%[1]			19,92%[2]		
Mediated path						
p (BTC, COE)	-0,063***	-6,74	0,000	-0,065***	-6,94	0,000
p (COE, LEV)	0,060***	3,25	0,000	0,321***	5,52	0,000
Total mediated path	-0,004***	-2,93	0,000	-0,021***	-6,33	0,000
Percent	18,43%[1]			80,08%[2]		
n	3844			3830		
R^2 (COE)	1,17%			1,24%		
R^2 (LEV)	0,37%			6,02%		

[1]Percentage of each path to the total accounting leverage path of -0.021
[2]Percentage of each path to the total path of market leverage of -0.026
Significance level: *** 1%, ** 5% and * 10%

First, we observed that the number of observations significantly reduces to the initial sample since the availability of data for calculating cost of capital is restricted. Besides, there was a low explanatory power for the endogenous variables of the structural equation model. In the model that uses accounting leverage, the book-tax conformity (BTC) explained only 1.17% of the variation in the cost of capital (COE), and the COE and BTC explained only 0.37% of the variation in the leverage (LEV). The same is correct for market leverage. However, the explanatory power for leverage was significantly greater, explaining 6.02% of the variation under this alternative.

As a main result, Table 3 shows that the BTC did not present a significant direct path to explain the capital structure, whether accounting or market leverage. However, when assessing the indirect effect on this relationship, it is observed that the total mediated path had a negative and significant coefficient, indicating that the BTC only influences the organization's financial leverage by affecting its cost of capital. Following Zhao et al. (2010), these findings suggest that the effect of BTC on leverage is only indirect, consistent with the second hypothesis.

Such findings are robust for both leverage measurement alternatives. However, when examining each path's percentage of participation in the total effect, it is possible to notice significant differences between the alternatives. In accounting leverage, the direct effect corresponds to 81.57% of the total effect of BTC on the capital structure, with the indirect effect being only 18.43%. On the other hand, these percentages are inverted in the market leverage, with 19.92% being the direct effect and 80.08% the indirect effect, probably due to market expectations, which drive the cost of capital and market leverage.

Also, in both alternatives, a negative association was observed between BTC and COE, indicating that the greater proximity between accounting and tax rules is linked to lower cost of capital for companies, which is the opposite to that observed by Blaylock et al. (2017), who found a positive association in the American context. Since the cost of capital would reduce in environments with less asymmetry and higher information quality, this result suggests that the BTC would be related to the improvement in the quality of information, contrary to the premise of the study, and corroborating the defenders of book-tax conformity, who defend higher quality in these environments (Desai, 2005).

Finally, a positive and significant association was found between the cost of capital and leverage, consistent with Blaylock et al. (2017), showing that companies use more third-party financing when the return required by the market is more significant. However, this coefficient is higher for market leverage (0.32 compared to 0.06 for accounting leverage), as these factors would be more linked to market expectations for the firm. The greater magnitude of cost of capital in explaining market leverage can also help understand why BTC was significant in explaining market leverage, but not accounting leverage, as shown in Table 1.

3.4. Sensitivity and Robustness Analysis

For the purposes of sensitivity and robustness analysis, we applied: a) the reestimation of Eq. (5) with a dummy that controls the 2008 crisis year; b) the reestimation of Eq. (5) using sequential country elimination to assess whether inferences are widespread among the countries in the sample or whether certain nations are unduly influential; c) the reestimation of Eq. (5) by replacing the country-level BTC variable with the total company-level BTD. We verified that the results in Table 3 and 3 remaining unchanged. Finally, regarding the possibility of endogeneity, the HLM tends to reduce this problem since the grouping process inherent in this model helps control latent variables not directly observed, capturing its effect (Bernardo et al., 2018).

4. CONCLUSION

It became evident that BTC has no impact on the capital structure when using accounting leverage. However, when considering market leverage, the results suggest that companies located in countries with a higher BTC resort less to debt financing, depending more on equity. Path analysis provides additional evidence on this relationship, demonstrating that the impact of book-tax conformity on leverage occurs only because of its effect on cost of capital. Investors demand lower returns from companies in countries requiring more excellent proximity between accounting standards, leading to greater equity participation in the capital structure. Given that the cost of capital is more explanatory of market leverage, as both depend on market expectations, this result helps explain why conformity is limited to market leverage and is not significant in accounting.

Although contrary to expectations, if the negative association between BTC and market leverage from the Pecking Order Theory perspective were analysed, it may indicate that book-tax conformity is associated with a better information environment. This finding contributes to the discussion about the proximity between accounting and tax rules, suggesting that this institutional requirement may improve the quality of information disclosed by companies from investors' point of view.

The study has some limitations. First, the inferences depend on the BTC measure's ability to estimate mandatory conformity arising from the approximation of accounting and tax rules. Second, the book-tax conformity measure considers the proximity between accounting and taxable profit but makes no distinction as to whether accounting profit conforms to taxable income and vice versa. This distinction in the sense in which book-tax

conformity occurs can be necessary for the perceived information quality and, therefore, for cost of capital and leverage. Furthermore, the evidence on mediation is limited to a single cost of capital metric and a low number of observations concerning the study's initial sample.

Considering that the findings corroborate previous studies by pointing out the importance of institutional characteristics as predictors of firms' capital structure, further studies can investigate other latent institutional characteristics incorporated in the country effect found in MLH. We also suggest that future research look for alternatives to measure BTC and verify in what sense the conformity occurs and consider other countries. We also recommend carrying out an empirical assessment of the premise assumed in relation to information asymmetry and quality. Future research may use an ESM covering all relationships, from how the BTC influences information asymmetry and quality up to its impact on cost of capital and leverage.

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CALCULATION OF COMPRESSBILITY COEFFICIENT WITH FOURTH VIRIAL COEFFICIENT

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ÖZET

Bu çalışmada, Lennard-Jones (12-6) potansiyeli ile dördüncü virial katsayı kullanılarak sıkıştırılabilirlik katsayısını hesaplamak için sayısal hesaplama yöntemi önerilmiştir. Bu yöntem, gerçek gazların sıkıştırılabilirlik katsayısının doğru ve hassas bir şekilde belirlenmesi için uygundur. Bilindiği gibi, Metan endüstriyel kimyasal alanlarda (soğutulmuş sıvı, sıvılaştırılmış doğal gaz veya LNG, soğuk gaz) kullanılır. Ayrıca, doğal gazın ana bileşeni olan metan, bir buhar jeneratörü veya gaz türbininde yakıt olarak yakılarak elektrik üretimi için önemli bir rol oynamaktadır. Bu nedenle, metan için sıkıştırılabilirlik katsayısını hesaplamak için önerilen sayısal yönteme uygulanmıştır. Bildiğimiz kadarıyla, metanın sıkıştırılabilirlik katsayısı dördüncü virial katsayı ile ilk defa hesaplanmıştır. Hesaplama sonuçları, bu sayısal yöntemin metan için Lennard-Jones (12-6) potansiyeline ile ikinci virial katsayıdan daha doğru sonuçlar verdiğini göstermiştir. Metanın sıkıştırılabilirlik katsayısı için hesaplama sonuçları deneysel ve teorik veriler ile karşılaştırılmış ve sayısal yöntemin gerçek gazlar için kullanılabileceğini göstermiştir.

Anahtar kelime: Virial durum denklemi, Dördüncü virial katsayısı, Sıkıştırılabilirlik katsayısı, Lennard-Jones (12-6) potansiyeli

ABSTRACT

In this work, the numerical calculation method has been used to calculate the compressibility coefficient with the fourth virial coefficient over Lennard-Jones (12-6) potential. This method is convenient for the accurate and sensitive determination of the compressibility coefficient for real gases. As well known, Methane is used in industrial chemical fields (a refrigerated liquid, liquefied natural gas, or LNG, the cold gas). Also, methane, the main constituent of natural gas, plays a significant for electricity generation by burning it as a fuel in a steam generator or gas turbine. Therefore, the suggested numerical method has been applied to

calculate the compressibility coefficient for methane. To our knowledge, the compressibility coefficient of methane is calculated for the first time using the fourth virial coefficient. The results of the calculation have indicated that this numerical method gives correct results compressibility coefficient for methane than the second virial coefficient with Lennard-Jones (12-6) potential. The results of the calculation for the compressibility coefficient of methane have been compared with experimental data and theoretical data shown that the numerical method can be used for real gases.

Keywords: Virial equation of state, Fourth virial coefficient, Compressibility coefficient, Lennard-Jones (12-6) potential

Introduction

The thermodynamic properties of real gases are an important for many industrial applications. Therefore, many theoretical and experimental methods are proposed by authors. One of methods is virial equation of state. This equation is given some thermodynamic properties (compressibility coefficient, speed of sound, heat capacity, entropy, enthalpy, and internal energy) of real gases in range of temperature. It is known, compressibility coefficient is defined to examine for the behaviour of the gases [1-2] and it is role play important in chemical engineering calculations and in the petroleum industry [3-5].

In this work, we present the numerical calculation method for evaluating the compressibility coefficient of gases using fourth virial coefficient with Lennard-Jones (12-6) potential. The results of calculation are shown that the numerical calculation method is suitable to gases.

Material and Method

Fourth virial coefficient

The fourth virial coefficient can be expressed following form:

$$D(T) = D_1(T) + D_2(T) + D_3(T). \quad (1)$$

Here, the quantities $D_1(T)$, $D_2(T)$ and $D_3(T)$ is written in the following as [6]:

$$D_1(T) = -\frac{3N_A^3}{8}\iiint f(r_{12})\, f(r_{14})\, f(r_{23})\, f(r_{34})\, dr_2 dr_3 dr_4 \ , \tag{2}$$

$$D_2(T) = -\frac{3N_A^3}{4}\iiint f(r_{12})\, f(r_{13})\, f(r_{14})\, f(r_{23})\, f(r_{34})\, dr_2 dr_3 dr_4 , \tag{3}$$

$$D_3(T) = -\frac{N_A^3}{8}\iiint f(r_{12})\, f(r_{13})\, f(r_{14})\, f(r_{23})\, f(r_{24})\, f(r_{34})\, dr_2 dr_3 dr_4 . \tag{4}$$

Here, $f(r_{ij}) = \left(e^{u(r_{ij})/k_B T} - 1\right)$ is Mayer function [6]. By considering Eqs. (2)- (4) into Eq. (1) and using Lennard-Jones (12-6) potential, we obtain the formulae for the fourth virial coefficient [7]:

$$D_1(T) = -6\pi^2 b_0^3 \int_0^\infty \int_0^\infty \int_0^\infty \int_{-1}^{1} \int_{-1}^{1} r_{12}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{12}}\right)^{12} - \left(\frac{\sigma}{r_{12}}\right)^{6}\right)} - 1 \right) r_{13}^2 \, r_{14}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{14}}\right)^{12} - \left(\frac{\sigma}{r_{14}}\right)^{6}\right)} - 1 \right)$$
$$\left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{12}^2 + r_{13}^2 - 2 r_{12} r_{13} \eta_{23}}}\right)^{12} - \left(\frac{\sigma}{\sqrt{r_{12}^2 + r_{13}^2 - 2 r_{12} r_{13} \eta_{23}}}\right)^{6}\right)} - 1 \right) \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{14}^2 + r_{13}^2 - 2 r_{14} r_{13} \eta_{34}}}\right)^{12} - \left(\frac{\sigma}{\sqrt{r_{14}^2 + r_{13}^2 - 2 r_{14} r_{13} \eta_{34}}}\right)^{6}\right)} - 1 \right) \quad (6)$$
$$dr_{12} dr_{13} dr_{14} d\eta_{23} d\eta_{34}$$

$$D_2(T) = -12\pi^2 b_0^3 \int_0^\infty \int_0^\infty \int_0^\infty \int_{-1}^{1} \int_{-1}^{1} r_{12}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{12}}\right)^{12} - \left(\frac{\sigma}{r_{12}}\right)^{6}\right)} - 1 \right) r_{13}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{13}}\right)^{12} - \left(\frac{\sigma}{r_{13}}\right)^{6}\right)} - 1 \right)$$
$$r_{14}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{14}}\right)^{12} - \left(\frac{\sigma}{r_{14}}\right)^{6}\right)} - 1 \right) \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{13}^2 + r_{12}^2 - 2 r_{13} r_{12} \eta_{23}}}\right)^{12} - \left(\frac{\sigma}{\sqrt{r_{13}^2 + r_{12}^2 - 2 r_{13} r_{12} \eta_{23}}}\right)^{6}\right)} - 1 \right) \quad (7)$$
$$\left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{12}^2 + r_{14}^2 - 2 r_{12} r_{14} \eta_{24}}}\right)^{12} - \left(\frac{\sigma}{\sqrt{r_{12}^2 + r_{14}^2 - 2 r_{12} r_{14} \eta_{24}}}\right)^{6}\right)} - 1 \right) dr_{12} dr_{13} dr_{14} d\eta_{23} d\eta_{24}$$

$$D_3(T) = -\pi^2 b_0^3 \int_0^{\infty}\int_0^{\infty}\int_0^{\infty}\int_{-1}^{1}\int_{-1}^{1}\int_0^{2\pi} r_{12}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{12}}\right)^{12}-\left(\frac{\sigma}{r_{12}}\right)^{6}\right)} -1 \right) r_{13}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{13}}\right)^{12}-\left(\frac{\sigma}{r_{13}}\right)^{6}\right)} -1 \right)$$
$$r_{14}^2 \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{r_{14}}\right)^{12}-\left(\frac{\sigma}{r_{14}}\right)^{6}\right)} -1 \right) \left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{12}^2+r_{14}^2-2r_{12}r_{14}\eta_{24}}}\right)^{12}-\left(\frac{\sigma}{\sqrt{r_{12}^2+r_{14}^2-2r_{12}r_{14}\eta_{24}}}\right)^{6}\right)} -1 \right)$$
$$\left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{13}^2+r_{14}^2-2r_{13}r_{14}\eta_{34}}}\right)^{12}-\left(\frac{\sigma}{\sqrt{r_{13}^2+r_{14}^2-2r_{13}r_{14}\eta_{34}}}\right)^{6}\right)} -1 \right)$$
$$\left(e^{-\frac{4\varepsilon}{T k_B}\left(\left(\frac{\sigma}{\sqrt{r_{12}^2+r_{13}^2-2r_{12}r_{13}\left(\eta_{24}\eta_{34}+\sqrt{1-\eta_{24}^2}\sqrt{1-\eta_{34}^2}\cos\vartheta\right)}}\right)^{12}-\left(\frac{\sigma}{\sqrt{r_{12}^2+r_{13}^2-2r_{12}r_{13}\left(\eta_{24}\eta_{34}+\sqrt{1-\eta_{24}^2}\sqrt{1-\eta_{34}^2}\cos\vartheta\right)}}\right)^{6}\right)} -1 \right)$$
$$dr_{12}dr_{13}dr_{14}d\eta_{24}d\eta_{34}d\vartheta \qquad (8)$$

where $b_0 = 2\pi N_A \sigma^3/3$ [7].

In this study, we use the fourth virial coefficient to determine the compressibility factor following form [6]:

$$Z = \frac{PV}{RT} = 1 + \left(\frac{P}{RT}\right)^3 D(T). \qquad (9)$$

By considering Eq. (9) into Eq. (1), we can be calculated compressibility factor for real gases.

Numerical Results and Discussion

The numerical calculation of the method for the compressibility coefficient using the fourth virial coefficient over the Lennard-Jones (12-6) potential of real gases is suggested in this work. The compressibility coefficient of Methane was calculated using Mathematica 7.0 software in order to shown that the results are correct and sensitive. The obtained results were

compared with literature data [8, 9]. The results are given in Table 1. The suggested numeric method is applicable and can be calculated for the compressibility coefficients of other real gases. As seen from Table 1, the obtained results have shown that suggested numerical method gives accurate results compressibility coefficient for methane than the second virial coefficient with Lennard-Jones (12-6) potential at higher pressure. To our knowledge, the compressibility coefficient of methane is calculated for the first time using the fourth virial coefficient. The Lennard-Jones (12-6) potential parameters are $\varepsilon/k_B = 148.4$ and $\sigma = 3.81$ [8].

Table 1. Compresibility coefficient of Methane for $T = 323.15\,K$

$P\,(\mathrm{Bar})$	Z	z [8]	Experimental [9]
10,696	1,00000	0,986211	0,98657
30,469	1,00006	0,960719	0,96282
50,263	1,00026	0,935201	0,94091
70,368	1,00071	0,909281	0,92101
90,270	1,0015	0,883623	0,90429
100,673	1,00208	0,870212	0,89687
120,702	1,00358	0,84439	0,88549
140,792	1,00568	0,81849	0,87823
160,678	1,00844	0,792853	0,87536
180,842	1,01203	0,766857	0,87669
201,419	1,01662	0,740329	0,88225
221,029	1,02196	0,715048	0,89113
241,005	1,02847	0,689294	0,90331
251,066	1,03219	0,676324	0,91051
261,256	1,03627	0,663187	0,91843
281,121	1,04519	0,637576	0,93551
286,680	1,04792	0,63041	0,94064

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A SURVEY STUDY EVALUATING INTERNET USERS' PRONENESS TO FALL PREY TO SOCIAL ENGINEERING ATTACKS

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ABSTRACT

Social engineering has become one of the biggest challenges and threats to information security in recent years. Social engineering refers to a wide range of malicious activities accomplished through human interactions. Hackers utilizing social engineering techniques aims to manipulate individuals to disclose valuable and sensitive data for the benefit of cybercriminals. Through social engineering techniques, users are psychologically manipulated to make security mistakes or give away very sensitive information to malicious hackers. When we look at the cyber security incidents that have taken place in the last decade, we can see that the most vulnerable and weakest part of the organization is not the information system components such as hardware, software, and network. Information security incidents in recent years show that most of the cyber-attacks are successful because of end user errors and carelessness. Social engineering attacks may cause devastating financial losses to businesses and individuals alike. If hackers manage to gain access to individuals' sensitive personal and financial data, there is a risk that personal funds and investments will be stolen. When social engineering attacks are directed to organizations and successful, the most obvious consequence of these attacks is the monetary damage they cause. However, long term indirect losses caused by social engineering attacks on organizations such as loss of reputation, loss of trust, legal issues could be much higher than direct monetary losses.

This research evaluated the Internet users' proneness to fall prey to five most common types of social engineering attacks which are domain spoofing, email spoofing, search engine phishing, SMS phishing, and social media phishing. 350 volunteer participants participating in this research were presented with simulated images prepared by taking into account the social engineering attack that has taken place in recent years. Some of the images were legit and some of them were not. Participants were asked to identify these simulated scenarios as legit or cyber-attack. By utilizing the descriptive statistics techniques, this study reports the responses of the participants. This research presents important findings by showing which types of Internet users are more likely to be victim of which types of social engineering attacks. This research findings will benefit those interested in taking action against social engineering attacks.

Keywords: Social engineering attacks, Phishing attacks, Domain spoofing, Email spoofing, Search engine phishing, Social media phishing, SMS phishing, Internet users, Internet Security

INTRODUCTION

In the information security context, social engineering is the art of manipulating people so they give up confidential information. Hadnagy (2018) defines social engineering as any act that influences a person to take an action that may or may not be in his or her best interests. In the social engineering attacks, end users of systems are under attack because they are usually the weakest component in the cyber-security chain (Ozkaya, 2018).

The most common and dangerous form of social engineering attacks is Phishing (Hadnagy, 2018). Phishing can be simply defined as online identity theft in which confidential information is obtained from individuals through different techniques. Phishing has many different types such as email phishing, spear phishing, whaling, pharming, etc. Hackers utilize different types of social engineering techniques. In each technique, hackers approach to their victims through different channels with different methods. In this study, five different types of social engineering techniques were assessed. These techniques are namely Domain Spoofing, Email Spoofing, Search Engine Phishing, SMS Phishing, and Social Media Phishing.

In domain spoofing, cybercriminals forge a website name in an attempt to trick users. The main purpose of domain spoofing is to trick users into interacting with the malicious website as if it were legitimate. Through this malicious website cyber criminals try to collect sensitive information of users (Krombholz et al., 2015). Email spoofing is the creation of email messages with a forged sender address. In other words, in this kind of attack cyber criminals send emails that have been manipulated to seem as if they originated from a trusted source (Chaudhry et al., 2016; Krombholz et al., 2015). Search engine phishing attacks are carried through online search engines (Chaudhry et al., 2016). Here, users may encounter search results that persuade them to visit the website. The search process may be legitimate, but the website that users visit are actually fake and created by cyber criminals with the purpose of stealing the person's personal information. In SMS phishing cyber criminals send misleading text messages to the mobile devices of users (Yeboah-Boateng & Amanor, 2014). Cyber criminals aim to trick victims into believing that message has arrived from a trusted source. After gaining user trust, users may be asked to provide sensitive information or install malicious software to their devices. In a social media phishing attack cyber criminals use social media platforms such as Facebook, Twitter, or Instagram to steal sensitive information of users (Krombholz et al., 2015). Cyber criminals may create fake login pages of well-known social media platforms, they may send malicious messages, or they may persuade users to visit malicious posts.

In this research, different types of social engineering attack scenarios were designed by considering the most common type of social engineering attacks that occurred in the recent years. These scenarios consisted of simulated images. Participants were asked to carefully examine these images and identify which were real and which were malicious cyber-attacks. There were details in the images showing that whether these scenarios were real or fake, and users had to carefully examine these details in order to make the right decision. Study questionnaire were distributed to the participants through online platforms. In one-month time period 350 total useful responses were collected.

Collected data was analyzed by using scientific computation libraries of python programming language such as Pandas and Numpy. These scientific libraries were used to carry out descriptive statistical analysis. Descriptive statistics in this study describe, show, and summarize the basic features of the study dataset.

By considering demographic profile and technology usage patterns of users, this study aims to show which types of people are more inclined to fall victim to what kind of social engineering attacks. Findings of this study aim to provide important information to decision makers in the prevention of social engineering attacks.

FINDINGS

Table 1 shows the demographic profile of study participants. Most of the participants (61.7%) were between ages of 18 and 23 which was followed by participants (18.9%) with ages of between 24 and 29.

Table 1 - Demographic profile of respondents

Demographic Profile		Frequencies	Percentages (%)
Age			
	18-23	216	61.7
	24-29	66	18.9
	30-35	30	8.6
	36-41	27	7.7
	42 and above	11	3.1
Gender			
	Male	169	48.3
	Female	181	51.7
Education			
	Doctorate	32	9.1
	Masters	66	18.9
	Bachelors	242	69.1
	High School	10	2.9
Employment			
	Student	227	64.9
	Employed	123	35.1

In this study, the proportion of female participants (51.7%) was relatively higher than male participants (48.3%). The great majority of participants (69.1%) were either a bachelor graduate or bachelor's student. About two-thirds of the participants were students at different levels at universities.

Table 2 shows technology usage patterns of participants. A vast majority (92.0%) of participants were using Windows operating system and little more than half (52.3%) were using Android mobile operating system. In addition, a great majority (72.9%) of them frequently make commercial transactions over the Internet.

Table 2 - Technology usage patterns of participants

Technology Usage Profile		Frequencies	Percentages (%)
Desktop OS			
	Windows	322	92.0
	Mac OS	27	7.7
	Linux	1	0.2
Mobile OS			
	Android	183	52.3
	iOS	167	47.7
Frequent Online Shopper			
	Yes	255	72.9
	No	95	27.1

Figure 1 shows the overall and average scores of participants according to different types of social engineering attacks. These percentages in Figure 1 and in all following other tables show how successful users were in distinguishing between legit and scam scenarios presented to them within the scope of this research. The lower the given score is, the more likely the respondents are prone to fall prey to the given type of social engineering attack. Overall average score of participants was found to be 65.0%. According to the results, Domain Spoofing is the type of attack that participants received the lowest score. That is, Domain Spoofing (43.3%) is the type of attack that participants are most at risk of. The other type of attack that users are most at risk of is Search Engine Phishing (63.3%) and Email Spoofing (64.6%), respectively. On the other side, SMS Phishing (84.8%) and Social Media Phishing (72.7%) are the categories with the highest scores, respectively. Compared to other attack types, these attack types are categories where users are less at risk.

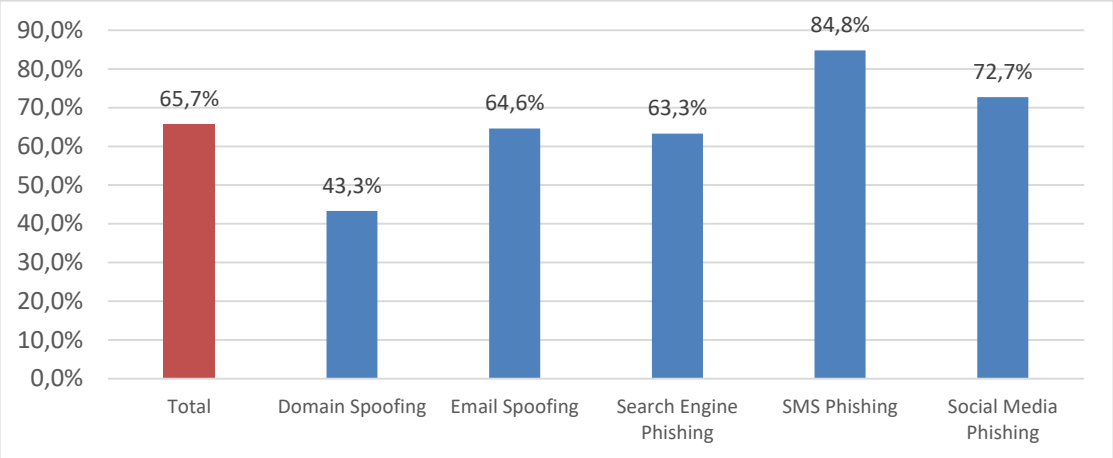


Figure 5 - Overall Average Social Engineering Scores

The following five tables show the different types of social engineering scores of the participants by gender, e-commerce usage frequency, trust in e-commerce, and knowledge and experience in social engineering. All of the scores are given in terms of percentages.

Table 3 shows scores of participants according to gender in different types of social engineering attack types. Findings show that when compared to females, males are slightly less prone to all kind of social engineering attack assessed in this study. While average overall phishing score of male was found to be 67.4 %, this score was found to be 64.2% in females. The biggest gap between the scores of males and females was found in Domain Spoofing and Email Spoofing categories.

Table 3 - Genders of respondents

	Phishing Overall (%)	Domain Spoofing (%)	Email Spoofing (%)	Search Engine Phishing (%)	SMS Phishing (%)	Social Media Phishing (%)
Male	67.4	46.4	67.2	64.1	85.7	73.6
Female	64.2	40.4	62.2	62.5	84.0	71.8

Table 4 shows the social engineering scores of participants who use e-commerce platforms very often and those who do not. It was found that users who use e-commerce platforms more frequently scored higher on the social engineering test than users who use these platforms less frequently. It can be inferred that, frequent e-commerce users are less

likely to fall victim to social engineering attacks. While average overall phishing score of frequent e-commerce users was found to be 66.9%, this score was found to be 62.7% in users who do not use e-commerce frequently. The biggest difference between the two groups was observed in the Domain Spoofing attack.

Table 4 - Do you frequently make commercial transactions (buying/selling products or services) over the Internet?

	Phishing Total (%)	Domain Spoofing (%)	Email Spoofing (%)	Search Engine Phishing (%)	SMS Phishing (%)	Social Media Phishing (%)
Yes	66.9	45.5	64.5	64.4	85.9	74.1
No	62.7	37.6	64.9	60.5	81.9	68.7

Table 5 shows the scores of participants who have heard or researched about social engineering in the press and on the Internet before, and those who do not have any knowledge about it. The findings showed that people who are knowledgeable about and have done research on social engineering attacks are less likely to be victims of all attack types than those who have no knowledge about it. While average overall phishing score of experienced participants was found to be 74.1 %, this score was found to be 61.4% in unexperienced participants. The biggest gap between scores were found in Domain Spoofing, Search Engine Phishing and Social Media Phishing categories respectively.

Table 5 - Have you ever heard or researched about social engineering before?

	Phishing Total (%)	Domain Spoofing (%)	Email Spoofing (%)	Search Engine Phishing (%)	SMS Phishing (%)	Social Media Phishing (%)
Yes	74.1	55.8	70.9	73.7	89.0	81.2
No	61.4	36.8	61.3	57.9	82.6	68.2

Table 6 shows the social engineering scores of the participants who feel safe while conducting commercial transactions online and those who do not feel safe. Although the average overall score of both groups was almost the same, the score of those who did not find the Internet safe for commercial transactions was found to be slightly higher. While participants who did not find the Internet safe for commercial transactions scored higher in domain spoofing and search engine phishing, those who found the Internet safe scored higher in Email Phishing, SMS Phishing and Social Media Phishing categories.

Table 6 - Do you feel safe while conducting transactions over the Internet?

	Phishing Total (%)	Domain Spoofing (%)	Email Spoofing (%)	Search Engine Phishing (%)	SMS Phishing (%)	Social Media Phishing (%)
Yes	65.7	41.0	66.6	63.0	85.7	73.0
No	65.9	44.4	63.6	63.4	84.4	72.5

Table 7 shows the scores of users according to whether or not they have been victims of social engineering attacks before. Participants who were previously victim of social engineering attacks scored higher in all categories. Especially in the Domain Spoofing category, the difference in scores between the two groups is the highest.

Table 7 - Have your private information (username, password, credit card information) been captured by hackers before?

	Phishing Total (%)	Domain Spoofing (%)	Email Spoofing (%)	Search Engine Phishing (%)	SMS Phishing (%)	Social Media Phishing (%)
Yes	69.5	54.2	68.5	64.2	85.0	75.4
No	65.4	42.4	64.3	63.2	84.8	72.4

CONCLUSION

Social engineering attacks can lead to devastating financial losses for individuals as well as businesses (Deloitte, 2019). The results of the study also clearly showed a significant level of vulnerability to social engineering attacks. For an individual, if a hacker manages to access sensitive personal and financial details, personal funds and investments are at risk of being stolen. When social engineering attacks are aimed at organizations and are successful, the most obvious result of these attacks is the monetary damage they cause (Ragucci and Robila, 2006). However, emotional and non-monetary damages such as reputation loss and customer dissatisfaction can have more negative consequences for the business in the long run. Therefore, it is very important that businesses and governments take necessary measures to reduce the potential negative consequences of social engineering attacks. Companies need not only effective strategies against social engineering attacks and also countermeasure techniques to detect and minimize the impact of these attacks (Salahdine & Kaabouch, 2019). Businesses and governments must constantly inform and train employees and citizens about social engineering attacks. They need to raise user awareness of social engineering attacks (Bakhshi, 2008). The more people know about it, the less they become victims of such kind of attacks.

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CALCULATION OF ENTROPY USING THIRD VIRIAL COEFFICIENT WITH KIHARA POTENTIAL

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ÖZET

Bu çalışmada, Kihara potansiyeli ile üçüncü virial katsayı kullanılarak entropinin hesaplanması için sayısal hesaplama yöntemi önerilmiştir. Önerilen yöntem, nitrojen ve diğer gerçek gazların entropisini doğru ve hassas hesaplanması için uygundur. Bilindiği gibi, nitrojen bileşiklerini nitrojen gazı oluşturmak üzere ayrıştırmak, büyük miktarlarda genel olarak faydalı enerji açığa çıkarır. Endüstrinin birçok alanında kullanılmaktadır. Ayrıca nitrojen, antibiyotiklerin de dâhil olduğu farmakolojik ilaç sınıfının yaratıcısıdır. Bu nedenle azotun termodinamik özelliklerinin değerlendirilmesi oldukça önemlidir. Azotun entropisi hesaplamak için sayısal yöntem pratik olmuştur. Bildiğimiz kadarıyla, nitrojenin entropisi ilk kez Kihara potansiyeli ile üçüncü virial katsayısı kullanılarak hesaplanmıştır. Elde edilen sonuçlar, önerilen sayısal yöntemin azot için doğru sonuçlar verdiğini göstermiştir. Azot entropi hesaplama sonuçları teorik verilerle karşılaştırıldı ve sayısal yöntemin diğer gerçek gazların entropisini hesaplamak için yararlı olabileceğini gösterdi.

Anahtar kelime: Virial durum denklemi, Üçüncü virial katsayısı, Entropi, Kihara potansiyel

ABSTRACT

In this stud, the numerical calculation method has been suggested to evaluate the entropy using third virial coefficient with Kihara potential. The proposed method is convenient for the correct and precision calculation of the entropy for nitrogen and other real gases. As well known, decomposing nitrogen compounds to form nitrogen gas releases large amounts of generally useful energy. It is used in many areas of industry. Also, nitrogen is a creative of every great pharmacological drug class, with the inclusion of antibiotics. Therefore, evaluation of the thermodynamic properties of nitrogen is quite important. The numerical method has been practical to calculate the entropy for nitrogen. To our knowledge,

the entropy of nitrogen is calculated for the first time using the third virial coefficient with Kihara potential. The results have indicated that the suggested numerical method gives accurate results entropy for nitrogen. The results of the calculation for the entropy of nitrogen have been compared with theoretical data and demonstrate that the numerical method can be useful to calculate the entropy of other real gases.

Keywords: Virial equation of state, Third virial coefficient, Entropy, Kihara potential

Introduction

Many equations of state have been proposed to study the physical and chemical properties of gases [1-2]. The most important of these state equations is the virial state equation [2-3]. The virial state equation has an important feature that determines the interdependent changes of temperature, pressure, volume and potential energy of fluids [3]. Virial state equation:

$$Z = 1 + B_2(T)\frac{n}{V} + B_3(\mathrm{T})\frac{n^2}{V^2} + \ldots \qquad (1)$$

where $B_2(T), B_3(T)$ is second and third virial coefficient, respectively [3]. These coefficients provide to evaluated accurate and precision some thermodynamic properties of real gases [3]. One of thermodynamic properties is the entropy of real gases. Entropy is a thermodynamic term in physics that represents the thermal energy of a system that cannot be converted into mechanical work [4]. It is often defined as randomness and disorder (chaos) in a system and is used in many fields from statistics to theology.

In this work, we present the numerical calculation method for evaluating the entropy of real gases using third virial coefficient with Kihara potential. The obtained results are demonstrated that the numerical calculation method is suitable to calculate thermodynamic properties of real gases.

Material and Method

Third virial coefficient and entropy

The third virial coefficient can be expressed in following form:

$$B_3(T) = -\frac{N_A^2}{3}\iiint f(r_{12})\, f(r_{13})\, f(r_{23})\, dr_{12} dr_{13} \tag{1}$$

where $f(r_{ij}) = \exp\left(u(r_{ij})/k_B T\right) - 1$ is Mayer functions and N_A is Avogadro's constant [3]. $u(r_{ij})$ is the intermolecular potential, k_B is the Boltzmann constant and T is temperature in Mayer functions [3]. For evaluation of the third virial coefficient in the previous work [5], we use the Kihara potential in the following form [6]:

$$u(r) = \begin{cases} \infty & r < 2a \\ 4\varepsilon\left(\left(\dfrac{\sigma - 2a}{r - 2a}\right)^{12} - \left(\dfrac{\sigma - 2a}{r - 2a}\right)^{6}\right) & r \geq 2a \end{cases}, \tag{2}$$

The replacing Eq. (2) into the Eq. (1), we have obtained for third virial coefficient in following as:

$$B_3^*(T^*) = \frac{6}{(1+a^*)^6}\left[\int_0^\infty \left(e^{-\frac{4}{T^*}\left(\left(r_{12}^*-a^*\right)^{-12}-\left(r_{12}^*-a^*\right)^{-6}\right)}-1\right)\int_0^\infty \left(e^{-\frac{4}{T^*}\left(\left(r_{13}^*-a^*\right)^{-12}-\left(r_{13}^*-a^*\right)^{-6}\right)}-1\right)\right.$$
$$\left.\int_{-1}^{1}\left(e^{-\frac{4}{T^*}\left(\left(\sqrt{r_{12}^2+r_{13}^2-2r_{12}r_{13}\eta}-a^*\right)^{-12}-\left(\sqrt{r_{12}^2+r_{13}^2-2r_{12}r_{13}\eta}-a^*\right)^{-6}\right)}-1\right) r_{12}^{*2} r_{13}^{*2}\, d\eta\, dr_{12} dr_{13}\right] \tag{3}$$

where, $r_{ij}/\sigma - 2a = r_{ij}^*$, $a/\sigma - 2a = a^*$, $T^* = k_B T/\varepsilon$, $B_3^*(T^*) = B_3(T^*)/b_0^2$ and $b_0 = 2\pi N_A \sigma^3/3$ [5].

The replacing Eq. (3) into the Eq. (4), we have obtained for entropy:

$$S = S^0 - R\ln P + \frac{P^2}{2}\left(-B_3(T^*) + T^*\frac{d}{dT^*}B_3(T^*)\right) \tag{4}$$

where S^0 is entropy of ideal gases, R is universal gas constant, and P is pressure [7]. By considering Eq. (3) into Eq. (4), we can be calculated entropy for real gases.

Numerical Results and Discussion

In this work, the numerical calculation of the method for the entropy using the third virial coefficient with the Kihara potential of gases is presented. The entropy of Nitrogen was computed using Mathematica 7.0 software to illustrate that the obtained results are accurate. The results of calculation were compared with literature data [8]. The obtained results are given in Table 1. The numerical calculation method is suitable and computed for the entropy of other real gases. As seen from Table 1, the results have demonstrated that the presented numerical calculation method is in approximate agreement with results at higher temperatures and pressure. To our knowledge, the entropy of Nitrogen is computed for the first time using the third virial coefficient with Kihara potential. The Kihara potential parameters are $\varepsilon/k_B = 127.95$, $\sigma = 3.2199$, $d\left(A^0\right) = 0.35$, and $a^* = 0.121955$ [9].

Table 1. Entropy of Nitrogen

$P(atm)$	$T(K)$	$S(j/mol.K)$	$S(j/mol.K)$ [8]
0.0986923	200	154.203	199.13
	300	166.123	210.93
	500	183.846	225.87
	600	192.592	231.30
	1000	225.851	247.27
	1500	254.81	260.95
	2000	273.42	271.11
0.986923	200	154.203	179.94
	300	166.123	191.77
	500	183.846	206.72
	600	192.592	212.16
	1000	225.851	228.12
	1500	254.81	241.80
	2000	273.42	251.96
3.94769	200	154.203	168.27
	300	166.123	180.19
	500	183.846	195.18
	600	192.592	200.62
	1000	225.851	216.60
	1500	254.81	230.27
	2000	273.42	240.44

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USING ARTIFICIAL INTELLIGENCE IN ASSESSING STUDENTS' ACHIEVEMENT AT HIGH SCHOOLS: A CASE STUDY IN MATHEMATICS

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Abstract

Nowadays, Artificial Intelligence is widely applied in many areas of society, especially in education with Intelligent Teaching Systems, cooperative robots (cobots), chatting robots (chatbots), etc. While the assessment of academic achievement plays an important role in Education with many modern models, including Adaptive testing model based on Item Response Theory. This paper presents a study that integrates Adaptive tests into the AI Chatbot system on the Facebook Messenger platform to assess students' Mathematical achievement at Vietnam High schools. A quantitative research was conducted to analyse the advantages and challenges of this integrated model in today's teaching and learning context.

Keywords: Artificial Intelligence, Chatbot, Adaptive Test, Mathematics education.

I. INTRODUCTION

In the current globalization context, AI is gradually becoming an important element in social innovation, and it plays a crucial role in improving production, business, health, transportation, etc, including education. According to Goksel & Bozkurt (2019), AI has existed for a long time in education, specifically in automating the management of teachers and as a practical assistant of learners.

In the past, when technology was applied to the educational process. Teachers can significantly reduce the time spent on tests and assessments. However, that support can not adapt when conditions change. When AI was used, it gradually demonstrated its role in changing asses methods. Zawacki-Richter et al. (2019) argue that the original application of AI is to create models and learner profiles to serve the processes of predicting and adjusting progress. From there, the learning content and progress are appropriate to the capacity of the learners. That process of self-assessment and adjustment helps to ensure the quality of training, besides saving time and effort of teachers (Serhani et al., 2019). This is also the trend of testing and evaluation of modern education: Adaptive Test.

Moreover, as the appearance of AI in the classroom is increasingly popular, virtual intelligent assistant are developed on many different platforms (Marr, 2018), typically Siri from Apple. , Cortana from Microsoft, Google Assistant from Google, Alexa from Amazon, etc. It contributes to supporting teachers in student management in a specific 1-to-1 (student - virtual

assistant) model, in terms of learning time, knowledge volume, and assessing students' abilities – instead of 1 – 30 (1 teacher – 30 students) as before.

This paper designs a virtual intelligent assistant as a chatbot on Facebook Messenger platform for assessing high school students' Mathematical achievement. And then, the researchers take an experiment with the Combination and Probability topic.

II. LITERATURE REVIEW

1. Briefly about Artificial Intelligence and Chatbot

Artificial Intelligence

Difference state of the AI's development have different definition. However, in general, AI is an intelligence created by humans with the goal of making computers be able to simulate human behaviors. According to Thuy et al. (2018) research, there are 05 significant trends of AI development:

– Robotics's goal is to design a machine or a robot that can help and assist humans.

– Computer vision make computers be able to understand digital images or videos. It seeks to understand and automate tasks that the human visual system can do.

– Natural language processing's goal is a computer capable of "understanding" the contents of documents, including the contextual nuances of the language within them.

– Machine learning is the study of computer algorithms that improve automatically through experience and by the use of data.

– Artificial neural networks may be used for predictive modeling, applications where they can be trained via a dataset.

AI Chatbot

A chatbot (or chatter bot) is a software application used to conduct an online chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent. AI Chatbot is a chatbot which is integrated with Artificial Intelligences. A typical AI chatbot is based on natural language processing and machine learning technologies. AI chatbots can understand language outside of a set of pre-programmed rule and learn based on the input messages. They can also make changes based on patterns and become more intelligent over time. Figure 1 shows how an AI chatbot works.

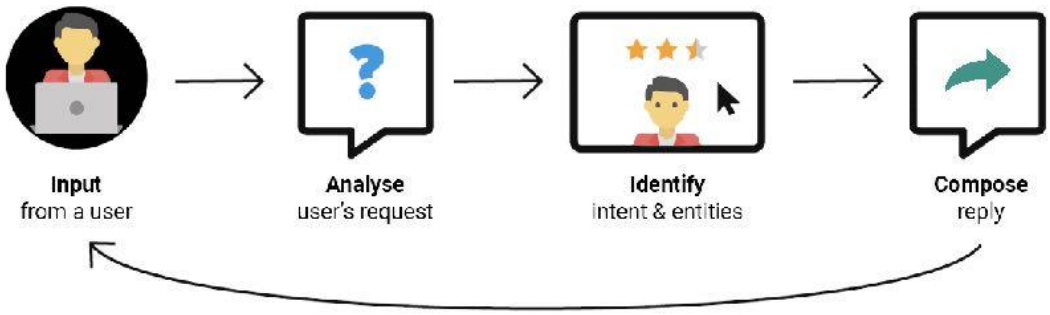


Figure 1. How AI Chatbot works

2. Adaptive Test

Adaptive Test (or Computerised Adaptive Test – CAT) is a form of computer-based test that adapts to the student's ability level. CAT is simulate the reaction of a teacher: in this test, the next item selected to be administered depends on the correctness of the test taker's responses to the most recent items administered.

CAT successively selects questions for the purpose of maximizing the precision of the exam based on the previous questions. Compared to static multiple-choice tests with a fixed set of questions for all students, CAT requires fewer question to receive a equivalent result.

The primary CAT method is an iterative algorithm with the following steps:

1. The question pool is searched for the most suitable item based on the current estimate of student's ability.

2. The chosen item is presented and student answeres it.

3. The ability estimate is updated based upon all prior answers.

4. Steps 1 to 3 are repeated until a termination criterion is met.

There are two common types of CAT:

Adaptive item: Adjusts each future item based on an average estimated ability. When a student answers incorrectly, the student is presented with a lower-level question. As students get questions correct, the next question can become increasingly difficult and complex (Figure 2a).

Branching: Use form mini-tests (called testlets), which are subject to the adaptive algorithm. Each testlet is chosen based on the student’s ability estimate up to that point. Moreover, a testlet can be a sub-system of CAT in adaptive item type (Figure 2b).

In this paper, we design API for CAT type 2; however, there is only one topic in the question pool. So the method is like CAT type 1.

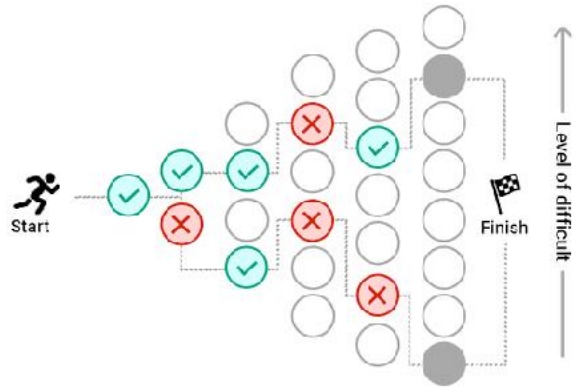


Figure 2a. Adaptive item

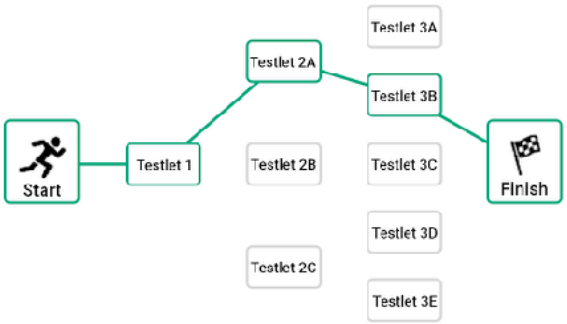


Figure 2b. Branching

III. RESEACH METHODS AND RESULTS

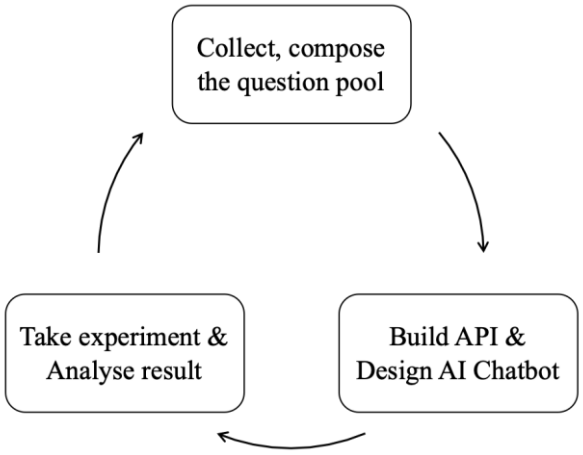


Figure 3. Process of designing a complex chatbot

Figure 3 shows the typical process of designing a chatbot for assessing students' Mathematical achievement:

Phase 1. Collect, compose the question pool: This phase creates a dataset of multiple-choice questions as chatbot's input data. We selected the topic of Combination and Probability because of its important role in Mathematics. Then all questions were standardised by using

IATA software (Tuan et al., 2021), and then the final dataset has 87 questions in two-parameter IRT model.

Phase 2. Build API and Design AI Chatbot: Chatfuel's basic components can help teachers create a powerful AI chatbot. However, to bring some complex features to chatbot such as algorithms implementation, language processing, etc, programming an API is needed (Tuan et al., 2020). Specifically, we designed a basic chatbot named Kant; and then programmed an API to enable him the ability of processing Adaptive Testing algorithms based on Item Response Theory.

Phase 3. Take an experiment and Analyse the result (section 3): The researchers conducted experiments of assessing High school students' Mathematical ability with Kant bot built on the previous phase. Finally, we analyse the results to check the feasibility of the product in education and to improve our chatbot.

1. The question pool of Conbination and Probability

Question pool plays an essential role in CAT. Therefore, it needs to be selected scientifically. The researchers build a question pool of Combination and Probability, which is parameterised by IATA (Item and Test Analysis) software.

The precision process is based on the result of Hung et al. (2019):

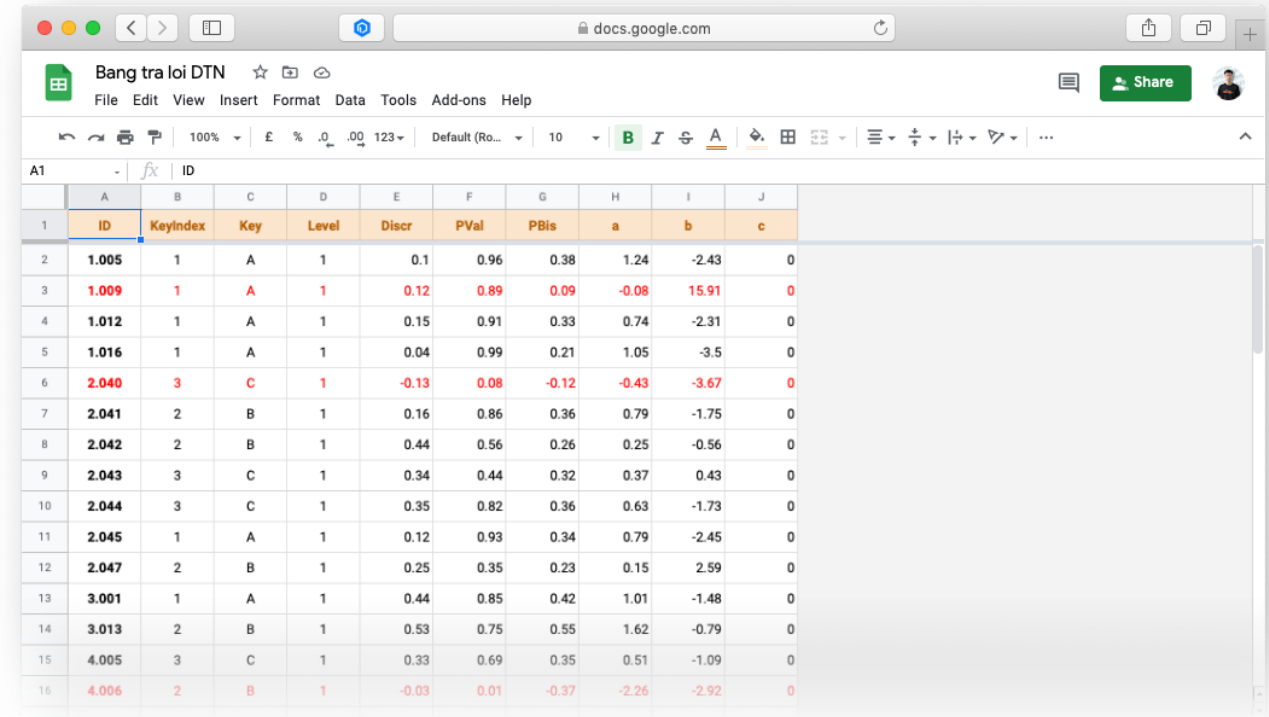
1. Collect, compose multiple-choice questitons.

2. Students take some tests which these items.

3. Collect and analyse with IATA software.

4. Remove unsatisfactory questions and collect parameters from the others.

The result was exported for processing using Google Sheet (Figure 4), and then saved into API's database.



	ID	KeyIndex	Key	Level	Discr	PVal	PBis	a	b	c
2	1.005	1	A	1	0.1	0.96	0.38	1.24	-2.43	0
3	1.009	1	A	1	0.12	0.89	0.09	-0.08	15.91	0
4	1.012	1	A	1	0.15	0.91	0.33	0.74	-2.31	0
5	1.016	1	A	1	0.04	0.99	0.21	1.05	-3.5	0
6	2.040	3	C	1	-0.13	0.08	-0.12	-0.43	-3.67	0
7	2.041	2	B	1	0.16	0.86	0.36	0.79	-1.75	0
8	2.042	2	B	1	0.44	0.56	0.26	0.25	-0.56	0
9	2.043	3	C	1	0.34	0.44	0.32	0.37	0.43	0
10	2.044	3	C	1	0.35	0.82	0.36	0.63	-1.73	0
11	2.045	1	A	1	0.12	0.93	0.34	0.79	-2.45	0
12	2.047	2	B	1	0.25	0.35	0.23	0.15	2.59	0
13	3.001	1	A	1	0.44	0.85	0.42	1.01	-1.48	0
14	3.013	2	B	1	0.53	0.75	0.55	1.62	-0.79	0
15	4.005	3	C	1	0.33	0.69	0.35	0.51	-1.09	0
16	4.006	2	B	1	-0.03	0.01	-0.37	-2.26	-2.92	0

Figure 4. Exported result on Google Sheet

The result of this section is shown on Table 1:

Table 1. Matrix of the question pool

	Level of Remembering	**Level of Understanding**	**Level of Applying**	**Level of Analysing**	**Total**
Permutation, combination	11	15	13	3	42
Binomial theorem	7	7	9	2	25
Probability	5	10	4	1	20
Total	**23**	**32**	**26**	**6**	**87**

2. Design Kant bot using Chatfuel

In this part, the article builds a chatbot on Facebook Messenger social network, which the platform is Chatfuel, and calls it Kant (or Kant bot).

Build API for Kant

Chatfuel only provides some tools for designing a common chatbot. Thus the researchers have to build an API (Application Programming Interface) to extend chatbot's processing ability, especially CAT algorithms.

In this paper, the API was built based on the PHP programming language. The output of our code is in JSON type, with Chatfuel's syntax. Table 2 shown the structure of API database:

Table 2. Database structure

Table name	Field name	Data type	Description
topic	id	int	Primary key
	parent_id	int	ID of item's parent
	name	varchar	Name of topic
	title	varchar	Display name of topic
	question_limit	tinyint	Maximum number of questions
question	id	int	Primary key
	block_name	varchar	Block name of the question, link to Chatfuel data
	right_answer	tinyint	Right answer index of question
	level	tinyint	Level of question
	a	decimal	a parameter of IRT, or discrimination of question
	b	decimal	b parameter of IRT, or difficulty of question
student_variable	id	int	Primary key
	user_id	varchar	Student ID, linked to Facebook account ID
	variable_name	varchar	Student's property name
	variable_value	varchar	Property value

About code structure, API includes 04 main classes:

– MySQL: provide some methods to connect and interact with mySQL Database server.

– Maths: brings Mathematical functions to API, and it also includes some library of Machine learning areas.

– IRT: include some processing methods based on Item Response Theory (IRT).

– CAT: used for extending IRT class to implement CAT algorithms.

Besides, the API is also equipped with the ability to processing language and navigating in chatbots.

All methods of API receive and return GET requests to make it easy for the researcher to widen chatbot's platform. All syntax of API is given on Table 3:

Table 3. JSON API syntax

user_id	action	type	Other parameters	Description
{{messenger user id}}	get	topic	topic_id (optional)	Get list of (sub) topics. Ignore topic_id parameter will return main topics list.
		question	topic_id	Get an adaptive item from question pool by topic.
		topic_result	topic_id	Get topic test result.
	set	user_variable	variable_name, variable_value, next_block	Dim or modify a variable, and then redirect user to the block given in next_block.

Design Kant bot and connect to API

The main feature of Chatfuel is in Automation group. They are:

– Blocks: Contain many blocks that are used for designing a small stage of communication. Block is simple and easy to use (Figure 5a).

– Flows: A flow includes many cards, which they also equivalent to blocks. A flow is better than a block since it supports branching structure (if – then) (Figure 5b).

– AI Setup: Used for setting simple communication rules. This allows administrators to "teach" chatbot how to respond to messages correctly.

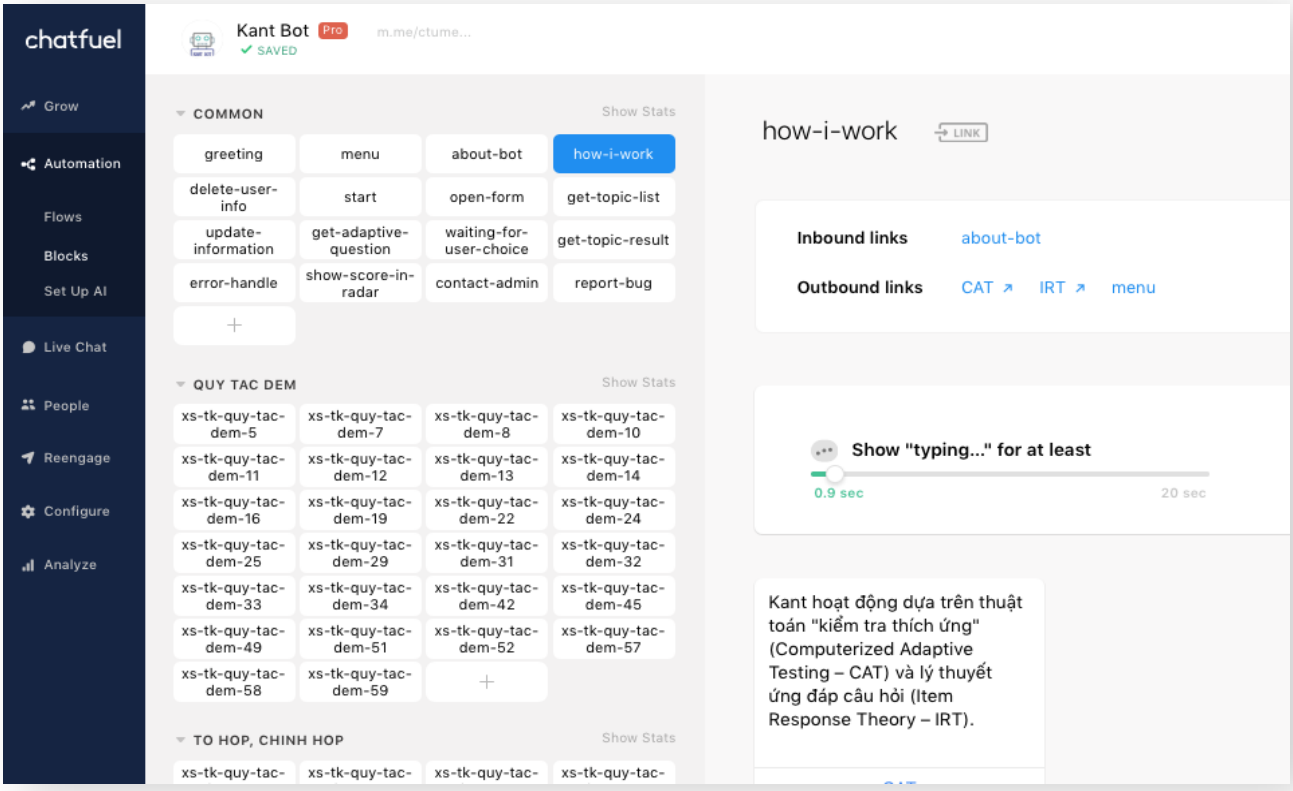


Figure 5a. Blocks working UI

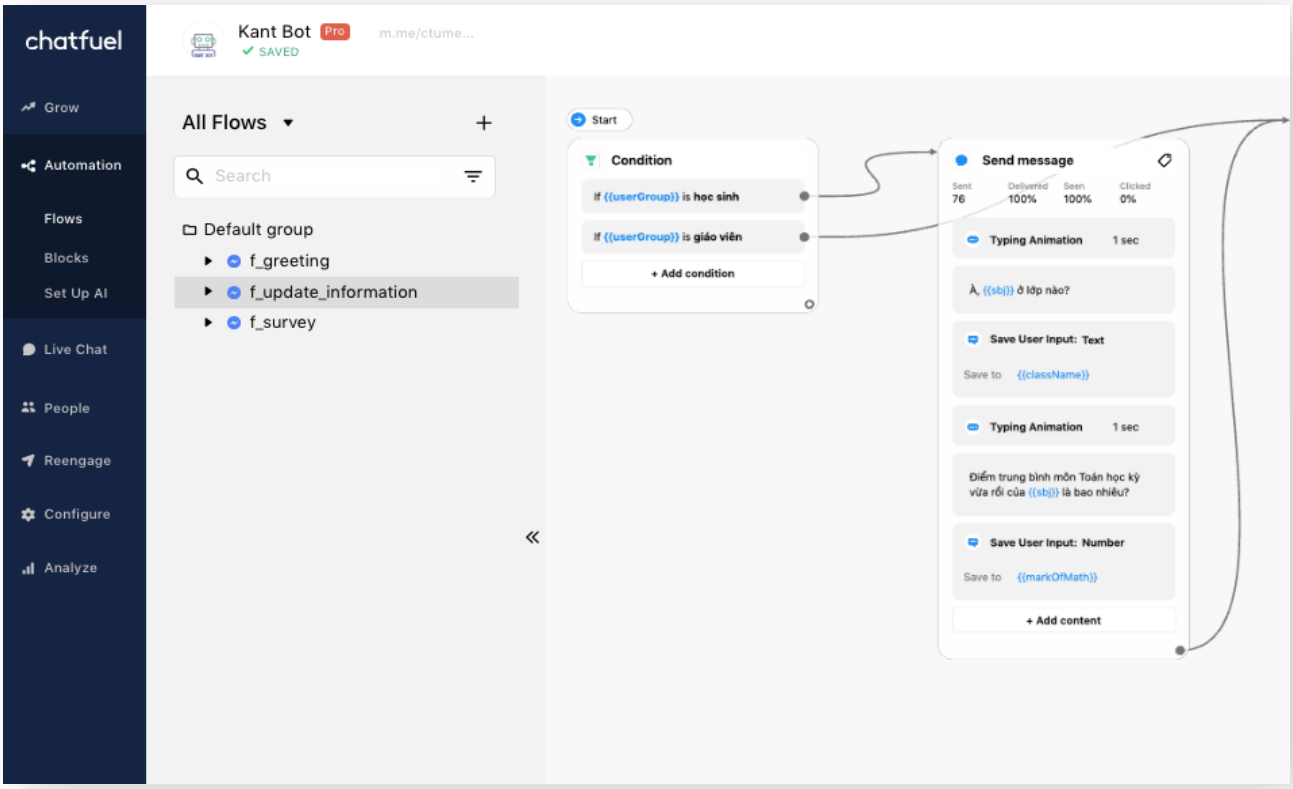


Figure 5b. Flows working UI

After creating all basic components of Kant bot, the paper links it with the API:

– Get topic list on block named get-topic-list:

```
GET /chatfuel.php
{
   user_id  = {{messenger user id}},
   action   = get,
   type     = topic,
   topic_id = {{selected topic id}}
}
```

– Get adaptive item on block named get-adaptive-question:

```
GET /chatfuel.php
{
   user_id  = {{messenger user id}},
   action   = get,
   type     = question,
   topic_id = {{selected topic id}}
}
```

– Caculate the topic result on block named get-topic-result:

```
GET /chatfuel.php
{
   user_id  = {{messenger user id}},
   action   = get,
   type     = topic_result,
```

```
    topic_id = {{selected topic id}},
}
```

With {{messenger user id}} is the default variable provided by Chatfuel, {{selected topic id}} is customised variable by system administrators.

The final version of Kant bot got 03 flows, 103 blocks (16 blocks for functioning and 87 blocks for showing questions), and 08 AI rules.

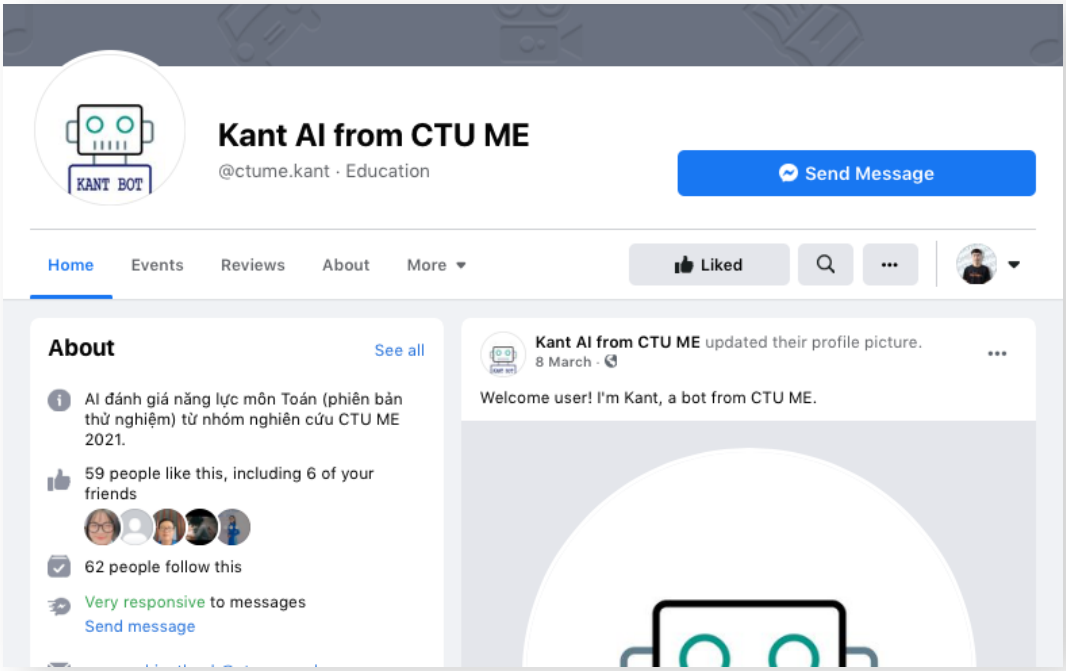


Figure 6. Kant – AI Chatbot on Facebook social network

3. Use Kant bot in assessing students' achievement

The researchers take an experiment with 25 High school students of grade 11 and 12 at Can Tho city, Vietnam, which the purpose are:

– Evaluate whether Kant can be used positively at High school.

– Analyse the accuracy of assessment methods.

Table 4. Student sample structure

School name	11 Graders	12 Graders	Total
Chau Van Liem High School	–	4	4
Ly Tu Trong High School for the Gifted	–	4	4
Phan Ngoc Hien High School	1	1	2
High school Teacher Practice – Can Tho University	12	3	15
Total	**13**	**12**	**25**

The experiment was processed completely remote via Facebook Messenger social network. Tai & Phuong (2015) proved that the result of CAT is approach the exact value after 5 to 10 questions, no matter what is the beginning value. So question_limit for each topic is 10.

Figure 7 shows an illustration of the experimental process.

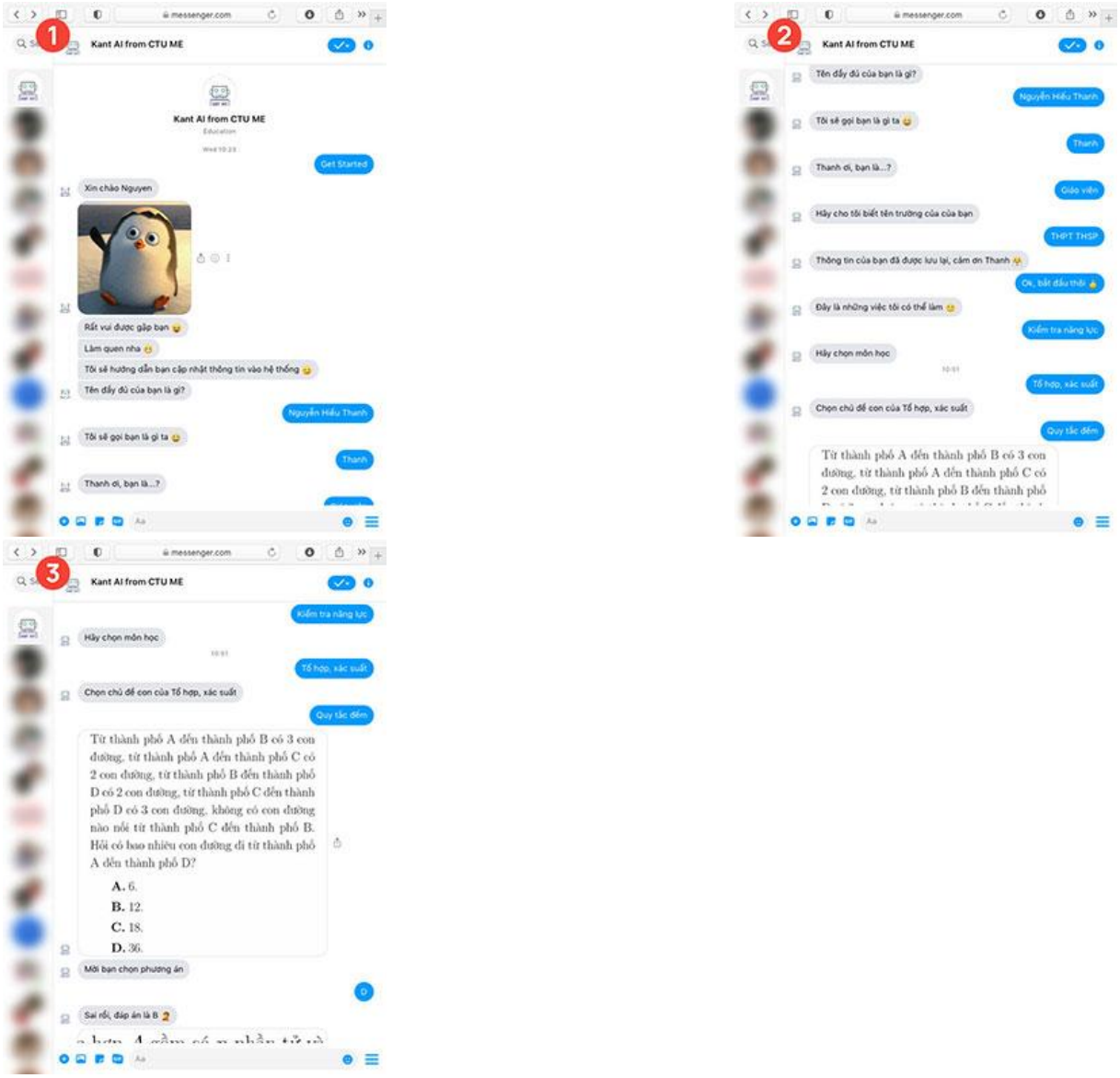


Figure 7. The experimental process

First look at the experimental result

The collected data was encoded and entered into GNU PSPP statistical application version 1.4 for processing. Table 5 gives a first look at the experimental result.

Table 5. First look at experimental result

Factor	Scale	Quantity	Proportion
Gender	1: Male 2: Female	11 14	44% 56%
Grade	1: Grade 10 2: Grade 11 3: Grade 12	– 13 12	0% 52% 48%
Number of quesitons	1: Less than 5 2: 5 or greater	4 21	16% 84%
Test taking duration (minutes)	1: Less than 5 2: From 5 to 9 3: From 10 to 14 4: From 15 to 20 5: 20 or greater	2 7 8 2 6	8% 28% 32% 8% 24%
Mathematics' mark	1: Less than 3.5 2: From 3.5 to 4.9 3: From 5.0 to 6.4 4: From 6.5 to 7.9 5: 8.0 or greater	– – 2 6 17	0% 0% 8% 24% 68%
Experimental result	1: Less than 3.5 2: From 3.5 to 4.9 3: From 5.0 to 6.4 4: From 6.5 to 7.9 5: 8.0 or greater	1 2 5 3 14	4% 8% 20% 12% 56%

Analyse the experimental result

First of all, we estimate the Error of assessment by Explore function of PSPP. The result is shown in table 6:

Table 6. Estimating result on PSPP

		Statistic	Std. Error
Mean		0.78	0.14
95% Confidence Interval for Mean	Lower Bound	0.50	
	Upper Bound	1.07	
5% Trimmed Mean		0.75	
Median		0.60	
Variance		0.48	
Std. Deviation		0.69	

With 95% confidence, the error of assessment is in closed interval $[0.50; 1.07]$. This is an accepted interval. In the other hand, standard deviation equals 0.69, corresponds to the termination condition of CAT. That means almost all students' standard error of measurement becomes stable before finishing their test.

Next, the paper takes a Cross-Tab calculating from PSPP between Experimental result and Students' mark of Mathematics (Table 7).

Table 7. Crosstab of Experimental result and Students' mark

		Students' mark of Mathematics			Total
		8.0 – 10.0	6.5 – 7.9	5.0 – 6.4	
Experimental result	8.0 – 10.0	14	–	–	14
	6.5 – 7.9	–	3	–	3
	5.0 – 6.4	3	2	–	5
	3.5 – 4.9	–	1	1	2
	0.0 – 3.4	–	–	1	1
Total		**17**	**6**	**2**	**25**

Table 8 shows the Chi-square test result from PSPP:

Table 8. Chi-square test result from PSPP

	Value	**df**	**A. Sig. (2-tailed)**
Pearson Chi-Square	34.90	8	0
Likelihood Ratio	30.84	8	0
Linear-by-Linear Association	14.67	1	0
N of Valid Cases	25		

The Chi-square test gives us p-value approximate zero, so the results are highly reliable.

The researchers continue with Independent Samples Test between Gender, Grade and Error of assessment (Table 8). The summary test shows that these variables do not affect the Error of assessment. Thus the method is very objective.

Table 8. Independent samples test from PSPP

	Sig. of Lenvene's Test	**Sig. of T-Test**	**Conclusion**
Gender and Error of assessment	0.676 > 5%	0.259 > 5%	Independent
Grade and Error of assessment	0.499 > 5%	0.907 > 5%	Independent

IV. CONCLUSION

This paper has built an AI Chatbot system on the Facebook Messenger platform, which is integrated with CAT method to assess students' Mathematical achievement at Vietnam High schools. The product approaches the trend of using AI in Education. Moreover, the researchers bring CAT to High school education and get a very possible result. The project will continue to optimise and expand the database in further research.

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TÜRKİYE'DE KİŞİ BAŞINA KARBONDİOKSİT EMİSYONUNUN DURAĞANLIĞI: FOURİER YAKLAŞIMI

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ÖZET:

Küresel sera gazları emisyonu dünya genelinde artış göstermektedir. Bu artışın temel nedeni ekonomik büyüme ve fosil yakıt kullanımından kaynaklanmaktadır. Sera gazlarının en önemli bölümünü karbondioksit (CO_2) emisyonu oluşturmaktadır. CO_2 emisyonunun sera gazı ve iklim değişikliği üzerindeki etkisi hem gelişmiş hem de gelişmekte olan ülkeler için önemini koruyan bir konudur. Literatürde CO_2 emisyonunun etkilerini araştıran çalışmalar mevcuttur. Bu çalışmaların bazılarında, Çevresel Kuznets Eğrisi yaklaşımı kullanılarak gelir ve CO_2 emisyonu arasındaki ilişki tartışılmaktadır. Diğer bir grup çalışmada ise odak noktası CO_2 emisyonunun yakınsaması konusuna kaymıştır. Stokastik yakınsama yaklaşımı, şokların değişkenler üzerindeki etkilerine ve şokların değişkenler üzerindeki kalıcılığına odaklanmaktadır.

Bu çalışmada, Türkiye'nin 1960-2016 dönemi kişi başına CO_2 emisyonunun durağanlığının test edilmesi amaçlanmıştır. Çalışmada CO_2 emisyonunun durağanlığı geleneksel ADF birim kök testi, yapısal kırılmalı birim kök testleri, Fourier durağanlık testi (Fourier KPSS) ve Fourier ADF birim kök testi kullanılarak analiz edilmiştir. İlk olarak ADF birim kök testi, Zivot-Andrews (1992), Lumsdaine ve Papell (1997), Lee ve Strazicich (2003,2004) (LM) yapısal kırılmalı birim kök testleri uygulanmıştır. Daha sonra, Fourier KPSS durağanlık ve Fourier ADF birim kök testleri kullanılmıştır. ADF, Zivot-Andrews (1992) ve Lumsdaine ve Papell'e (1997) birim kök testleri sonuçları, durağan olmama lehine kanıtlar göstermiştir. Lee ve Strazicich (2003, 2004) LM birim kök testi sonuçlarına göre iki kırılma dikkate alındığında Türkiye için birim kök testi sonuçları durağandır. Fourier KPSS durağanlık ve Fourier ADF birim kök testleri sonuçları ise Türkiye'de kişi başına CO_2 emisyonunun durağan olmadığını ortaya koymuştur.

CO_2 serisinin durağanlık özelliklerinin incelenmesi hem araştırmacılar hem de politika yapıcılar için önemlidir.Sürdürülebilir çevre politikaları, CO_2 emisyon serilerinin özelliklerine dayanmaktadır. CO_2 emisyon serisinin durağan olmaması seriye gelen şokların kalıcı olacağı ve serisinin ortalamaya dönme eğiliminde olmayacağı anlamına gelmektedir. Bu bağlamda uygulanacak çevre politikalarının uzun vadede etkili olacağı kabul edilmektedir.

Anahtar Sözcükler: CO_2 Emisyonu, Fourier KPSS Durağanlık Testi, Fourier ADF Birim Kök Testi, Türkiye

STATIONARITY OF CARBON DIOXIDE EMISSIONS PER CAPITA IN TURKEY: THE FOURIER APPROACH

Abstract

Global green house gas emissions are increasing worldwide. The main reason for this increase is due to economic growth and fossil fuel use. Carbon dioxide (CO_2) emissions

constitute the most important part of green house gases. The impact of CO_2 emissions on green house gas and climate change is an issue that remains important for both developed and developing countries.There are studies in the literature investigating the effects of CO_2 emissions. In some of these studies, the relationship between income and CO2 emissions is discussed using the Environmental Kuznets Curve approach. In another group of studies, the focus shifted to the convergence of CO_2 emissions.The stochastic convergence approach focuses on the effects of shocks on variables and the persistence of shocks on variables.

In this study, it is aimed to test the stationarity of CO_2 emissions per capita in Turkey for the period 1960-2016. In the study, the stationarity of the CO_2 emission was analyzed using traditional ADF unit root test, structural break unit root tests, Fourier stationarity test (Fourier KPSS) and Fourier ADF unit root test. Firstly, ADF unit root test, Zivot-Andrews (1992), Lumsdaine and Papell (1997), Lee and Strazicich (2003, 2004) (LM) structural break unit root tests were applied.Then, Fourier KPSS stationarity and Fourier ADF unit root tests were used.Unit root test results to ADF, Zivot-Andrews (1992) and Lumsdaine and Papell (1997) showed evidence in favor of non-stationarity.According to Lee and Strazicich (2003, 2004) LM unit root test results when two breaks are taken into account, unit root test results are stationarity for Turkey. The results of Fourier KPSS stationarity and Fourier ADF unit root tests revealed that per capita CO_2 emissions in Turkey are non-stationarity.

Examining the stationarity properties of the CO_2 series is important for both researchers and policy makers. Sustainable environmental policies are based on the characteristics of the CO_2 emission series.The fact that the CO_2 emission series is non-stationarity means that the shocks to the series will be permanent and the series will not tend to return to the mean. In this context, it is accepted that the environmental policies to be implemented will be effective in the long run.

Key Words: CO_2 Emissions, Fourier KPSS Stationarity Test, Fourier ADF Unit Root Test, Turkey

1. GİRİŞ

Günümüzde iklim değişikliği hem gelişmiş hem de gelişmişte olan ülkelerin üzerinde durduğu önemli bir konu haline gelmiştir. Ülkelerin ekonomik büyüme, sanayileşme, kentleşme gibi faaliyetlerinden kaynaklı sera gazları salınımı her geçen gün artmaktadır. Bu çabalar daha fazla enerji tüketimine neden olarak başta karbondioksit (CO_2) olmak üzere sera gazları emisyonunun atmosferdeki miktarını yükseltmektedir. CO_2 sera gazları içinde en büyük paya sahip olup, ülkelerin iklim değişikliği ile mücadelesinde kilit faktör olarak değerlendirilmektedir.

Küresel sera gazları emisyonu dünya genelinde artış göstermektedir. Bu artışın temel nedeni ekonomik büyüme ve fosil yakıt kullanımından kaynaklanmaktadır. İnsan faaliyetlerinden dolayı sera gazları emisyonu artmakta, bu durum sera gazı etkisi, sıcaklık değişimleri ve iklim değişikliklerine neden olmaktadır. CO_2 emisyonu ormansızlaşmaya ve fosil yakıt kullanımına bağlı olarak sera gazlarının en önemli bölümünü oluşturmaktadır (OECD, 2019:1-3). 2019 yılı verilerine göre birincil yakıt tüketimi içinde en yüksek payı fosil yakıtlar oluşturmaktadır. Birincil enerji tüketimi içinde petrolün, kömürün, gazın, yenilenebilir enerjinin, hidronun ve nükleer enerjinin payları sırasıyla %33.1, %27.0, %24.2, %5.0, %6.4, %4.3 olarak gerçekleşmiştir. Dünya genelinde 2009 yılında 29745.2 milyon ton gerçekleşen CO_2 emisyonu, 2019 yılında 34169.0 milyon tona yükselmiştir. Ülke gruplarının CO_2 emisyonları incelendiğinde 2019 yılında ilk sırada %50.5'lik payla Asya Pasifik

ülkeleri, ikinci sırada %17.5 payla Kuzey Amerika ülkeleri ve üçüncü sırada %12'lik payla Avrupa gelmektedir. CO_2 emisyonunun en fazla OECD üyesi olmayan ülkelerden (%68.4) kaynakladığı, OECD üyesi ülkelerin toplam payının %35.2, AB birliği üyesi ülkelerin ise %9.7'lik bir payı olduğu gözlemlenmektedir. Yıllar itibariyle ülkelerin CO_2 emisyon miktarlarında artışlar yaşanmıştır. Ülke bazında Çin 9825.8 milyon ton ile en fazla CO_2 emisyonunda bulunan ülke olup, dünya genelindeki payı %28.8'dir. İkinci sırada ise 4964.7 milyon ton CO_2 ve %14.5'lik payla ABD gelmektedir. ABD'yi sırasıyla Hindistan (%7.3), Rusya (%4.5), Japonya (%3.3) izlemektedir. Türkiye'nin CO_2 emisyon değerleri 2009-2019 döneminde 275.3 milyon tondan 383.3 milyon tona yükselmiştir. Türkiye'nin dünya genelinde CO_2 emisyonundaki payı ise %1.1'dir (BP, 2020: 4-13).

Literatürde CO2 emisyonunun etkilerini araştıran bir çok çalışma gerçekleştirilmiştir. Bu çalışmaların bir bölümünde konu gelir ve CO_2 emisyonu arasındaki ilişki çerçevesinde Çevresel Kuznets Eğrisi yaklaşımı kullanılarak ele alınmıştır (Grossmann ve Kruger (1991), Dinda (2004), Başar ve Temurlenk (2007), Narayan ve Narayan (2009), Akbostancı vd. (2009), Fodha ve Zaghdoud (2010), Oruba ve Omotor (2011), Koçak (2014)). Çevresel Kuznets Eğrisi ile ilgili ampirik çalışmaların temeli Grossmann ve Kruger (1991), Shafik ve Bandyopadhyay (1992) ve Panayotou (1993) çalışmalarına dayanmaktadır (bkz Panayotou, 2003: 2; Dinda, 2004: 433).

Diğer bir grup çalışmada ise odak noktası kişi başına CO2 emisyonlarının yakınsaması konusuna kaymıştır. Bu çalışmalarda kişi başına düşen CO_2emisyon farklılıkları, gelir büyüme literatüründe yer alan yakınsama ölçümleri kullanılarak incelenmektedir. Literatürde Beta-β yakınsaması, sigma -σ yakınsaması ve stokastik yakınsama olmak üzere üç ana yakınsama türü olduğu kabul edilmektedir (Bayer ve Juessen, 2006: 4; Fallahi ve Voia, 2015: 246-247). β yakınsamasında, bir "yakalama" sürecinin gerçekleşip gerçekleşmediği belirlenmeye çalışılmaktadır. Sigma yakınsamasında bir grup ülke arasında standart dağılımın zamanla azalıp azalmadığı test edilmektedir (Li ve Lin, 2013: 359). Stokastik yakınsamada kirlilik serilerinde birim kökün varlığını reddetmek, seriye yönelik rastgele bir şokun sabite veya sabit ve trende geri dönme eğiliminde olduğunu ifade etmektedir (Criado ve Grether, 2010: 4).

CO_2 emisyonunun sera gazı ve iklim değişikliği üzerindeki etkisi hem gelişmiş hem de gelişmekte olan ülkeler için önemini koruyan bir konudur. İlgili çalışmaların büyük bir bölümünde geleneksel birim kök testleri ve yapısal kırılmalı birim kök testleri kullanılarak ülkeler, OECD üyesi ülkeleri ve ülke grupları ele alınmıştır. Yapısal kırılmaların kademeli olarak modellenmesi ekonomik gerçekliğe daha uygun olarak değerlendirilmektedir. Literatürde yapısal değişmelerin kademeli olarak değişmesi yumuşak geçiş kavramı ile ifade edilmektedir (Bostancı, 2019: 29) Literatürde CO_2 emisyonunun durağanlık özelliğini yumuşak geçişleri dikkate alarak inceleyen çalışma (Tiwari vd. (2016), Chai vd. (2018); Chai ve Wu (2019); Ye vd. (2019), Erdoğan ve Solarin (2020) ve/veya CO2 emisyonunu gelir gruplarına göre analiz eden Ahmed vd. (2017), Payne ve Apergis (2020), Erdoğan ve Solarin (2020) çalışma sayısı az sayıdadır. Bu çalışmanın temel amacı, kişi başına karbondioksit emisyonunun durağanlık özelliğini yumuşak geçişi dikkate alan birim kök testleri ile sınayarak Türkiye'deki CO_2 emisyon serisinin durağanlık özelliğini incelemektir. Çalışmada Türkiye'nin kişi başına CO_2 emisyonları 1960-2016 dönemi dikkate alınarak incelenmiştir. Çalışmada geleneksel ADF birim kök testi, yapısal kırılmalı Zivot-Andrews (1992), Lumsdaine ve Papell (1997), Lee ve Strazicich (2003,2004) LM birim kök testleri ve yumuşak geçişi dikkate alan Beckers vd. (2006) Fourier KPSS durağanlık, Christopoulos ve León-Ledesma (2010) Fourier ADF birim kök testleri kullanılmıştır.

Çalışma dört bölümden oluşmaktadır. İkinci bölümde $C0_2$ emisyonunun durağanlık özelliğine yönelik literatür özetlenmiştir. Üçüncü bölümde kullanılan yöntemler ve elde edilen bulgulara yer verilmiştir. Son bölümde ise elde edilen bulgular çerçevesinde konu ile ilgili genel bir değerlendirme yapılmıştır.

2. LİTERATÜR

Literatürde CO_2 emisyonunun Beta ve/veya sigma yakınsaması gösterip göstermediğini test etmek amacıyla çeşitli çalışmalar yapılmıştır. Beta yakınsamasını araştıran çalışmalar arasında List (1999), Strazicich ve List (2003), Brock ve Taylor (2004), Lee ve Chang (2008), Solarin (2014), Presno, Landoja ve Gonzales (2018) yer almaktadır. Diğer bir grup çalışma Aldy (2006), Panopoulou ve Pantelidis (2009), Jobert, Karanfil ve Tykhanenko (2010) ise CO_2 emisyonun yakınsamasını sigma yakınsaması açısından incelemiştir. Nguen-Van (2005), Magazzino (2019), Li, Zuo, Wang ve Zhang (2020) çalışmalarında hem beta hem sigma yakınsaması birlikte ele alınmıştır.

Stokastik yakınsamada kişi başına düşen CO2 emisyonunun durağan olup olmadığı birim kök testleri ile test edilmektedir. Bu çalışmaların büyük bir bölümünde geleneksel birim kök testleri, yapısal kırılmalı birim kök testleri ve panel birim kök testleri kullanılmıştır. Örneğin Heil ve Selden (1999), Barassi, Cole, Elliott (2008), Westerlund ve Basher (2008), Romero-Avila (2008), Lee ve Chang (2009), Magazzino (2019), Li vd.(2020) çalışmalarında panel birim kök testlerini kullanılarak CO_2 emisyonunun durağanlık özelliği incelenmiştir.

Diğer bir grup çalışmada ise zaman serisi analizi kapsamında geleneksel ve yapısal kırılmalı birim kök testleri kullanılmıştır. Örneğin Lee, Chang, Chen (2008) çalışmasında yapısal kırılmasız ve yapısal kırılmalı birim kök testleri kullanılarak 21 OECD ülkesinin 1960-2000 dönemini test edilmiştir. Çalışma sonucunda kişi başına CO_2 emisyonunun durağanlık gösterdiği bulgusu elde edilmiştir. Ulucak ve Erdem (2012) çalışmasında Türkiye'nin 1960-2000 dönemi kişi başına CO_2 emisyon verileri Lee-Strazicich yapısal kırılmalı birim kök testi ile analiz edilmiştir. Çalışma sonucunda yapısal kırılmalar dikkate alındığında CO_2 serisinin durağan bir seri olduğu tespit edilmiştir. Acaravcı (2013)'de 19 Kıta Avrupa ülkesi ve Türkiye'nin 1960-2000 dönemine ait kişi başına CO_2 emisyon verilerinin Lee ve Strazicich (2003, 2004) yapısal kırılmalı birim kök testi kullanılarak incelendiği çalışma sonucunda karma bulgular elde edilmiştir. Tek yapısal kırılma dikkate alındığında 19 Kıta Avrupa ülkesinden 18'inde ve Türkiye'de CO_2'ye gelen şokların kalıcı olduğu, çift yapısal kırılma dikkate alındığında ise 14 Kıta Avrupa ülkesinde kişi başı CO_2 değişkenine gelen şokların kalıcı nitelikte olduğu tespit edilmiştir. Çift yapısal kırılma dikkate alındığında Türkiye için sabit ve trendde iki kırılma altında durağanlık olduğu gözlemlenmiştir. Yamazaki, Tian ve Tchatoka (2014) çalışmasında 34 OECD üyesi ülkesinin 1971-2009 dönemi için kişi başına CO_2 emisyonunun trend özellikleri incelenmiştir. Robust yönteminin kullanıldığı çalışma sonucunda bazı OECD ülkelerinde 1970'lerdeki petrol şoklarından sonra ya da 2000'lerin başlarından ortalarına kadar kişi başına CO2 emisyonlarındaki eğilimin aşağıya ya da tersine döndüğü tespit edilmiştir. Solarin (2014) çalışmasında 39 Afrika ülkesinin 1960-2010 dönemi göreli kişi başına CO_2 emisyon verisi kullanılarak geleneksel ve yapısal kırılmalı birim kök testleri ile analiz edilmiştir. Lee ve Strazicich (2003, 2004) yapısal kırılmalı birim kök test sonuçları birçok Afrika ülkesinde kişi başına CO_2 emisyonunun durağan olduğu (stokastik yakınsama gösterdiği) yönündedir.

Son yıllarda literatürde kişi başına düşen CO2 emisyonunun durağanlık özelliği doğrusal olmayan ve/veya yumuşak geçişi dikkate alan birim kök testi kullanarak analiz edilmeye başlanmıştır. Tiwari, Kyophilavang ve Albulescu (2016) çalışmasında 35 Sahra-altı Afrika ülkesinin 1960-2009 dönemi kişi başına CO_2 emisyon serisinin durağanlık özelliği

incelenmiştir. Doğrusal olmayan zaman serisi ve panel kök testleri kullanılan çalışmada, Becker, Enders ve Lee (2006) testi sonuçlarına göre kişi başına CO_2 emisyon serisi 35 ülkeden 27'sinde ortalamaya dönme eğilimi göstermiştir. Ancak SPSM sürecinin izlendiği panel birim kök testi sonuçlarına göre ise kişi başına CO_2 emisyon serisinin 15 ülkede durağan olduğu bulgusu elde edilmiştir.

Ozcan ve Gültekin (2016) çalışmasında OECD üyesi ülkelerin 1960-2013 dönemi göreli kişi başına düşen CO_2 emisyonunun stokastik yakınsama gösterip göstermediği incelenmiştir. Geleneksel birim kök testi (ADF) sonuçlarına göre altı ülkede için Ho hipotezi reddedilirken, 22 ülkede Ho hipotezi reddedilememiştir. LM testi sonuçlarına göre üç ülkede (Avusturya, Kanada ve Danimarka) göreli kişi başına düşen CO_2 emisyonlarının durağan olduğu, diğer 25 ülkede durağan olmadığı sonucuna ulaşılmıştır. RALS-LM birim kök testi sonuçlarına göre ise göreli kişi başına düşen CO_2 emisyonlarının altı ülkede (Avusturya, Belçika, Kanada, Danimarka, Finlandiya ve İsrail) durağan olduğu, kalan 22 ülkede ise durağan olmadığı tespit edilmiştir.

Sun, Su ve Shao (2016)'da 10 büyük ekonominin (ABD, Çin, Japonya, Almanya, Fransa, İngiltere, Brezilya, İtalya, Hindistan, Kanada) 1971-2010 dönemi için Enders ve Lee (2012) esnek fourier birim kök testini kullanarak CO_2 emisyonunun yakınsama gösterip göstermediği analiz edilmiştir. Çalışma sonuncunda bir çok ülkede CO_2 emisyon serisinin durağan olduğu (yakınsama gösterdiği) sonucuna ulaşmışlardır.

Chai, Chang ve Inglesi-Lotz (2018) çalışmasında 21 OECD ülkesinin 1950-2014 dönemi yıllık kişi başına CO_2 emisyonu geleneksel birim kök testleri, quantil birim kök testi ve Foriuer fonksiyonlu quantil birim kök testi (FQKS) kullanılarak analiz edilmiştir. FQKS testi sonuçlarına göre Avusturya, Japonya, Hollanda, Yeni Zelanda, İsviçre ve ABD için sıfır hipotezi reddedilmiştir. Bu sonuç ilgili ülkelerde kişi başına CO2 emisyonunun durağan olduğu anlamına gelmektedir. Diğer ülkeler de ise (Avustralya, Belçika, Kanada, Finlandiya, Fransa,Yunanistan, Macaristan, İtalya, Kore, Norveç, Polonya, Portekiz, İspanya, İsveç ve İngiltere) kişi başına düşen CO_2 emisyonunun durağan olmadığı bulgusu elde edilmiştir.

Chai ve Wu (2019) çalışmasında 21 OECD üyesi ülkesi ve 19 yükselen piyasa ekonomisinin 1960-2014 dönemindeki kişi başına düşen CO_2 emisyonunun stokastik yakınsaması incelenmiştir. Çalışmada ani ve yumuşak geçişi dikkate alan panel birim kök testleri kullanılmıştır. Ampirik sonuçlar, iki grup ülke için de stokastik yakınsamayı (durağanlığı) önermektedir. Ancak, ülkeler için ayrı ayrı testler yapıldığında sonuçlar farklılaşmaktadır. Yumuşak geçişler dikkate alınmadığında 4 OECD ve 4 yükselen piyasa ekonomisi için yakınsama (durağanlık) tespit edilmiştir. Ani ve yumuşak geçişler dikkate alındığında ise 11 OECD ve 10 yükselen piyasa ekonomisinde yakınsama olduğu (durağanlık) sonucuna ulaşılmıştır.

Ye, Chen, Inglesi-Lotz ve Chang (2019) çalışmasında geleneksel birim kök testleri ve Fourier quantil birim kök testi kullanılarak G7 ülkelerinin ve Çin'in 1950-2013 dönemi için kişi başına $C0_2$ yakınsaması incelenmiştir. Geleneksel birim kök testi sonuçlarına göre G7 ve Çin için $C0_2$ emisyonu yakınsama (birim kök içermektedir) göstermemektir. Fourier quantil birim kök testi sonuçlarına göre Almanya, İtalya ve İngiltere'de $C0_2$ emisyonunun yakınsadığı (durağan olduğu) tespit edilmiştir. Diğer beş ülkede (Kanada, Fransa, Japonya, ABD ve Çin) güçlü yakınsama olmadığı, CO_2 emisyonlarının belirli miktarlarda yakınsadığı gözlemlenmiştir.

CO_2 emisyonunun durağanlığını gelir gruplarına göre inceleyen çalışmalardan Ahmed, Khan, Bibi ve Zakaria (2017) çalışmasında tüm gelir grupları (yüksek-gelirli OECD ülkeler, yüksek gelirli OECD üyesi olmayan ülkeler, orta-gelirli ülkeler, düşük gelirli ülkeler) dikkate alınarak 162 ülkenin 1960-2010 dönemi zaman serisi dalgacık tabanlı (wavlet) birim kök

testleri ile sınanmıştır. Çalışma sonucunda 18 yüksek gelirli OECD ülkesi, 2 yüksek gelirli OECD üyesi olmayan ülke, 13 orta-gelirli ülke, 5 düşük gelirli ülke olmak üzere toplam 38 ülke için kişi başına CO_2 emisyonun durağanlık (yakınsama) gösterdiği gözlemlenmiştir. Geri kalan 124 ülkede ise kişi başına CO_2 emisyonunun durağan olmadığı tespit edilmiştir. Kişi başına CO_2 emisyonunu gelir gruplarına göre inceleyen diğer bir çalışma Payne ve Apergis (2020) çalışmasıdır. Payne ve Apergis (2020) çalışmasında panel birim kök testleri (Pesaran, 2007; Bai ve Carrion-i Silvestre, 2009) kullanılarak 27 düşük gelirli, 38 düşük orta gelirli, düşük ve düşük orta gelirli ülke kombinasyonu 65 ülkenin 1972-2014 dönemi incelenmiştir. Pesaran (2007) birim kök test sonuçlarına göre sıfır hipotezi %1 anlamlılık düzeyinde reddedilmiş, hem CIPS hem de CIPS* istatistikleri kişi başına düşen CO_2 emisyonunun durağan olduğunu (stokastik yakınsama) göstermiştir. Benzer şekilde Carrion-i Silvestre (2009) birim kök testi sonuçlarından da kişi başına düşen CO_2 emisyonunun durağan olduğu (stokastik yakınsama) bulgusu elde edilmiştir. Erdoğan ve Solarin (2020) çalışmasında 151 ülkenin kişi başına CO_2 emisyonu 1960-2016 dönemi için Fourier tabanlı dalgacık modeli kullanılarak (FWAF) analiz edilmiştir. Çalışma sonucunda 53 yüksek gelirli ülkeden 35'inde ve 39 yüksek orta gelirli ülkeden 27'sinde kişi başına düşen CO_2 emisyonunun durağan olduğu sonucuna ulaşılmıştır. Ayrıca kişi başına düşen CO_2 emisyonunun 30 düşük orta gelirli ülkede (toplam 36 ülke) ve 13 düşük gelirli ülkede (toplam 23 ülke) durağan süreç izlediği tespit edilmiştir. Elde edilen bulgulara göre farklı gelir düzeylerindeki ülkelerde stokastik yakınsama görülmektedir.

Literatürde kişi başına CO_2 emisyonunun durağanlığı ilgili yapılan uygulamalı çalışmalardan kullanılan yönteme, örnekleme ve döneme göre farklı sonuçların elde edildiği gözlemlenmektedir.

3. VERİ, YÖNTEM VE BULGULAR

Çalışmada Türkiye'nin 1960-2016 dönemi yıllık kişi başına düşen CO_2 emisyon miktarları kullanılmıştır. İlgili veriler Dünya Bankası (World Development Indicator) istatistiklerinden elde edilmiştir. Analizlerde Gauss 6.0 ve Winrats 8.1 programları kullanılmıştır.

Tablo 1: Değişkenlerin Tanımlanması

Değişken	Açıklaması	Değer	Kaynak
TUR	Türkiye	CO2 Emisyonu (kişi başına metrik ton)	Dünya Bankası

Kaynak: https://databank.worldbank.org/source/world-development-indicators

3.1 Yöntem

Çalışmada geleneksel birim kök testleri, yapısal kırılmalı birim kök testleri ve Fourier birim kök testleri kullanılmıştır. Geleneksel birim kök testleri yapısal kırılmaları dikkate almadığında güçleri azalmaktadır. Kırılmaları dikkate almak için kullanılan genel yöntem ise

gölge değişken kullanmaktır. Ancak gölge değişken kullanılması birkaç durumu ortaya çıkarmaktadır. İlk olarak kırılmaların tam sayısı ve tarihi bilinmelidir. İkinci olarak yapısal kırılmayı dikkate alan testlerde bir ya da iki kırılma tarihi belirlenebilmektedir. Üçüncüsü ise gölge değişken kullanımı trendde ya da düzeyde keskin ve ani değişimleri önermektedir. Bununla birlikte, düşük frekanslı veriler için yapısal değişikliklerin büyük dalgalanmalar biçimini alması daha olasıdır. Bu değişiklikler yalnızca gölge değişken kullanılarak iyi bir şekilde yakalanamayabilmektedir. Bu nedenle kırılmalar yumuşak ve kademeli süreçler olarak ele alınmalıdır. Bu problemi aşabilmek amacıyla Beckers vd. (2006), Christopoulos ve Leon Ledesma (2010), Enders ve Lee (2012) tarafından Fourier dönüşümleri kullanılarak yumuşak süreçleri dikkate alan yapısal kırılmalı birim kök testi modelleri geliştirilmiştir (Leybourne vd. 1998 aktaran Sun vd. 2016: 455-456). Beckers vd. (2006) tarafından geliştirilen Fourier KPSS (FKPSS) durağanlık testi sadece ani değişimleri değil aynı zamanda yavaş değişimleri de tespit edebilmekte ve yapısal değişim(ler)in konumu, sayısı ve biçimi testin gücünü etkilememektedir (Yılancı, 2017: 56).

3.2. Bulgular

Kişi başına CO_2 emisyonu serisinin durağanlık özelliği ilk olarak yapısal kırılmayı dikkate almayan geleneksel birim kök testi kullanılarak incelenmiştir. Tablo 2'de ADF birim kök testi sonuçlarına yer verilmiştir.

Tablo 2: ADF Birim Kök Testi Sonuçları

Sabitli Model	**Hesaplanan Test İstatistiği**	**%1**	**%5**	**%10**	**Sonuç**
TUR	0.1419	-3.5526	-2.9145	-2.5950	**
Sabitli ve Trendli Model	**Hesaplanan Test İstatistiği**	**%1**	**%5**	**%10**	**Sonuç**
TUR	-3.2516	-4.1305	-3.4921	-3.1748	Birim kök

* Çalışmada uyumluluk olması için %5 anlamlılık düzeyi kritik değerleri dikkate alınmıştır.** Patlayan birim kök süreci olduğu için değerlendirilmemiştir.

ADF sabitli ve trendli model birim kök testi sonuçlarına göre %5 anlamlılık düzeyinde kişi başına CO_2 emisyonu birim kök içermektedir. Daha sonra kişi başına CO_2 emisyonu serisinin durağanlık özelliği yapısal kırılmayı dikkate olan Zivot-Andrews (1992), Lumsdaine ve Papell (1997), Lee ve Strazicich (2003, 2004) LM birim kök testleri ile analiz edilmiştir. Tablo 3 ve Tablo 4'te yapısal kırılmalı birim kök testi sonuçlarına yer verilmiştir.

Tablo 3: Yapısal Kırılmalı Birim Kök Testi Sonuçları

Zivot-Andrews (1992) Birim Kök Testi Sonuçları	
Model A	
Kırılma Tarihi	2005
Hesaplanan Test İstatistiği	-4.45751
Test İstatistiği	-4.8000
Sonuç	Birim Kök
Model C	
Kırılma Tarihi	2000
Hesaplanan Test İstatistiği	-4.63564
Test İstatistiği	-5.0800
Sonuç	Birim Kök
Lumsdaine ve Papell (1997) Birim Kök Testi Sonuçları	
Model AA	
Kırılma Tarihi	1977; 1998
Hesaplanan Test İstatistiği	-5.1791
Test İstatistiği	-6.1600
Sonuç	Birim Kök
Model CC	
Kırılma Tarihi	1978; 2000
Hesaplanan Test İstatistiği	-6.1354
Test İstatistiği	-6.7500
Sonuç	Birim Kök

*****Model A= Düzeyde Tek Kırılma, Model C= Hem Düzeyde Hem Eğimde Tek Kırılma, Model AA= Düzeyde İki Kırılma, Model CC= Hem Düzeyde Hem Eğimde İki Kırılma,** Kritik Değerler %5 değerleridir.

Zivot-Andrews (1992) ile Lumsdaine ve Papell (1997) birim kök testi sonuçlarına göre Model A, Model AA, Model C, Model CC test sonuçlarına göre TUR değişkeni birim köke

sahiptir. Elde edilen bu sonuç kişi başına CO_2 emisyon serilerine gelen şokların etkisinin kalıcılık gösterdiği şeklinde yorumlanabilir. Tablo 4'te Lee ve Strazicich (2003,2004) LM birim kök testi sonuçlarına yer verilmiştir.

Tablo 4: Lee ve Strazicich (2003,2004) LM Birim Kök Testi Sonuçları

Lee ve Strazicich (2003,2004) LM Birim Kök Testi Sonuçları	
Model A	
Kırılma Tarihi	2005
Hesaplanan Test İstatistiği	-3.5216**
Test İstatistiği	-3.4870
Sonuç	Yapısal Kırılmalı Durağan
Model C	
Kırılma Tarihi	1995
Hesaplanan Test İstatistiği	-3.7114
Test İstatistiği	-4.3503
Sonuç	Yapısal Kırılmalı Birim Kök
Model AA	
Kırılma Tarihi	1977; 2010
Hesaplanan Test İstatistiği	-4.5421**
Test İstatistiği	-3.5630
Sonuç	Yapısal Kırılmalı Durağan
Model CC	
Kırılma Tarihi	1980; 1999
Hesaplanan Test İstatistiği	-6.7023**
Test İstatistiği	-6.1850
Sonuç	Yapısal Kırılmalı Durağan

*Model A= Düzeyde Tek Kırılma, Model C= Hem Düzeyde Hem Eğimde Tek Kırılma, Model AA= Düzeyde İki Kırılma, Model CC= Hem Düzeyde Hem Eğimde İki Kırılma,**

Kritik Değerler %5 değerleri olup %5'de anlamlılık göstermektedir.*** Patlayan birim kök süreç olduğu için değerlendirme dışı tutulmuştur.

Lee ve Strazicich (2003,2004) LM birim kök testi sonuçlarına göre düzeyde ve eğimde iki kırılma dikkate alındığında Türkiye'nin kişi başına düşen CO_2 emisyonunu için Ho hipotezi %5 anlamlılık düzeyinde reddedilmektedir. İlgili seriler durağanlık göstermektedir.

Çalışmada serilerin birim kök içerip içermedikleri yumuşak geçişli kırılmaları dikkate alan Beckers vd.(2006) Fourier KPSS durağanlık testi, Christopoulos ve Leon Ledesma (2010) Fourier ADF birim kök testi ile analiz edilmiştir. Tablo 5'de elde edilen sonuçlara yer verilmiştir.

Tablo 5: Fourier Testi Sonuçları

Ho: Durağanlık Ha: Birim Kök	**Beckers vd. (2006) Fourier Durağanlık Testi**				
TUR			Hesaplanan Test İstatistiği	Tablo Değeri	Sonuç
Model A $(\tau_\mu(k))$	00		0.31639	0.1720	Birim kök
Model C $(\tau_\tau(k))$	00		0.14662	0.1423	Birim Kök
Ho: Birim Kök Ha: Durağanlık	**Christopoulos ve Leon-Ledesma (2010) Fourier ADF Birim Kök Testi**				
TUR	00		-0.62145	-3.85	Birim Kök

*****Model A= Sabitli Model, Model C= Sabitli ve Trendli Model, **Tablo değerleri Beckers vd. (2006) çalışmasından alınmıştır. %5 anlamlılık düzeyini göstermektedir*** Tablo değerleri Christopoulos ve Leon-Ledesma (2010) çalışmasından alınmıştır.

Beckers vd. (2006) durağanlık testine göre Türkiye'nin kişi başına düşen CO_2 emisyonu her iki model için birim köklü olduğu yönündedir. Christopoulos ve Leon-Ledesma (2010) Fourier ADF birim kök testi sonuçlarından da kişi başına CO_2 emisyon serisinin birim köklü olduğu bulgusu elde edilmiştir.

4. SONUÇ

Günümüzde sera gazları etkisi ve iklim değişikliği tüm ülkelerin ortak sorunu haline gelmiştir. İnsan faaliyetleri sonucu her geçen gün atmosferde CO_2 emisyonu miktarı artmaktadır. Özellikle fosil yakıt kullanımının birincil enerji tüketimi içinde payının yüksek

olması CO_2 emisyonundaki artışın en önemli nedenlerinden biridir. Dünya genelinde son yıllarda CO_2 emisyonunun artışında özellikle Asya ülkelerinin payının yükseldiği gözlenmektedir. CO_2 emisyonunda Çin ilk sırada gelirken, Çin'i ABD izlemektedir. Türkiye'nin dünya genelinde CO_2 emisyonundaki payı ise yaklaşık %1.1 düzeylerindedir.

Bu çalışmada Türkiye'nin kişi başına düşen CO_2 emisyon serilerinin durağanlık özelliği 1960-2016 dönemi için geleneksel birim kök testi, yapısal kırılmalı birim kök testleri ve Fourier durağanlık ve Fourier birim kök testi kullanılarak analiz edilmiştir. ADF birim kök testi sonuçlarına göre %5 anlamlılık düzeyinde kişi başına CO_2 emisyonu birim kök içermektedir. Zivot-Andrews (1992) ile Lumsdaine ve Papell (1997) birim kök testi sonuçlarına göre Model C, Model CC test sonuçlarına göre TUR değişkenleri birim köke sahiptir. Elde edilen bu sonuç kişi başına CO2 emisyon serilerine gelen şokların etkisinin kalıcılık gösterdiği şeklinde yorumlanabilir. Lee ve Strazicich (2003,2004) LM birim kök testi sonuçlarına göre düzeyde ve eğimde iki kırılma dikkate alındığında Türkiye'nin kişi başına düşen CO_2 emisyonunu için Ho hipotezi %5 anlamlılık düzeyinde reddedilmektedir. İlgili seriler durağanlık göstermektedir. Türkiye için elde edilen bu sonuç Ulucak ve Erdem (2012) ve Acaravcı (2013) çalışmaları ile benzerdir. Beckers vd.(2006) Fourier KPSS durağanlık testi sonuçlarına göre Türkiye'nin kişi başına düşen CO_2 emisyonu ise her iki model için birim köklü olduğu yönündedir. Christopoulos ve Leon-Ledesma (2010) Fourier ADF birim kök testi sonuçlarından kişi başına CO_2 emisyon serisinin birim köklü olduğu bulgusu elde edilmiştir. CO_2 emisyon serisinin durağan bulunması, seriye gelen şokların kalıcı olmadığı bu nedenle uygulanacak çevre politikalarının etkisinin geçici olacağı şeklinde yorumlanabilir. CO_2 emisyon serisinin birim kök içermesi ise seriye gelen şokların kalıcı olacağı ve kişi başına CO_2 emisyonunun kalıcı olarak etkileneceği anlamına gelmektedir. Bu bağlamda uygulanacak çevre politikaları uzun vadede etkili olacaktır.

Doğaya verilen tahribat eko-sitemi bozarak tüm canlıları etkilemektedir. Çevre kirliği insan yaşam kalitesini azaltan bir faktördür. Bu nedenle çevre kirliliğinin, iklim değişikliğinin, küresel ısınmanın etkileri çevre, ekonomi ve teknoloji politikalarında yer alması gerekmektedir. Ulusal anlamda temiz çevre bilincinin oluşturulabilmesi için tüm toplumun katılımın sağlandığı (kamu kurumları- sivil toplum örgütleri-üretici- tüketici) politikalar oluşturulmalıdır. Çevre dostu teknolojiler geliştirilmeli, enerji verimliliği artırılmalı, fosil yakıtlara alternatif enerji kaynakları kullanılmalıdır. Küresel ölçekte ulus-üstü çevre politikaları oluşturulmalıdır.

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IĞDIR'DA KUŞ HALKALAMA, DÜNYA'DA KUŞLARIN TARIMA VE ORMANLARA KATKISI

BIRD RINGING IN IĞDIR, CONTRIBUTION OF BIRDS TO AGRICULTURE AND FORESTS IN THE WORLD

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Abstract

Iğdır is located on the outskirts of Ağrı Mountain which is called Sürmeli Pit in Erzurum-Kars part of Eastern Anatolia. Aras Basin which is a migration route for the migratory birds is in the borders of the city. Being located in the region of transition from Caucasus to Anatolia, having microclimate areas, existence of an altitude like 600 – 5000 in a confined space, Passing of one of the migration ways of the migratory birds from Iğdır and being in a place Irano-Turanian vegetating zone getting closed to the Europa-Siberia zone makes the city rich in the biological way. Being on the important bird migratory route and harbouring 489 species of total 530 bird species (92%) that Europe has, our country's importance as being a significant area of nourishment and breeding for birds is enhanced. With up to 120 mammals ,130 reptilians and 400 fish species, our country is very rich with regard to species diversity in biological diversity. It is confirmed that 325 of 489 bird species found in Turkey live in Iğdır and use this region as a migration path. Nearly 192 species of 105,000 birds have been recorded. With 325 bird species recorded in its region, Iğdır harbours 66% of Turkey's bird entity and 60% of Europe in its area. All of the living and non-living things in nature play important roles directly or indirectly in conserving ecologic balance. Birds prevent the increase of the population of some insects that damages trees in the forests by eating them. Birds, feeding on seeds and fruits of plants, take these seeds and fruits away and leave them in remote areas by defecating so, they cause reproduction and spread of these plants. Conservation of the ecologic balance depends on the food chain which forms the dietary habits of living creatures.

Keywords: Bird ringing, Agriculture, Forest, iğdir, Anatolia

Özet

Iğdır İli, Doğu Anadolu bölgesinin Erzurum-Kars Bölümünde Sürmeli Çukuru adı verilen Ağrı Dağı eteklerinde yer almaktadır. Göçmen kuşlar için bir geçiş güzergâhı olan Aras Havzası ilin sınırları içerisindedir. Kafkaslardan Anadolu'ya geçiş bölgesinde yer alması, mikroklima alanlarına sahip olması, dar bir alan içerisinde 600-5000 m rakımın bulunması, göçmen kuşların göç yollarından birinin Iğdır'dan geçmesi ve Iran-Turan bitki kuşağının Avrupa-Sibirya kuşağına yaklaştığı bir noktada bulunması, ili biyolojik yönden zengin kılmaktadır. Ülkemizin dünyanın önemli kuş göç yolları üzerinde olması ve Avrupa kıtasındaki 530 kuş türünün, 489 türünü (% 92) barındırması kuşların beslenme ve üreme alanı olarak önemini artırmaktadır. 120 memeli, 130 kadar sürüngen, 400'e varan balık

türüyle, biyolojik çeşitlilikte tür çeşitliliği açısından çok zengindir. Iğdır genelinde, Türkiye'de bulunan 489 kuş türünden, 325 türün Iğdır İlinde yaşadığı ve göç güzergâhı olarak bölgeyi kullandığı tespit edilmiştir. 192 türden yaklaşık 105.000 kuş halkalanmış ve kayıt altına alınmıştır. Iğdır ilinde şimdiye kadar kaydedilmiş 325 kuş türü ile Ülkemizin kuş varlığının %66'sini, Avrupa'nın %60 türünü alanda barındırmaktadır. Doğadaki tüm canlı ve cansız varlıklar doğrudan ya da dolaylı olarak ekolojik dengenin korunmasında önemli rol oynarlar. Ormanlardaki ağaçlara zarar veren bazı böcekleri kuşlar yiyerek sayılarının artmasına engel olur. Tohum ve meyvelerle beslenen kuşlar, yedikleri bitki tohumlarını uzak yerlerde, dışkılarıyla birlikte atarak bitkilerin çoğalmalarına ve yayılmalarına neden olurlar. Ekolojik dengenin korunması, Canlıların beslenme alışkanlığını oluşturan besin zincirine bağlıdır.

Anahtar kelime: Kuş halkalama, Tarım, Orman Iğdır, Anadolu

GİRİŞ

Türkiye'nin doğu sınırında yer alan Iğdır Aras Nehri boyunca yer alan tektonik bir çöküntü ovasıdır. Çevresine göre daha düşük olan yıllık yağış miktarı (257,6 mm), kurak yaz ve ılıman kış şartları nedeniyle Doğu Anadolu'dan farklı bir "mikroklima" özelliği gösterir. Aras-Karasu Sulak Alanı Iğdır İli Tuzluca İlçesi Kars sınırında bulunan bölge Aras nehrinin geçiş yolundadır (Şimşek ve Alim 2009).

Kafkaslardan Anadolu'ya geçiş bölgesinde yer alması, dar bir alan içerisinde 600-5000 m rakımın bulunması, göçmen kuşların göç yollarından birinin Iğdır-Tuzluca'dan geçmesi ve İran-Turan bitki kuşağında bir noktada bulunması biyolojik yönden zengin kılmaktadır (Anonim, 2004).

IĞDIR'DA KUŞ HALKALAMA

40º07'16''K 43º35'00'' D koordinatlarında bulunan Aras Nehri Kuş Araştırma ve Halkalama İstasyonu 2006 yılının sonbahar göç döneminden itibaren ilkbahar ve sonbahar aylarında düzenli halkalama yapmaktadır.

İstasyon, 1059 m. Yüksekliğinde Aras Nehri'nin kuzey kıyısında, Iğdır'ın Tuzluca ilçesine bağlı Yukarı Çıyrıklı köyünün 300 metre uzağında, nehir ile köyün meyve bahçeleri ve merasının arasındaki sulak alanda kurulmuştur. Aras Nehri'nden bir setle ayrılan alanda, küçük göletler, söğüt ve ılgın ağaçları mevcuttur. Zeminin çamurlu olmayan kısmı kireçli topraktır. İstasyonun içinde olduğu vadi çoğunlukla çorak ve bitki örtüsünden mahrum olduğu için, istasyon göçmen ve üreyen kuşlar için küresel çapta çok önemli bir konaklama, beslenme, dinlenme ve üreme noktasıdır.

Iğdır il sınırları içerisinde rastlanan fauna örneklerini ise Bozkır Şahini, Arı Şahini, Kınalı Keklik, Çil Keklik, Puhu Kuşu, Baykuş, Yaban Domuzu, Kaya Kartalı, Tilki, Kurt, Atmaca, Macar Ördeği, Sakarmeke, Karabatak, Bahri Ördeği, Tepeli Toygar, Tavşan, Vaşak, Ayı, Akbaba, Arap Tavşanı, Delice ve Küçük Kerkenez olarak sıralayabiliriz. Orman ve Su İşleri İl Şube Müdürlüğü, Kafkas Üniversitesi ve KuzeyDoğa derneği tarafından yürütülen halkalama çalışmaları neticesinde,325 tür kuş gözlenmiş olup 192 türden yaklaşık 105.000 kuş halkalanmış ve kayıt altına alınmıştır (Şekercioğlu, 2016).

Iğdır ve Aras Vadisi kuşların göç yolu üzerinde bulunmakta kuşlar Rusya, Litvanya, Estonya, Ukrayna, Finlandiya, Polonya, Avusturya, Çek Cumhuriyeti, Macaristan, Belarus gibi ülkelerden gruplar halinde yavrularıyla gelip bu vadide konaklamakta buradan Afrika'ya gitmektedir. "Kafkas Çıvgını, Yeşil Arıkuşu ve Saz Horozu Türkiye'de ender görülen türlerdendir." Türkiye'de sadece Kızılırmak Deltası, Göksu deltası ve Çukurova'da üreyen Porphyrio porphyrio (Saz Horozu) Iğdır Tuzluca Yukarı Çıyrıklı Köyünün birinci göl mevkiinde ürediği tespit edilmiş ve Türkiye'de dördüncü üreme bölgesi olduğu ortaya çıkarılmıştır (Çevre ve Orman İl Müdürlüğü 2006). Ayrıca iki büyük memeli türü de

Bulakbaşı köyü sulak alanındaki gölde yaşamaktadır. Karnivorlardan nesli tehlike altında olan Susamuru (Lutra lutra) ve rodentlerden Su maymunu (Myocastor coypus). Türkiye'nin en batısı olan Trakya bölgesinde daha önce tespit edilmiş olan Su Maymunu ikinci olarak Türkiye'nin en doğusu olan Iğdır ilimiz Karasu bölgesinde olduğu görülmüştür (Türkoğlu vd 2008).

KUŞ HALKALAMA NEDİR? NİÇİN YAPILIR

Kuş türlerinin hareketlerini, göçlerini izlemek ve yayılışlarını saptamak, popülâsyonlarını izlemek gibi amaçlarla kuşun çok ince ağlarla yakalanmasından sonra, tür, yaş ve cinsiyet gibi bilgilerin kayıt edilerek kimlik niteliği taşıyan, hafif, paslanmaz, alüminyum halkaları kuşların bacağına takılması işlemidir. Bu adres sayesinde kuş ölü bulunduysa halkası, canlı olarak tekrar yakalandıysa kuşla ilgili bilgiler halkalandığı merkeze ulaştırılır ve kuşun nerede, ne zaman halkalandığı öğrenilir Halkalama çalışmaları, kuşların yaşamları ile ilgili birçok bilinmeyeni ortaya çıkarmak üzere tüm dünyada yüzyılı aşkın bir süredir uygulanan yaygın bir yöntemdir. Bu yöntemle, temelde kuşların göçleri (kuş türlerinin göç stratejileri, konaklama, kışlama ve üreme alanları, göç takvimleri, fizyolojileri) ve popülasyon dinamikleri (kaç yıl yaşadıkları, üreme başarıları, hayatta kalma başarıları, ilk üreme yaşları, kaç yaşına kadar üremeye devam ettikleri, genç bireylerin dağılma oranları) araştırılmaktadır. Ayrıca, tüm dünyada standart yöntemlerle yapılan ve her yıl tekrarlanan halkalama çalışmaları ile kuş popülasyonlarındaki değişimler takip edilebilmekte ve türlerin korunmasına yönelik kararlar alınabilmektedir. Özellikle göçmen kuşlarla ilgili koruma çalışmaları açısından, türlerin ya da popülasyonların üreme, konaklama, kışlama alanlarıyla ilgili bilgiler ve popülasyonların hayatta kalma başarıları ile ilgili veriler büyük önem taşmaktadır.

SEEN (South-east Bird Migration Network- Güneydoğu Kuş Göç Ağı)standartlarına göre gerçekleştirilmiştir.

SEEN standartları gereğince Aras Nehri Kuş Araştırma ve Halkalama İstasyonu'nda standart olarak uygulanan halkalama aşağıda belirtilen aşamalardan oluşmaktadır:

1- Ağların kurulması
2- Ağlardan kuş çıkartılması ve istasyona getirilmesi
3- Halkalama
3.1. Tür teşhisi
3.2. Halkanın takılması
3.3. Yaş tayini
3.4. Cinsiyet tayini
3.5. Yağ skoru tayini
3.6. Kanat formülü ölçümü
3.7. Kanat uzunluğu ölçümü
3.8. Kuyruk uzunluğu ölçümü
3.9. Ekstra ölçümler (tarsus, notch, tırnak, gaga vb.)
3.10. Ağırlık ölçümü

TABİATTA KUŞLARIN GÖÇÜNÜN ETKİSİ

Göçmen kuşlar farklı mevsimleri farklı coğrafyalarda peryodik ve düzenli bir şekilde geçiren kuş türlerinden oluşan bir gruptur. Her sene dünyaca 50 milyar kuşun göç ettiği tahmin edilir. Bunlardan yaklaşık 5 milyarı Avrupa ile Afrika arasında göç eder. (Anonim, 2016)

Milyarlarca kuş her yıl üreme ve kışlama bölgeleri Kuzey ve Güney yarımküre arasında (İlkbaharda üremek için kuzeye, sonbaharda ise ülkemizin güneyindeki kışlama alanlarına) uzun yolculuklar yaparlar. Kış aylarında havaların soğumasıyla, kuşların besin bulması

zorlaşır ve bu konuda aralarında rekabet artar. Bu sebeple Kuzey Yarımküre'de üreyen göçmen kuşlar, her sonbaharda Güney Yarımküre'ye doğru göç hareketine girişir. Güney daha sıcak ve besin bakımından daha zengin olduğundan iyi bir kışlama alanı teşkil eder. İlkbaharın başlamasıyla da güneyden kuzeye dönüş göçüne başlarlar. İlkbaharda kuzey bölgeleri kuş akınlarına uğrar.

Göçmen kuşların mesafeler kat ederek yaptığı yolculuk Ekolojik denge ve İnsanlar için hayati değer taşır. Baharda milyonlarca böcek, bitkiler üzerine yumurta bırakır. Bunlardan çıkan tırtıllar, kuşlar tarafından yenilerek kontrol altında tutulur. Çeşitli kurt, böcek ve çekirge yumurtalarını yiyerek mutlak bir kıtlığın önüne geçerler.

1) KUŞLARIN TARIMSAL VERİME DOĞRUDAN ETKİSİ

Tohumların dağıtılması, kuşların en önemli ekolojik fonksiyonlarından biridir. Bazı tropikal ormanlarda kuşlar 82 kerestelik ağaç türü, kokulu otlar da dâhil olmak üzere 182 yenebilir bitki cinsi, 153 tıbbi bitki, 146 süs bitkisi ve ekonomik ya da kültürel kullanımı olan 84 diğer bitki cinsi olmak üzere tüm ağaç ve odunsu türlerin %92'sinin tohum dağıtımını yapmaktadır (Şekercioğlu ve ark. 2017).

Afrika maunu (Meliaceae) gibi bazı önemli ağaç türlerinin tohumları sadece birkaç özel kuş tarafından dağıtılmaktadır. Hornbill (boynuzgaga) ve curassow (ağaç tavuğu) kuşu gibi meyveyle beslenen büyük kuşların yok olması ekonomiye zarar vermektedir, çünkü Gana'da bulunan Antiaris toxicaria gibi tohumları kuşlar tarafından dağıtılan kerestelik ağaç türleri çok büyük tohumlara sahip olduğundan tohumları sadece büyük kuşlar tarafından dağıtılabilmektedir.

Isveç'te Stockholm Ulusal Kent Parkında alakarga yerine tohum dağıtımı veya bitki dikiminin insan gücüyle yapılmasının maliyeti kuş başı 2,450-11,250 dolar ve park boyunca 210,000-950,000 dolar olarak hesaplanmıştır.

Denver'da Colorado Üniversitesinde orman ekoloji profesörü olan Diana Tomback' a göre beyaz çam tohumlarının dağıtımının Clark's Nutcrackers (Köknar Kargası) kuşu yerine insan gücüyle yapılmasının maliyeti hektar başına 1,980-2,405 dolar ve tüm ABD'deki beyaz çam alanları için 11.4-13.9 milyar dolardır.

Bitkilere zarar veren böceklerin kuşlarla kontrol edilmesinin büyük bir ekonomik değeri vardır. Kuşlar, çam tomurcuk tırtılı istilasının yoğunluğunu ve etkin insektisitler gibi çam dikim alanlarındaki zararı azaltabilir. Washington'da çam tomurcuk tırtılının kuşlarla kontrolü en düşük 1,473$/km2/yıl olarak hesaplanmıştır.

Böcekle beslenen kuşların elma, brokoli, kakao, kahve, mısır, karalahana, üzüm, ve palmiye ağacı gibi çeşitli zirai alanlardaki böcek zararını azalttığı gözlenmiştir. Örneğin, Hollanda elma bahçelerinde kuşların böcek zararını azaltması sonucu yerel elma verimin %66 arttığı bulunmuştur.

Borneo'dan araştırıcılar kuşların gerçekleştirdiği zararlı kontrolünün palmiye ağaçlarında meyve kaybını %9-26 oranında azalttğını bulmuştur. Matt Johnson ve arkadaşları, kahve üzüm kurdu böceğinin kuşlarla kontrol altına alınması sonucu Jamaika'da kahve veriminin ve çiftçilerin hektar başına kazancının 310 dolar arttığını bulmuştur.

Yırtıcı kuşların zararlı kontrolündeki rolü daha az bilinmektedir. Ancak, peçeli baykuşun yaşamı boyunca, 13 tonluk mahsul tüketebilecek olan 11,000'den fazla fareyi yediğini biliyoruz. Eğitilmiş peçeli baykuşla Israilde yürütülen tarla denemelerinde, kuş predatörünün varlığı korku yarattığından küçük kemirgenler tarafından tohum tüketiminin önemli derecede azaldığı bulunmuştur. Baykuşların buğday, pirinç ve mısır gibi çeşitli ürünlerde fare populasyonlarını kontrol altına aldığı görülmüştür.

Malezya'daki palmiye ağacı çiftçileri, kemirgen zararlılarının kemirgen öldürücü Varfarin kimyasalına karşı dayanım geliştirdiğinde dikim alanlarına peçeli baykuş yuvaları

yerleştirmektedir. Zararlı kontrolünün baykuşlarla yapılması, varfarin tarafından zehirlenen misk kedisi ve leopar gibi memeli predatörler dahil olmak üzere diğer türlerin populasyonlarında da artış sağlamaktadır.

Kuşlar, diğer kuş populasyonlarının kontrolünde de kullanılabilir. Yeni Zelanda'daki bağlarda kullanılan şahinler zararlı kuş türlerini azaltarak üzüm kaybını %95 oranında azaltmıştır. Yırtıcı kuşlar, sıklıkla uçaklara çarpan kuşları uzaklaştırmada özellikle havaalanlarında önemli olabilmektedir. ABD Hava Kuvvetleri, eğitilmiş şahinlerin McGuire Hava Kuvvetleri İstasyonu civarındaki sığırcık, Kanada kazı ve diğer kuşları kovması için yıllık 200,000 dolar harcamaktadır.

İspanya'da karkas temizleme hizmetini üstlenen Akbabalar, 1 milyon avroluk tasarruf sağlamıştır; çünkü akbabalar olmasaydı açık alanda ölen hayvan leşlerinin toplanması ve bertaraf edilmesi için belli bir işgücü gerekecekti. Akbabalar, çürüyen etteki bakteri toksinlerine tolerans gösterme ve zehrini giderme özelliğine sahiptir. Akbaba midesindeki aşırı asidik salgı en dayanıklı sporları dahi öldürmektedir. Akbabalar karkasları tüketerek patojenik bakterileri azaltmakta ve böylece hastalık oranını düşürmektedir.

2) KUŞLARIN EKOLOJİK DENGEYE KATKISI

Ekolojik denge, dünya üzerinde canlıların yaşamı için gereklidir. Bu denge korunduğu müddetçe, canlıların yaşam seviyesi de artarak devam eder. Doğadaki tüm canlı ve cansız varlıklar doğrudan ya da dolaylı olarak ekolojik dengenin korunmasında önemli rol oynarlar.

Ormanlardaki ağaçlara zarar veren bazı böcekleri kuşlar yiyerek sayılarının artmasına engel olur. Tohum ve meyvelerle beslenen kuşlar, yedikleri bitki tohumlarını uzak yerlerde, dışkılarıyla birlikte atarak bitkilerin çoğalmalarına ve yayılmalarına neden olurlar. Ekolojik dengenin korunması, canlıların beslenme alışkanlığını oluşturan besin zincirine bağlıdır.

Dünyada 10.660 kuş türü bulunmaktadır (Gill & Donsker, 2016). Her bir türün ekolojisi ve dağılımı farklılık göstermekle birlikte kuşlar çöllerden dağlara farklı habitatlarda bulunmaktadır. Bu türlerden bazıları çok karakteristik belirli habitatlara özelleşmiş olup sınırlı alanlarda yayılış göstermektedir. Kuşların dağılımları göz önüne alınarak biyolojik çeşitliliğin dünya genelinde nasıl dağıldığı ve kuşların da küresel çevre değişikliklerinde gösterge rolü üstlendikleri görülebilir (BirdLife International, 2008a). Kuşlar, besin döngüsü, biyolojik ayrışma, haşere kontrolü, bitkilerde döllenme ve tohum ayrımı gibi birçok önemli ekosistem hizmetleri sunmaktadır (Şekercioğlu, 2006).

3) SONUÇ VE ÖNERİLER

Türkiye'deki fauna ve flora varlığı göz önüne alındığında, Avrupa kıtasındaki 530 kuş türünün, 489 türünü (% 92) barındırması, 120 memeli, 130 kadar sürüngen, 400'e varan balık türüyle, biyolojik çeşitlilikte tür çeşitliliği açısından zenginliğini , Özellikle Avrupa ve Asya kıtaları arasında köprü görevi görmesi biyolojik çeşitlilik açısından zenginliğinin göstergesidir.. Iğdır yüzölçümü olarak Türkiye'nin % 0,5 kara toprağına sahip olması , Türkiye'de bulunan 489 kuş türünden, 325 türün Iğdır İlinde yaşadığı ve göç güzergâhı olarak bölgeyi kullandığı düşünüldüğünde Akademik çalışmalara katkısı olacağı ve eko turizm potansiyelinin en üst seviyelere çıkaracağı aşikardır.

Diğer bir bakış açısıyla, Iğdır ilinde şimdiye kadar kaydedilmiş 325 kuş türü ile Ülkemizin kuş varlığının %66'sini, Avrupa'nın %60 türünü alanda barındırmaktadır.

Tüm bu veriler ışığında, Iğdır'ın ekosistem zenginliğini ortaya koyması ve doğa turizmi açısından ayrı bir değere sahip olması Kuş Gözlemciliği, Yürüyüş ve Sırt Çantalı Gezileri

(Doğa Gezileri), Bisiklet Gezileri, Atlı Geziler, Yaban Hayatı Gözlemciliği (Fauna Gezileri), Bakir Orman Gezileri, Foto Safariler, Botanik Gezileri, Ekosistem Tabanlı Doğa Eğitimi Programları, Bilimsel Turizm, Aile/ Yerli Turistler, Köy Ürünleri Satın Alma, Dünyada öne çıkan alternatif turizm dallarından kuş gözlem turizminin gelişmesine olanak sağlamanın yanısıra böcek, haşere ve sürüngen gibi tarım zararlılarının kontrol altına alınması, tozlaşma ve tohum dağıtımı ile ormanların gelişmesine tarımsal verimliliğe katkıda bulunacaktır.

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FİNANSAL TÜKETİCİLERİN FİNANSAL OKURYAZARLIK DÜZEYLERİNİN ÖLÇÜLMESİ (NEVŞEHİR İLİ ÖRNEĞİ)

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ÖZET

Finansal okuryazarlık; para kazanmak, kazanılan paranın stratejik bir şekilde kullanılması üzerinedir. Finansal okuryazarlık, sadece belirli bir kitleye hitap eden değil herkesin yatırımlarında efektif kararların alınabilmesinde önemli rol oynamaktadır. Finansal bilgi yetersizliği, bireylerin riskli olarak gördüğü varlıklara yatırım yapmaması en önemli nedenlerden birisidir. Bireylerin sorunlara çözüm üretip, fırsat değerlendirmesi yapabilmeleri ve seçenekler arasında seçim yapabilmeleri finansal okuryazar olabilmeleri ile mümkündür. Bireylerin kazanç ve yatırımlarını bilinçli olarak yönetmeleri hayatlarını belirli bir kalitede yürütmelerine de olanak sağlayacaktır. Finansal okuryazarlıkta yatırımları şekillendirebilme veya sermayeyi doğru kullanabilmenin farkındalığı olsa da Nevşehir ilinde ki finansal tüketicilerin çoğunluğu yaptığı yatırım ve kullanım şekillerinin doğrudan finansal okuryazarlıkla bağlantılı olduğundan haberdar değillerdir. Bu yüzden finansal tüketicilerin, finansal okuryazarlık düzeylerini belirleyen ve yatırım getirisine olan etkilerinin inceleneceği bir çalışma yürütülmüştür. Çalışmamızda, Nevşehir ilindeki finansal tüketicilerin okuryazarlık düzeylerinin bir anket çalışması ile ölçülmesi amaçlanmaktadır ve finansal okuryazarlık düzeyinin borçlanma ve tasarruf davranışına etkisinin ölçülmesi hedeflenmiştir. Finansal okuryazarlığa sahip olmak, hem finansal problemleri önceden belirleyip sorunları giderebilmek hem de sağlıklı bir şekilde hayat sürdürebilmek için önemlidir. Araştırmada Nevşehir ilinde online ve yüz yüze anket metoduyla sorular yöneltilmiştir. Elde edilen bulgular SPSS paket programı ile analiz edilmiştir. Sonuç olarak, Nevşehir ilinde finansal okuryazarlık kavramının bilinmediği ancak temel düzeydeki finansal konularda bilgi sahibi olunduğu söylenebilmektedir.

Anahtar Kelimeler: Finansal Okuryazarlık, Finansal Okuryazarlık Düzeyi, Finansal Bilgi.

MEASURING THE EFFECT OF FINANCIAL LITERACY ON THE FINANCIAL CONSUMER: THE CASE OF NEVŞEHİR PROVINCE

Abstract

Financial literacy; making money is about using the money earned strategically. Financial literacy plays an important role in making effective decisions in the investments of everyone, not just a specific audience. Lack of financial information is one of the most important reasons individuals do not invest in assets that they see as risky.

Bu çalışma Nevşehir Hacı Bektaş Veli Üniversitesi Sosyal Bilimler Enstitüsü'nde Doç. Dr. Ebrucan İSLAMOĞLU danışmanlığındaki "Finansal Tüketicilerin Finansal Okuryazarlık Düzeylerinin Ölçülmesi: Nevşehir İli Örneği" başlıklı yüksek lisans tezinden türetilmiştir.

It is only possible for individuals to be financially literate to find solutions to problems, evaluate opportunities and choose between options. The conscious management of individuals' earnings and investments enable them to carry out their lives with a certain quality. Although there is awareness of shaping investments or using capital properly in financial literacy, the majority of financial consumers in Nevşehir province are not aware that their investment and usage patterns are directly related to financial literacy. Therefore, a study has been conducted to determine the financial literacy levels of financial consumers and to examine their effects on return for investment. In our study, it is aimed to measure the literacy levels of financial consumers in Nevşehir province with a survey study and to measure the effect of financial literacy level on borrowing and saving behaviuor. Having financial literacy is important both for determining and resolving financial problems in advance and to lead a healthy life. In the research, questions were directed in Nevşehir province using online and face-to-face survey method. The findings are obtained analyzed with the SPSS package program. As a result, it can be said that the concept of financial literacy is not enough known in Nevşehir province, but Nevşehir' people has knowledge of basic financial issues.

Key Words: Financial Literacy, Financial Literacy Level, Financial Information.

1. GİRİŞ

Finansal okuryazarlık, para kazanmak ve stratejik bir şekilde kullanmak üzerinedir. Finansal okuryazarlık konusu harcamalar ve yönetme biçimini ele almaktadır. Bu konu toplum açısından büyük öneme sahiptir çünkü finans bilmek ve kullanmak yaşamı kolaylaştırır. Finansal okuryazarlık, günlük hayatta finansal araçların seçimi hakkında karar vermede yeterlilik düzeyini belirtir ve bu süreç, kişisel finans durumlarıyla nasıl başa çıkılacağının bilgisine yardımcı olmaktadır. Finansal okuryazarlığa sahip olmak, hem finansal problemleri önceden belirleyip sorunları giderebilmek hem de sağlıklı bir şekilde hayat sürdürebilmek için önemlidir. Belirtilen bütün nedenlerden ötürü bireylerin finans kültür temelinin oluşabilmesini sağlayan finansal okuryazarlık önemli hale gelmektedir (Güler, 2015). Çalışmamızda bireylerin finansal okuryazarlık düzeyinin belirlenmesi amaçlanmıştır. Araştırmamızda bireylerin finansal okuryazarlık seviyesini ölçtüğümüz çalışmanın önemi, yöntemi, amacı, bulguları sonuçları ve önerileri bulunmaktadır. Çalışma Nevşehir ilinde ikamet eden ve finansal tüketici olan 407 birey üzerinde uygulanmıştır. Sonuç ve öneriler kısmında, elde edilen sonuçlar diğer çalışmaların bulgularıyla kıyaslanarak öneride bulunulmuştur.

2. FİNANSAL OKURYAZARLIK

Finansal okuryazarlık, kişilerin finansal kavramların belirli bir düzeyde bilinmesi ve anlaşılabilmesini ifade etmektedir. Finansal araçlara ilişkin bilgi düzeyi finansal araçların (portföy yönetimi ve çeşitlendirmesi, enflasyon, kredi notu, tasarruf fonları gibi) araçların etkin kullanımını ifade etmektedir. Finansal okuryazarlık kavramı, farkında olmak, bilgi,

beceri, tutum ve davranışların birleşimi olan güvenli ekonomik kararların alınması ve dolayısıyla kişisel ekonomik refahın gerçekleştirilebilmesi için önemli bir araçtır. Finansal okuryazarlığın temelini aslında finansal farkındalık oluşturmaktadır ve finansal okuryazarlık düzeyinin arttırılabilmesi için ilk önce finansal farkındalığa sahip olunması gerekmektedir. Finansal okuryazarlık seviyesinin düşük olması sadece bireysel bir sorunu ortaya çıkartmamaktadır. Bu durumun yanı sıra parasını doğru bir şekilde yönetemeyen kişiler aşırı borçlanma, iflas vb. durumlarla sektöre de zarar vermektedirler. Bu durumda ekonomiyi oldukça kötü etkilemektedir (Yücel ve Kuyumcu, 2018: 399).

Tablo1:Bireylerin finansal okuryazar olarak tanımlanabilmesi için taşıması gereken yetenekler

1.Finansal sistemin işleyişi ve finansal kurumlar ile ilgili farkındalık
2. Nakit akımı yönetimi
3.Kaynaklar ve öncelikleri göz önüne alarak bütçe hazırlayabilmek
4.Ölüm, sakatlık gibi acil durumlar için rezerv oluşturabilmek
5.Kredi temini ve kredilendirme sürecinde seçenekleri değerlendirebilmek
6.Emeklilik dönemini planlamak ve bireysel emeklilik hesabını yönetmek
7.Temel yatırım araçlarını risk ve getiri çerçevesinde değerleyebilmek

Kaynak : https://dergipark.org.tr/tr/download/article-file/383519

Finansal okuryazar olmak isteyen kişilerin dikkat etmesi gereken bazı hususlar bulunmaktadır. Bunlar;

1. Gelirin bir kısmı mutlaka tasarrufa ayrılmalı,
2. Harcamalar yazılarak ödeme planı yapılmalı,
3. Kesinlikle gelirden fazla harcama yapılmamalı,
4. Finansal planlar uzun vadeli ve gerçekçi olmalı,
5. Bütçe planı senelik yapılmalı,
6. Hanedeki harcamalar kontrol altına alınmalı,
7. Çocuklar ev bütçesi konuşulurken konuya dahil edilmeli,
8. Kişinin maddi durumu ne olursa olsun tasarruflu olmayı alışkanlık haline getirmelidir (Erim, 2018).

3. KAVRAMSAL ÇERCEVE

Finansal okuryazarlık, kişi ve kurumların finansı anlayabilme yetisidir. Atkinson ve Messy' e göre (2012) finansal okuryazarlık; finansal kararları doğru almak ve kişisel refahı elde edebilmek için gerekli olan farkındalık, bilgi, beceri, tutum ve davranışların bileşimidir. Dünya Bankası' nın finansal okuryazarlığı bilgiden beceriye, tutumlara ve davranışlara doğru bir ilişki şeklinde anlatmaktadır. Bu ilişki çok mühimdir, aksi takdirde bilgi tutumları etkilemekte ve tutumlar daha sonra bambaşka davranışlar oluşturmaktadır (Sarıgül, 2015). Bireysel finansal okuryazarlık sadece kişi için değil toplumun ekonomik açıdan refahını etkilemektedir. Ailede kazanılan para yönetimi becerisi eğitim ve tecrübeyle yoğurularak toplumun tamamının tüketim alışkanlığına tesir etmektedir. Bu nedenle toplumsal refahın yükselmesi kişilerin finansal kararlarına bağlıdır (Coşkun, 2016). Hanehalkına yapılan bir

araştırmada finansal okuryazarlığın az olması, çalışmadaki bütün kişiler açısından aşırı borçluluğun en belirgin nedeni olarak görülmüştür (Güler ve Tunahan, 2017). Bireylerin finansal okuryazarlık bilgilerinin düşük olması sadece az gelişmiş ve gelişmekte olan ülkeleri etkilemez onlarla birlikte gelişmiş ülkeler için de büyük sorun oluşturabileceği gösterilmekte ve bu konu devletlerce tedbir alınıp önüne geçilmesi gereken problemler içindedir. Zira finansal okuryazarlık sadece bireysel yatırımcıların problemi değildir. Aynı zamanda üst düzey yöneticilerin, firmaların ve endirekt olarak devletlerin makro seviyede karşılarına çıkabilecek bir sorundur. Ne firmalar ne de üst düzey yöneticiler finansal kriz zamanlarında riskli yatırımlardan tamamen uzak kalamayabilirler. Bu sebeple hem kurumsal yönetişimin gelişmesi hem de olumsuz durumlardan korunabilmenin finansal okuryazarlık seviyesinin arttırılmasında önemli rolü vardır (Kılıç, Ata ve Seyrek, 2015). Birçok çalışma belirtiyor ki refah düzeyi finansal okuryazarlığı olumlu şekilde etkilemiştir. Delavande' a göre refah düzeyinin olumlu yönde etkilemesinin nedeni finansal bilgiye ulaşımın bireyin kendi serveti arttıkça, servetini idare edebilme yeteneğine sahip olma arzusu ile alakalı olduğunu iddia etmiştir (Şamiloğlu, Kahraman ve Bağcı, 2016).

4. YÖNTEM

Araştırmanın bu kısmında, araştırmanın amacı, yöntemi, konusu, örneklemi, araştırmada kullanılan veri toplama araçları, araştırmanın hipotezleri ve verilerin analizi hakkında bilgi verilecektir. Araştırmada, farklı demografik özelliklere sahip olan finansal tüketicilerin finansal okuryazarlık faaliyetleri ile ilgili tutumlarını ölçmek amacıyla Nevşehir ilinde bir uygulama gerçekleştirilmiştir. Finansal okuryazarlığın gelişimi açısından finansal tüketicilerin faaliyetlerine yönelik tutum ve davranışlarını ölçmek önemlidir. Bu çalışma hem finansal okuryazarlık ile ilgili çalışmanın literatüre eklenmesi hem de böyle bir çalışmanın daha önce Nevşehir ilinde yapılmamış olması bakımından da önem arz etmektedir. Araştırmada veri toplama aracı olarak anket tekniği kullanılmıştır. Öncelikle örneklemin nasıl belirlendiği açıklanmıştır. Araştırmada güvenilirlik katsayıları ve kullanılan ölçekler hakkında bilgi verilmiştir. Daha sonra, araştırma bulguları ve analiz yöntemlerine yer verilmiştir.

4.1. Örneklem

Araştırmanın evrenini Nevşehir ilindeki finansal tüketiciler oluşturmaktadır. Ancak zaman ve maliyet kısıtlı olması sebebiyle örneklem seçimi yoluna gidilmiştir. Araştırmanın örneklemi Nevşehir il ve ilçelerinde çalışan finansal tüketiciler olarak belirlenmiştir. Örneklem çerçevesindeki finansal tüketicilere anket formu dağıtılmıştır. Geri dönen anket sayısı 407 'dir. Değerlendirmeye dâhil edilmeyen anket bulunmamaktadır. Bu oran bu tür araştırmalar için bilimsel olarak kabul edilebilir bir orandır (Ogbanna ve Harris, 2000: 773).

4.2. Veri toplama tekniği ve ölçekler

Araştırmada anket tekniğine yer verilmiştir. Nevşehir ilindeki finansal tüketicilerin, finansal okuryazarlık düzeylerinin ölçülmesi üzerine etkisini belirlemek amacıyla kullanılan anket üç kısımdan oluşmakta olup; ilk kısım demografik özellikler ile ilgili sorular yer almaktadır. Ankette katılımcıların cinsiyeti, medeni durumu, yaşı, eğitim durumu, iş deneyimi ve çalışmakta oldukları departmanı belirlemeye yönelik sorular bulunmaktadır.Araştırmanın evrenini Nevşehir ilindeki finansal tüketiciler oluşturmaktadır. Ancak zaman ve maliyet kısıtlı olması sebebiyle örneklem seçimi yoluna gidilmiştir. Tesadüfi olmayan örneklem

yöntemlerinden kolayda örneklem yöntemi ile 407 kişi örnekleme dâhil edilmiştir. Anket formu iki kısımdan oluşmuştur. Araştırmada veri toplama aracı olarak anket kullanılmıştır. Kullanılan anket beş bölümden oluşmaktadır. İlk bölümde demografik sorular yer almaktadır. İkinci bölüm finansal okuryazarlığın temel tanımları üzerinde durulmuştur. Üçüncü bölüm ise finansal gelişmelerin hangi kaynaklardan ne sık aralıklarla takip edildiği ile ilgilidir. Dördüncü bölüm finansal okuryazarlıkla ilgili temel kavramlar ile ilgilidir ve beşli likert ölçeği kullanılmıştır. Öncelikle örneklem belirlenip, analiz aşamasından hemen sonra anket hazırlanıp, ön test aşaması gerçekleştirilip veriler toplanmış ve veriler analiz edilerek sonuçlar değerlendirilmiştir. Literatürden uyarlanan ifadeler beşli likert ölçeği kullanılarak test edilmiştir (1=Kesinlikle katılıyorum, 2=Katılıyorum, 3=Kararsızım, 4=Katılmıyorum, 5=Kesinlikle katılmıyorum). Güvenilirlik katsayısı Cronbach Alpha hesaplandığında $\propto$=0,748 olarak bulunmaktadır.

Yığındaki birey sayısı bilindiğinden dolayı örnek sayısı,

$$n = \frac{N\ t^2\ pq}{d^2\ (N-1) +\ t^2\ pq}$$

formülü ile elde edilmektedir (Yazıcıoğlu ve Erdoğan, 2004). N; yığındaki birey sayısını (384), n; örnekleme alınacak birey sayısını, p; incelenen olayın görülüş sıklığını (0.50), q; incelenen olayın görülmeyiş (0.50) sıklığını, t; belirli serbestlik derecesinde ve saptanan yanılma düzeyinde t tablosundan bulunan teorik değeri (1.96) ve d ise olayın görülüş sıklığına göre yapılmak istenen sapmayı (0.05) belirtmektedir.

5. ARAŞTIRMANIN BULGULARI

Anket formunun birinci kısmında yer alan demografik bilgiler için frekans ve yüzde olmak üzere temel istatistiki veriler verilmektedir.

Tablo 2:Katılımcıların demografik özelliklerinin dağılımı

Demografik Bilgiler	Değişkenler	Frekans	Yüzde(%)
Cinsiyet	Kadın	272	66,8
	Erkek	135	33,2
Yaş Grubu	18 yaş ve altı	89	22,9
	18-22 yaş arası	123	30,5
	23-27 yaş arası	70	17,2
	28-32 yaş arası	20	4,9
	33-37 yaş arası	37	9,1
	38-42 yaş arası	55	13,5
	43 yaş ve üzeri	407	100
	Toplam		

		407	
Medeni durumunuz	Evli	179	44
	Bekar	20	54,1
	Boşanmış	8	2
	Toplam	407	100
Eğitim Düzeyi	İlkokul	14	3,4
	Ortaokul	15	3,7
	Lise	63	15,5
	Ön Lisans	98	24,1
	Lisans	174	42,8
	Lisansüstü	43	10,6
	Toplam	407	100
Meslek i Durumunuz	Kamu Kurumu	88	21,6
	Özel Sektör -alan	105	25,8
	Öğrenci	116	28,5
	Serbest Meslek Sahibi	15	3,7
	Ev Hanımı	44	10,8
	Çalışmıyorum	37	9,1
	Emekli	24	0,5
	Toplam	407	100
Aylık Gelir Düzeyiniz	1000 TL'den az	122	30
	1001-2000 TL	67	16,5
	2001-3000 TL	93	22,9
	3001-4000 TL	55	13,5
			17,2
			100

	4001TL ve üstü	70	
	Toplam	407	
Gelir getirici bir işte	Çalışanlar	246	60,4
	Çalışmayanlar	145	35,6
	Emekliler	16	3,9
	Toplam	407	100
Aylık geliriniz giderinizi karşılıyor mu?	Evet	167	41
	Hayır	240	59
	Toplam	407	100

Tablo 2’ de anket formunun birinci kısmında yer alan demografik bilgiler için frekans ve yüzde olmak üzere temel istatistiki veriler verilmektedir. Çalışanların demografik özellikleri ile ilgili araştırma sonuçları ele alındığında; katılımcıların %33,2’ si erkek, %66,8’ inin kadın olduğu görülmektedir. Medeni durum açısından bakıldığında, katılımcıların %44’ ünün evli ve %54,1’ inin bekâr olduğu görülmektedir. Anketin uygulandığı bireylerin yaş aralığı dağılımı açısından dağılımı incelendiğinde ise; %2’ sinin 18 yaş ve aşağısı, %22,9’ unun 18-22 yaş arasında, %30,5’ inin 23-27 yaş arasında, %17,2’ sinin 28-32 yaş arasında ve %4,9’ unun 33-37 yaş arasında, %9,1’ inin 38-42 yaş arasında ve %13,5’ unun 43 yaş ve üzerinde olduğu görülmektedir. Anketi cevaplayan finansal tüketicilerin %7,1’ inin ilk ve orta öğretim, %15,5’ unun lise, %24,1’ inin ön lisans, %42,8’ inin lisans ve %10,6’ sının lisansüstü eğitime sahip olduğu tespit edilmiştir. Finansal tüketicilerin %60,4’ ünün gelir getirici bir işte çalıştığı, %35,6’ sının gelir getirici bir işte çalışmadığı ve %3,9’ unun emekli olduğu bulgusuna varılmıştır. Araştırmaya katılan bireylerin ailelerinin aylık ortalama gelir aralıklarına bakıldığında, %30’ unun 1000 TL ve aşağısı, %16,5’ inin 1000-2000 TL arası, %22,9’ unun 2000-3000 TL arası, %13,5’ inin 3000-4000 TL arası ve %17,2’ inin ise 4000 TL ve üzerinde kazandıkları görülmektedir.

5.1. Faktör analizi

Geçerlilik, verilerin ölçülmek istenen kişi özelliklerinin ne derece doğru ölçtüğüyle ilgili bir kavramdır. Faktör analizi yapılmadan önce verileriniz faktör analizine uygunluğunu bulmak için KMO and Barllett's Testi (Kaiser-Meyer-Olkin) yapılmalıdır. Bu test sonuçlarında 0,70 ve üzeri test değeri olduğunda verilerin anlamlı çıkması faktör analizi için uygun olduğunu göstermektedir. (http://www.spsssanaliz.com).

Tablo 3: Faktör analizi yapılmasının uygunluğunun tespiti

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,681
Bartlett's Test of Sphericity	Approx. Chi-Square	17206,826
	df	1770
	Sig.	,000

KMO değerimiz yüksek ve veri setimiz p= 0,00 ile anlamlı olması, faktör analizi yapılmasına uygun bir verimizin olduğu sonucunu göstermektedir.

Tablo 4: Açıklanan varyans oranının tespiti

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	,510	14,183	14,183	,510	14,183	14,183
2	,760	12,933	27,116	,760	12,933	27,116
3	,047	6,745	33,861	,047	6,745	33,861
4	,092	5,153	39,013	,092	5,153	39,013
5	,946	4,910	43,924	,946	4,910	43,924
6	,238	3,731	47,654	,238	3,731	47,654
7	,934	3,223	50,878	,934	3,223	50,878
8	,834	3,057	53,934	,834	3,057	53,934
9	,730	2,883	56,818	,730	2,883	56,818

10	,631	2,718	59,536	1,631	2,718	59,536
11	,486	2,476	62,012	1,486	2,476	62,012
12	,411	2,352	64,364	1,411	2,352	64,364
13	,345	2,242	66,606	1,345	2,242	66,606
14	,263	2,104	68,710	1,263	2,104	68,710
15	,144	1,907	70,617	1,144	1,907	70,617
16	,082	1,803	72,420	1,082	1,803	72,420
17	,009	1,682	74,103	1,009	1,682	74,103
18	948	1,581	75,683			
19	890	1,484	77,167			
20	871	1,451	78,619			
21	855	1,425	80,044			
22	805	1,342	81,386			
23	708	1,181	82,566			
24	680	1,134	83,700			
25	668	1,114	84,814			
26	651	1,086	85,899			
27	578	,964	86,863			
28	539	,898	87,762			
29	525	,874	88,636			
30		,	89,			

	491	818	454			
31	475	, 791	90, 245			
32	431	, 718	90, 963			
33	392	, 654	91, 617			
34	369	, 615	92, 232			
35	365	, 608	92, 840			
36	336	, 559	93, 399			
37	319	, 532	93, 931			
38	301	, 502	94, 433			
39	287	, 479	94, 912			
40	270	, 450	95, 362			
41	260	, 434	95, 796			
42	239	, 399	96, 195			
43	218	, 363	96, 558			
44	208	, 347	96, 904			
45	200	, 333	97, 238			
46	190	, 317	97, 555			
47	182	, 303	97, 858			
48	167	, 278	98, 136			
49	152	, 254	98, 390			
50	140	, 234	98, 624			
51	120	, 199	98, 823			
52	114	, 190	99, 013			
53	094	, 157	99, 170			
54	089	, 149	99, 319			

55	,086	,143	99,461			
56	,079	,131	99,592			
57	,075	,126	99,718			
58	,065	,108	99,826			
59	,056	,094	99,919			
60	,048	,081	100,000			

Oluşturulan tabloda 17 adet faktörün toplamda varyansın %74,1'ini açıklamaktadır.

5.2. Güvenilirlik analizi

Güvenirliğin tanımında, bireylerin sorulara verdikleri cevaplar arasındaki tutarlılık olarak da belirtilir. Güvenirlik, veri analizlerinin ne derece doğru ölçtüğü ile ilgilidir. Testin güvenirlik katsayısı olarak hesaplanan korelasyon (r), test puanlarına ilişkin bireysel farklılıkların gerçeklik ve hata faktörüne ne kadar bağlı olduğunu belirlemek amacıyla kullanılır. Cronbach Alfa güvenirliği sonucu 70 ve daha yüksek olması test puanlarının güvenirliği için genel olarak yeterli görülmektedir (http://www.spsssanaliz.com).

Tablo5: Analizde kullanılan ifadelerin güvenilirlik durumu

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,850	,840	62

Analiz anketimizde ifadelerimizin Alpha değerimiz: tablosuna göre, kullandığımız (Cronbach's 0,80 > 0,7) güvenilir olduğu görülmektedir.

5.3. Normallik testi

Verinin dağılımını anlayabilmek, verilerin arasında anlamlı fark olup olmadığını anlamlandırmak için kullanılacak istatiksel testler adına önemlidir. Verilen verilerin dağılımına göre normal ise parametrik, normal olmayan dağılımda ise parametrik olmayan testi mevcuttur (www.psikolig.com).

Tablo6: Parametrik ve eşdeğer parametrik olmayan testlerin işlevleri

Parametrik Test	Parametrik Olmayan Test	İşlevi
Bağımsız T-testi	Mann-Whitney Testi	Bağımlı değişkenin gruplar arası anlamlılık yönünden karşılaştırılması
Eşleşmiş Örneklem T-testi	Wilcoxon Rank Testi	Ön test- son test arasındaki anlamlı farklılıkların bulunması
Tekrarlı Ölçümler ANOVA	Friedman Test	Üç veya daha fazla grup ortalamalarının karşılaştırılmasında kullanılmaktadır
Pearson Korrelasyon Testi	Spearman Korrelasyon Testi	Veriler arası pozitif ya da negatif korrelasyon ilişkisinin bulunması

Tablo7: Verilerin normal dağılım gösterip göstermediğinin tespiti

Descriptives				
			Statistic	Std. Error
Eğitim Düzeyi	Mean		4,31	,058
	95% Confidence Interval for Mean	Lower Bound	4,19	
		Upper Bound	4,42	
	5% Trimmed Mean		4,38	
	Median		5,00	
	Variance		1,371	
	Std. Deviation		1,171	
	Minimum		1	
	Maximum		6	
	Range		5	
	Interquartile Range		1	
	Skewness		-,875	,121
	Kurtosis		,539	,241

Mesleki Durumunuz	Mean		2,86	,078
	95% Confidence Interval for Mean	Lower Bound	2,70	
		Upper Bound	3,01	
	5% Trimmed Mean		2,78	
	Median		3,00	
	Variance		2,497	
	Std. Deviation		1,580	
	Minimum		1	
	Maximum		8	
	Range		7	
	Interquartile Range		1	
	Skewness		,741	,121
	Kurtosis		-,352	,241
Finansal okuryazarlık nedir biliyor musunuz?	Mean		1,52	,025
	95% Confidence Interval for Mean	Lower Bound	1,47	
		Upper Bound	1,57	
	5% Trimmed Mean		1,52	
	Median		2,00	
	Variance		,250	
	Std. Deviation		,500	
	Minimum		1	
	Maximum		2	
	Range		1	
	Interquartile		1	

	Range		
	Skewness	-,074	,121
	Kurtosis	-2,004	,241

Çarpıklık ve basıklık değerleri -1,5, + 1,5 (Tabachnick and Fidell, 2013 B.G. Tabachnick, L.S. Fidell Using Multivariate Statistics (sixth ed.) Pearson, Boston (2013)) değerleri arasında değildir ve veriler normal dağılım göstermemektedir.

Tablo 8: Cinsiyete göre aylık gelir gider durumu ile ilgili normallik testi

Tests of Normality							
	Cinsiyetiniz	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Aylık geliriniz giderinizi karşılıyor mu?	Kadın	,403	72	,000	,615	72	,000
	Erkek	,354	35	,000	,635	35	,000
a. Lilliefors Significance Correction							

Nonparametrik testler uygulanacaktır. İki grup arasındaki ilişki inceleneceği için Mann Whitney U testi uygulanacaktır.

Tablo 9: Cinsiyete göre aylık gelir gider durumu için Mann Whitney U testi

Ranks				
	Cinsiyetiniz		Mean Rank	Sum of Ranks
Aylık geliriniz giderinizi karşılıyor mu?	Kadın	72	210,44	15239,50
	Erkek	35	191,03	6688,50
	Total	107		

p=0,066 > Alpha=0,05 olduğu için %95 güvenilirlikle aylık gelirlerin giderleri karşılaması bakımından erkek ve kadın açısından fark olmadığı tespit edilmiştir.

Tablo 10: Finansal okuryazarlık bilgisi, gelir getirici bir işte çalışma durumu için normallik testi

Tests of Normality							
	Gelir getirici bir işte	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Finansal okuryazarlık nedir biliyor musunuz?	Çalışanlar	,341	246	,000	,636	246	,000
	Çalışmayanlar	,374	145	,000	,630	145	,000
	Emekliler	,398	16	,000	,621	16	,000

H_0: Finansal okuryazarlık bilgisi gelir getirici bir işte çalışmaya olanak sağlar. H_1: Finansal okuryazarlık bilgisi gelir getirici bir işte çalışmaya olanak sağlamaz.

Tablo 11: Finansal okuryazarlık bilgisi gelir getirici bir işte çalışma durumu için Kruskal Wallis H testi

Ranks			
	Gelir getirici bir işte		Mean Rank
Finansal okuryazarlık nedir biliyor musunuz?	Çalışanlar	246	200,25
	Çalışmayanlar	145	213,58
	Emekliler	16	174,81
	Total	407	

Tablo 10 normal dağılım göstermez. Bu nedenle Anova nonparametrik karşılığı olan Kruskal Wallis H testi yapılır. p=0,00>Alpha=0,05 olduğu için %95 güvenilirlikle H_0 hipotezi kabul edilerek finansal okuryazarlık bilgisi, gelir getirici bir işte çalışmaya olanak sağladığı tespit edilmiştir şeklinde yorumlanmaktadır.

Tablo 12: Aylık bütçe hazırlayan hanehalkının, finansal okuryazarlık düzeyinin farklılaşma durumu için normallik testi

Tests of Normality							
	Aylık bütçe yapmakta mısınız?	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	f	ig.	Statistic	f	ig.
Finansal okuryazarlık nedir biliyor musunuz?	Kesinlikle Katılmıyorum	,346	4	000	,700	4	000
	Katılmıyorum	,282	0	000	,842	0	000
	Ne Katılıyor Ne Katılmıyorum	,252	02	000	,869	02	000
	Katılıyorum	,272	22	000	,869	22	000
	Kesinlikle katılıyorum	,215	9	000	,846	9	000
a. Lilliefors Significance Correction							

H_0:Normal dağılım göstermektedir. H_1:Normal dağılım göstermez. Normal dağılım göstermez. Bu nedenle Anova testinin nonparametrik karşılığı olan Kruskal Wallis H testi yapılır.

Tablo 13: Aylık bütçe hazırlayan hanehalkının, finansal okuryazarlık düzeyinin farklılaşma durumu için Kruskal Wallis H testi

Test Statistics[a,b]	
	Aylık bütçe yapmakta mısınız?
Chi-Square	6,505
df	1
Asymp. Sig.	,011
a. Kruskal Wallis Test	
b. Grouping Variable: Finansal okuryazarlık nedir biliyor musunuz?	

H_0: Aylık bütçe hazırlayan hanehalkının, finansal okuryazarlık düzeyi farklılık yoktur. H_1: Aylık bütçe hazırlayan hanehalkının, finansal okuryazarlık düzeyi farklılık vardır. p değeri<alfa değeri olduğu için H_0 hipotezi reddedilir. Aylık bütçe hazırlayan hanehalkının, finansal okuryazarlık düzeyi farklılaşmaktadır.

6. SONUÇ

Bireyler paralarını yöneterek, gelecek için planlamalar yaparak ve finansal kaynakları etkin bir biçimde kullanarak refah düzeylerini arttırmaları mümkündür. Finans alanında bilinçli ve doğru kararlar alabilmek ve finansal farkındalık, finansal okuryazarlığı ulusal ve uluslararası düzeyde önemli konularından biri haline gelmiştir (Alkaya ve Yağlı; 2015: 596). Son zamanlarda finansal okuryazarlık gelişmiş ülkelerce de önem verilen bir konu halini almıştır. Bireyler yaşam süreleri boyunca finansal kararlar almak zorunda kalmaktadır. Bu kararların hem kendilerine hem topluma hem de ekonomiye etkileri düşünüldüğünde finansal yeterliliğe sahip bir birey olma ihtiyacı ortaya çıkmaktadır. Günümüzde de daha fazla bilinçli tüketicilere ihtiyaç duyulmaktadır. İnsanların ekonomik refah seviyelerini yükseltmeleri ancak finansal okuryazar bir birey olduklarında mümkün olacaktır (Öztürk; 2014: 96). Sonuç itibariyle özetlemek gerekirse, çalışma kapsamında yer alan kişilerin büyük çoğunluğunun düşük düzeyde finansal okuryazar oldukları ve finansal okuryazarlık düzeyinin kişilerin demografik özelliklerine göre araştırma sonucunda anlatılmıştır. Çalışma sonucunda finansal kavramlar iyi bilen kişilerin çoğunlukla yüksek düzeyde finansal okuryazarlığa sahip olduğu saptanmıştır. Bu çalışma sadece Nevşehir ili finansal tüketici olan hanehalkını kapsayacak şekilde tasarlanmıştır. Bu çalışmanın başka illerdeki hanehalkı araştırmalarıyla desteklenmesi finansal okuryazarlık konusunda genel bir resim çizebilmek adına faydalı olacaktır. Araştırma anketinde; ilerdeki çalışmalarda hanehalkının ifadelerine dayanan sorularını araştırmada yer almasının finansal okuryazarlık konusunda daha doğru bir öngörü kazandıracağı düşünülmektedir. Finansal okuryazarlıkta yatırımları şekillendirebilme veya sermayeyi doğru kullanabilmenin farkındalığı olsa da Nevşehir ilindeki finansal tüketicilerin çoğunluğu yaptığı yatırım ve kullanım şekillerinin doğrudan finansal okuryazarlıkla bağlantılı olduğundan haberdar değillerdir.

Bireylerin finansal konularda farkındalığının artışının, bilgi temelli kararlara dayalı şekillenmesini sağlamak amacıyla finansal okuryazarlık eğitimleri verilebilir. Ulusal ve uluslararası ihtiyaçlara göre geliştirilmiş finansal eğitim kişilerin; geleceği planlama ve gelir getirici fırsatlardan yararlanma, ekonomik ve finansal faaliyetlere katılma, finansal karar alma yetenek ve becerileriyle donatma, finansal bilgilendirme, ekonomik faaliyetler konularında daha bilinçli davranış ve tutum sergileme yönünde sağlayacağı katkının, ülkelerin ekonomik gelişiminde büyük rol oynamaktadır. Böyle bir eğitim; ekonomik ve finansal fırsatlara ulaşmada ve bu fırsatların kullanılabilmesine de katkı sağlayabilmektedir (Alkaya ve Yağlı; 2015: 597).

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MATRİX FİLMİ BAĞLAMINDA SİNEMA HAKİKAT İLİŞKİSİ

THE RELATIONSHIP WITH CINEMA-TRUTH IN THE CONTEXT OF THE MATRIX MOVIE

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ÖZET

Tasavvufun en temel öğretilerinden ve hedeflerinden biri de insanın hakikat boyutu ve bu bağlamda insanın hakikate ulaşma düşüncesi ve yolculuğudur. Tasavvuf, insanı hakikate ulaştırma serüveninde önemli dini reçeteler çerçvesinde ve belli bir disiplin dâhilinde maksada ulaştırır. Bu bağlamda "Hakikat nedir?" sorusu akla gelmektedir. Hakikat, sözlük olarak "gerçek, sabit ve doğru olmak, gerekmek; bir şeyi gerçekleştirmek" anlamına gelirken, tasavvufi planda ise "zâhirin ardındaki örtülü ve gizli mâna, dinî hayatın en yüksek seviyede yaşanarak ilâhî sırlara âşina olunması" gibi anlamlara gelmektedir. Hakikatin tasavvufi manadaki bu perspektifi günümüzde sinemanın da özel ilgi alanlarından biri haline gelmiştir. Bir başka ifade ile sinema da "görüntünün arkasındaki gerçekliği" vurgulamak adına kimi zaman senaryo, kimi zaman sinamatografi ve kimi zaman da her ikisini kullanarak hakikatin izini sürmeye aday olmuştur. Kitleleri etkileyen en önemli sanat dallarından biri olan sinemanın bu yönelişi " Sinemada hakikat" ve " hakikatın sineması" gibi iki yeni olguyu gündeme getirmiştir. Bütün diğer sanat türleri gibi kozmolojik bir tasavvur olarak hakikati kavrama ve kavratma iddiasına sahip bir sanat dalı olan sinema da sinemacının elinde bir hakikat ve var oluş yolculuğuna dönüşebilmektedir. Fetişlerinin, arzularının ve hazlarının hapishanesine hapsolmuş, yalnızca hakikatini yitirmiş değil, hakikatin hakikatini yitirdiği hakikatiyle yüzleşmek zorunda kalmış olan günümüz insanına, "ne olduğunu, nasıl bir varlık olduğunu, başına neler geldiğini" hatırlatacak bir ilerleme aracıdır sinema. Bu çalışmada sinemada gerçeklik algısından yola çıkılarak Andre Bazin'in ve Kracauer'ün gerçeklik algısı tasavvufi ilişki ile temellendirilmiştir. Tasavvufun, insanın var oluş meselesinde nereden gelip nereye ve nasıl gitmesi gerektiğini anlamlandıran bir yaşam biçimi, hakikatini bulma yolculuğu olduğu tanımından yola çıkılarak tasavvuf ile sinema ilişkisi, Matrix filminin tasavvuf bağlamında okunması üzerinden yapılmaya çalışılmıştır. Matrix'in hakikat ile ilişkisi

değerlendirilerek, dünyanın bir simulasyondan ibaret olduğu ve Matrixi kırmanın kişiyi hakikatine ulaştıracağı mesajı verilen filmin ilk sekansında, kahramanın elinde bulunan Baudrillard'ın "Simularklar ve Simulasyon" kitabı ile , tasavvufi anlayışta bu dünyanın bir oyun ve eğlence yeri olarak sahte bir perde ve bir rüya alemi olduğu ve temsilin temsili halini alan sanal gerçeklik bağlamında , Neo'nun "o kişi" olma yolculuğu ve insan-ı kamile ulaşma aşamalarında verdiği mücadele, mistik bir bakış açısıyla tasavvuf anlayışı çerçevesinde ele alınmıştır. Diğer yandan çalışmada metodoloji olarak içerik analizi ve göstergebilim yöntemlerinden yararlanılmıştır.

Anahtar Sözcükler: Matrix Filmi, Hakikat, Tasavvuf, Sinema

ABSTRACT

One of the most basic teachings and goals of Sufism is the dimension of truth of man and in this context, man's thought and journey to reach the truth. Sufism leads people to their purpose in the adventure of reaching the truth within the framework of important religious prescriptions and within a certain discipline. In this context, "What is truth?" question comes to mind. Truth, as a dictionary, means "to be true, constant and correct, to be necessary; While it means "to realize something", in the mystical plan it means "the hidden and hidden meaning behind the apparent, being familiar with the divine secrets by living the religious life at the highest level". This mystical perspective of truth has become one of the special interests of cinema today. In other words, in order to emphasize the "reality behind the image", cinema has been a candidate to follow the truth by using sometimes script, sometimes cinematography and sometimes both. This orientation of cinema, which is one of the most important branches of art that affects the masses, has brought forward two new phenomena such as "truth in cinema" and "cinema of truth". Cinema, which is a branch of art that claims to grasp and comprehend the truth as a cosmological imagination, like all other art forms, can also turn into a journey of truth and existence in the hands of the filmmaker. Cinema is a means of progress that will remind today's people, who are imprisoned in the prison of their fetish, desires and pleasures, who have not only lost their truth, but have to face the truth that the truth has lost its truth, "what it is, what kind of being it is, what has happened to it". In this study, based on the perception of reality in cinema, Andre Bazin's and Kracauer's perception of reality is based on the mystical relationship. Based on the definition that Sufism is a way of life that gives meaning to where people come from and how they should go in the matter of existence, a journey to find their truth, the relationship between Sufism and cinema has been tried to be made through the reading of the Matrix movie in the context of Sufism. In the first sequence of the film, in which the relationship of the Matrix with the truth is evaluated and

the message that the world consists of a simulation and that breaking the Matrix will lead one to the truth, in the first sequence of the film, Baudrillard's book "Simularks and Simulation" in the hands of the protagonist, this world is faked as a place of play and entertainment in mystical understanding. In the context of virtual reality, which is a screen and a dream world and has become the representation of representation, Neo's journey to become "that person" and his struggle to reach the perfect human being are discussed within the framework of mysticism from a mystical point of view. On the other hand, content analysis and semiotics methods were used as a methodology in the study.

Keywords: Matrix Movie, Truth, Sufism, Cinema

GİRİŞ

Felsefenin düşünsel nesnesi olarak hakikat kavramının içi hemen her filozof ve düşünür tarafından doldurulmaya çalışılmış, düşünce sistemleri ve teoriler çoğaldıkça, felsefi yöntem de gelişmesini sürdürmüştür. Hakikat, ontolojik bağlamda teolojinin de temel konusunu oluştururken modernizmin "mutlak hakikat" arayışının, günümüze kadarki süreçte, bilginin rasyonel, değişmez temellere dayandığını savunan epistemolojik bakışı tartışmaya açık bir durum kazanmıştır. Sûfiler, kelamcılar ve filozoflardan farklı olarak eşyanın hakîkatini anlamak için Kur'an, hadisler ve aklın yanında keşf, müşâhede, zevk ve manevî sezgi gibi yöntemleri de kullanmışlar, yakîn bilgisinin ancak bu yollarla elde edilebileceğini ifade etmişlerdir. Çağımızın en etkili sanatlarından ve anlatım araçlarından biri olan sinema, günlük hayatımız arasına karışmış daha çok bir eğlenti ve dinlenti aracı olarak yerini bulmuş olsa da bir var oluş meselesi olarak anlam arayışında olan insanın kendi hayat hikayesini okuduğu, beyazperdedeki aynada kendi halini seyrettiği, çıktığı yolculukta keşfedilmemiş kıtaları keşfedip, zenginleşip derinleşebildiği, varlığın bütün katmanlarında dolaşabilmesini mümkün kılan bir kozmolojik tasavvurdur. İlk ortaya çıktığında sanat olarak kabul görmeyen sinema, kuramcıların sinemayı ciddiyetle ele alıp psikolojik, sosyolojik ve estetik yönlerini analiz edip tiyatro ve fotoğraftan ayrı bir sanat olduğunu kanıtlama iddiasına girmesinden bugüne tartışılagelen birçok kuram ortaya konulsa da sinema, genel olarak biçimci kuramcılar ve gerçekçi kuramcılar olarak iki ana yaklaşım açısından değerlendirilmiştir. (Özarslan vd., 2013)**.** Biçimciliğin Aristo'nun mimesis anlayışının bir devamı ya da ondan beslenen bir görüş olduğunu söyleyebiliriz. Aristoteles'in sanat anlayışının şekillendiği İlkçağ Yunan felsefesinde, taklit ya da öykünme anlamında kullandığı mimesis kavramı, sanatın doğayı taklit ettiği düşüncesinin bir sonucudur. Aristoteles'in sanatın ve insanın özünde olduğunu iddia ettiği mimesis kavramını sinema açısından değerlendirdiğimizde ise, sinemayı da hayatın bir izdüşümü veya yansıması olarak görmek mümkündür. Bu bakımdan sinema doğal olarak yaşamın, daha doğrusu yaşam gerçekliğinin taklidi, yansıması ya da temsilidir. Sinemanın bir görüntüyü gerçeğe en yakın şekilde verme çabası aslında Aristo'nun mimesis kavramı ile belirttiği taklit ve yeniden yaratma anlayışından kaynaklanmaktadır. Biçimci gelenek günümüzde montaj, kurgu ve bilgisayar efektlerinden beslenen Hollywood sinemasının beslendiği bir alan olmuştur. Gerçekçi film kuramcılarına göre ise sinemada önemli olan, sinemanın gerçeği ortaya çıkarma gücüdür. Gerçeklik çok katmanlı bir yapıya sahiptir ve yönetmen kamera sayesinde bu katmanları aşarak gerçeği sergiler. Perdedeki görüntü, dış dünyada duyularımızla algılayamadığımız nesnel gerçeklik hakkında bize bilgi

verir. Gerçekçi film kuramcılarından Andre Bazin ve Siegfried Kracauer, yönetmenin gerçeği dönüştürmediğini ama gerçeklikten seçim yaptığını vurgular. Gerçeklikle oynayan ve onu kurmacaya dönüştüren montaja karşı çıkan biçimciler alan derinliği ve uzun planlarla izleyicinin filme katılımını talep eden bir dil yaratmayı amaçlamışlardır. Andre Bazin ve Siegfried Kracauer, kameranın gerçekliğin gizli yönlerini ortaya çıkardığını, gerçek dünyada göremediklerimizi gösterdiğini düşünürler. Kracauer'e göre sinemayı sanat yapan fizik gerçekliğin kurtarılmasıdır. "Gerçeklikle ilgili tüm düşünme biçimlerimiz ve tavırlarımız bilimin bize sağladığı ilkelerce şartlanmış" olduğu için" fizik gerçeklik ve içsel evrenimiz her zaman değişmektedir." Bu bilim ve teknoloji çağında araç içeriğe baskın gelmektedir. (Kracauer S., 2015) Bu noktada sanatçı günümüz insanının yardımına koşar ve ona farkında olmadığı şeyleri gösterir. Sinema, bu gerçekleri fark etmemizi, deneyimlememizi ve maddi dünyanın anlaşılmasını sağlar, nesnelerin altında yatan göremediğimiz gerçekliği bize gösterir. Bazin'e göre sinema, nesnelerdeki gizli anlamı çıkarır ve duyularla anlayamadığımız gerçekliği verir. Çünkü doğaya ve nesnelere dilediğince yaklaşır. Görüntü gerçeğe kattığından ötürü değil, gerçeği ortaya çıkardığından ötürü önemlidir. Görüntü gerçek dönüştürülerek değil, gerçekten seçme yaparak oluşturulur. Gerçekse çok katmanlıdır, bu katmanları ancak alıcı bulabilir. Çağımızın kuramcılarından Baudrillard, çağdaş sanatı ve sinemayı Batı dünyasının üretimi ve bu düşünce dünyasından beslenen ürünler olarak görmektedir. Mevcut dünyayı anlamlandırırken içinde bulunduğu Batı düşüncesinin geldiği noktada, sanattaki gerçeğin ve anlamın yitirildiğini, sanatın artık sahip olduğu ayrıcalığı ve amacını kaybettiğini, bakılmak için değil tüketilmek için yapılmış ve neyin sanat alanına dâhil olduğunu söylemenin artık çok zor olduğu bir saçmalık halini aldığını düşünür. Simülasyon evreninin belirleyici unsurunun medya ve kitlesel iletişim araçları olduğu vurgusunu yapan Baudrillard, artık gerçekle kurulan bağlantının, iktidarın ya da sistemin oluşturduğu kurgusal olan gerçekliğin dayatılması haline dönüştüğünü, gerçek olanın da kurgusal hale getirilmesinin kurgu ile gerçeklik arasındaki ayrımı kaldırdığını, geriye sadece imge ve göstergelerin kaldığını belirtir. Her geçen gün daha çok haber ve bilgiye karşın giderek daha az anlamın üretildiği bir evrende yaşanmaktadır. Böylece aslında rüya alemi olan dünyada insanların zihinleri uyutulmakta ve adeta temsilin temsili olan görüneni algılayan zihnin özgürlüğüne kavuşmasını engellemek suretiyle matrixten çıkışın önü kesilmektedir. Sinema ve tasavvuf ilişkisi ele alınırken, tasavvuf terminolojisine ait bazı kavramlar anlaşılmadan ilişkilendirme yapmak mümkün olamayacağı için tasavvufi terminolojide kendine genişçe yer bulan zâhir-bâtın, vahdet-kesret, ilmin mertebeleri, tevhid, varlığın mertebeleri ve zaman, insan, ruh ve nefs konuları çalışmanın temel yaklaşımı için önem teşkil etmektedir. Andre Bazin'in üzerinde durduğu, nesnenin altında yatan gizin ortaya çıkarılması konusuna paralel olarak bazı tasavvufi yaklaşımlar, "giz" üzerinde durmayı gerektirmektedir.

Mutasavvıflar dinî ilimleri biri zâhir, diğeri bâtın olmak üzere ikiye ayırır; hadis, fıkıh ve kelâm gibi ilimlere zâhir ilimleri, tasavvufa da bâtın ilmi adını verirler. Mutasavvıflara göre naslardaki gizli mânaları, ibadetlerin mânevî ve ahlâkî özünü, varlık ve olayların arkasındaki sırları açıklığa kavuşturan bâtın ilmi gizlidir. (İslam Ansiklopedisi, cilt5, s.188) Tasavvuf insana bu batın kapıları açarken onu rüya aleminden uyandırmaya çalışır. İnsanlar uykudadır, ölünce uyanacaklardır, hadisi nesnel karşılığı dünya olarak isimlendirilen ben(ego) nun yanıltıcı hapishanesinden çıkması gerektiğini ona hatırlatır. Bir rüya alemi olan bu aldatıcı dünyanın üzerinde bir idealar dünyası vardır ki Aristo'nun mimesis esasına dayalı sanatlar, ideaların ikinci elden taklitlerini vermektedir. Bu çerçeveden bakıldığında, Platon'un mağarasındaki alegoriden yola çıkarak, günlük yaşamda aslında gölgelerle karşılaşan ancak onların gölge olduğunun farkında olmayan varlıklar olarak paradoksal bir şekilde karanlık sinema salonunda izlenilen gölgeler, Platon'un düşündüğünün tersine artık insanı esir eden imajlar değil, tam tersine Kracaeur'ün söylediği "gerçekliğin kurtuluşu" ve dolayısıyla da bizim kurtuluşumuz haline gelir. Sinemadaki imajlar, imgeler ve semboller bir yanılsama

olmanın tam tersine, yanılsama mekanizmalarını ortaya çıkaran ve gerçekliğin kopyası yerine, kendi içinde gerçeklik haline gelen imajlar olurlar, içinde yaşadığımız ancak fark etmediğimiz dünyanın farkına varmamızı sağlarlar. (Öztürk , 2016, s. 4-5). Bu bağlamda Matrix filmi; filme yön veren diyaloglar, göstergeler, karakter isimlerinin ve konumlarının taşıdığı kadim anlamlar ve filmin içerdiği metaforlar, semboller ve bir rüyanın çokanlamlı yorumlanabilirliğine uygun alegorik anlatım dili açısından tasavvufi bakış açısından okunmaya uygundur. Sinema ve sanat ilişkisinden tasavvufa kapı aralanarak sinemanın bu kapıları açabilecek bir algı, duygu, anlam ortaya koyabileceği, varoluş ve hakikatle bağlantısı boyutunda ortaya koyulmaya çalışılmıştır.

1. Tasavvuf- Hakikat İlişkisi

Çeşitli anlamlarda kullanılan felsefe ve tasavvuf terimi olan hakikat sözcüğü, sözlükte "gerçek, sabit ve doğru olmak, gerekmek; bir şeyi gerçekleştirmek" gibi anlamlara gelen ḥaḳḳ kökünden türetilmiştir (et-Taʿrîfât, "el-ḥaḳīḳa" md.) Râgıb el-İsfahânî, hakikatin başlıca anlamlarını "gerçek (sabit) ve var olan şey, doğru inanç, riyadan arınmış amel ve tam olarak maksada uygun düşen söz, ebedî olması dolayısıyla asıl gerçek hayat kabul edilmesi gereken âhiret (fıkıh ve kelâmda), bir dilde asıl olarak hangi anlam için konulmuşsa o anlamı ifade etmek üzere kullanılan lafız" şeklinde sıralamıştır. (el-Müfredât, "ḥḳḳ" md.) (Çağrıcı, 1997, s. 177-178) Ferit Develioğlu'nun Osmanlıca-Türkçe Ansiklopedik Lugatında "hakikat" sözcüğü Arapça isim soylu bir kelime olup, bir şeyin aslı ve esası mahiyeti, gerçek, doğru, gerçekten doğrusu, sadakat, doğruluk, bağlılık, kadirbilirlik; mecaz karşılığı esas olarak kullanılan kelime; bir kelime neyi anlatmak için konulmuşsa, bu kelimenin o manada kullanılması anlamlarına gelmektedir. (Develioğlu, 1996, s. 313). Antik felsefede saklı, örtük olanın açığa çıkması, açılması anlamına gelen "hakikat" o dönemde ontolojik ve epistemolojik bütünlüğe sahip bir kavram iken Sokratik düşünce ile daha çok bilgisel bakımdan değerlendirilmiş ve nesneye uygunluk iddiasındaki bir doğruluk anlayışına karşılık gelmeye başlamıştır. Hakikatin nesneye uygunluk ve mantıksal doğruluk üzerinden değerlendirilmesi ise felsefede varlık ve bilgi bağının gözden kaçırılmasına yol açmıştır. (Çelik, 2012, s.1) Mutlak ve değişmez bir hakikatin var olmadığını düşünen Rölativizme göre bilgi ve hakikat bireyin algılarına; toplumsal, kültürel ve kişisel eğilimlerine göre şekillenir. Bu düşünce daha sonra tartışılacak olan "Hakikatin mutlaklığı ve biricikliği" sorunsalının temellerini atar. .İslâm felsefe tarihinde ise hakikat daha çok ontolojik bir kavram olarak ele alınmıştır.İnsanlık tarihiyle başlayan mistisizm, metafizik alemle irtibat kurarak sezgi metoduyla üst bilgiyi araştıran; doğaüstü güçlerle ilişki kurulabileceği temeline dayanan dünya görüşüdür. Kökeni itibariyle Latince olan mistisizm kelimesinin; gizli olmak, konuşmamak, dilsiz olmak, dudakları ve gözleri kapamak anlamları vardır. Felsefe beş duyu ile elde edilen bilgiyi esas alıp, düşünme, araştırma ve analizi esas alırken, mistisizm aklın ötesindeki gerçek bilgiyi konu alır ve sezgiye dayanır. (Erzurumlu, 2015, s.15-16). Beş duyunun ötesinde bir alemin varlığı, Yunan'da yazılı olarak ilk defa Pitagoras'ta ortaya çıkmış, sistematiğe dönüştürülmesi ise Platon tarafından gerçekleştirilmiştir. Plotinus'a göre bilgi Tanrıyı bilmektir ve Tanrıya ibadetle değil muhabbetle varılır. İnsan Tanrıyı duyularıyla ve aklıyla anlayamaz ama aşk ile onu sezer. Vecd ile kendinden geçme ve tanrıya ulaşma hali eski Yunan dini ve felsefesine antik çağlarda girmiş Pitagoras, Eflatun ve Plotin'in yeni Eflatunculuk ekolü ile şekillenmiştir. (Erzurumlu, 2015, s.19). İslamın din felsefesi olan tasavvuf, bilinen en eski tariflerinden birine göre" ilahi hakikatlerin idraki" olarak vasıflandırılırken İslam sufileri de kendilerine"ehlu'l Hakk" yani hak erenler demişlerdir. (Nicholson, 2014, s. 37) Tasavvuf, İslâm'ın zâhir ve bâtın hükümleri çerçevesinde yaşanan mânevî ve derunî hayat tarzıdır. Batı'da tasavvuf "kâinatın sırlarını, kanunlarını ve bunların üzerinde tasarruf etme yollarını öğreten akım" anlamında "theosophy" veya herhangi bir dinin derunî, ruhanî yönünü belirten "mistisizm" (mystisisme) şeklinde algılanarak İslâm mistisizmi diye ifade edilmiş, ancak tasavvufla mistisizm arasında belirgin farklar bulunduğunun anlaşılması üzerine "sufizm"

kelimesi kullanılmaya başlanmıştır. (Öngören, 2011, s. 119). Eski Yunan'dan başlayarak Musevilik, Hristiyanlık, Türk mitolojisi, Hint, eski İran, eski Mısır ve Tasavvufa göre hakikat meselesi, Batı ve Doğunun hakikat anlayışları mukayese edilerek ele alındığında, İslam mistisizmi kabul edilen tasavvuf ya da sufizmle diğer mistik anlayışların bazı benzerlikler taşımalarına rağmen birbirlerinden ayrıldıkları görülmektedir. Bu ayrımın en temel sebebi mistisizmi karakterize eden iki unsur olan pasiflik ve metot yokluğudur. Tasavvufi yolda ise teşebbüs ve gayret şart olup istidat tek başına yeterli değildir. Tasavvufta başlangıç ve kemale ulaşma yolculuğunda metodoloji öncelik kazanır. Tasavvufun tanımı hakkında değişik ifadeler kullanılsa da genelde İslam düşünürleri tasavvuf tanımını "İslam mistisizmi" anlamında kullanmaktadırlar. Tasavvufu, Cüneyt Bağdadi (822-911), "Tasavvuf, Allah'ın seni sende öldürüp, kendinde ebediyen diri kılmasıdır." Al Tabari (838-923), "Tasavvuf, insanı Allah'tan uzaklaştıran her şeyi terk etmektir." Abdulkadir Geylani (1077-1166), "Tasavvuf haldir, söz değildir; söz ile ele geçmez." şeklinde tanımlamışlardır. (Erzurumlu, 2015, s. 106). Maruf Kerhi tasavvufu " Hakikatleri almak, halkın elinde bulunandan ümidi kesmektir." Şeklinde tanımlarken Cüneyt Bağdadi "Sulhu olmayan bir savaştır. Dağınık olmayan zihinle Allah'ı zikretmek, sema ile vecde gelmek, sünnete uygun şekilde amel etmek, maddi şeylerden alakayı keserek Allah ile beraber olmaktır. Vakitleri muhafaza etmektir. Hakkın seni sende öldürmesi, kendisi ile diriltmesidir. Halka uyma kirinden arınmak, süfli huylardan ayrılmak, beşeri ve adi vasıfları söndürmek, nefsani davalardan uzaklaşmak, ruhani vasıflar kazanmaya gayret etmek, hakiki ilimlere sarılmak, daima en uygun olana göre hareket etmektir. Herkese nasihatte bulunmak, elest bezminde verilen söz üzere samimiyetle durmak, Resulüllaha ve şeriatına uymak " tanımını yapmıştır.(Kara, 2014, s.27). İslamiyette Asr-ı saadet döneminden sonra ortaya çıkan dört ana ekolden selefiler, kelamcılar, sufiler ve İslam filozofları arasında, batıni yorumu anlayabilmek için gönül bilgisi ve ilhama gerek duyan ekol sufiler olmuştur. (Ezurumlu, 2015,s.109) Fazlur Rahman'ın görüşüne göre; bilgelik, hikmet, felsefe ve akıl önderliğindeki güzellik ve sevgi olarak tanımlayabileceğimiz sufilik, İslam mistisizminin Hz Muhammed döneminden başlamış olan bir hareketidir. (Rahman, 2000, s. 193). Özellikle Hallac ve İslam tasavvufu konusunda çalışmış önemli bir oryantalist olan Louis Massignon (1883-1962)'a göre İslam tasavvufu üç devreye ayrılmıştır: Birinci devre Sufiler dönemi, ikinci devre İmam-ı Gazali'nin (1058-1111) bulunduğu Yeni Eflatuncu etkinin başladığı dönem, üçüncüsü ise Muhyiddin Arabi'nin (1168-1240) dönemidir ki Yeni Eflatuncu felsefenin tamamıyla hakim olduğu bir dönemdir. (Güngör, 2011, s. 50-51) Mustafa Kara ise İslam tasavvufunu tarikatlar öncesi ve 13. Yyda başlayan tarikatlar dönemi ve sonrası olarak iki ana dönemde ele almış daha sonra bu ana tasavvufi hayatı beş dönemde incelemiştir: Zühd devri, tasavvuf devri, (vahdet-i vücut) felsefi tasavvuf devri, tarikatlar devri, çağdaş dönem. (Kara, 2012, s. 75). Tasavvufi doktrinde eşyanın ardındaki hakikate ulaşmak için zahir ve batın meselesine açıklık getirmek gerekmektedir. Vahdet-i vücut anlayışını zirveye taşıyan İbn Arabî'ye göre varlık sahibi olan yalnız Allah'tır. Âlem ise varlık ile yokluk arasında bir berzah niteliğindedir. Varlık âlemde belirli ilâhî hazretlerde tecellî ederek zâhir olur. Bunlar, Gayb âlemi, şehâdet âlemi ve bu ikisinin arasında bulunan hayal âlemidir. Tüm varoluşun şehâdet âleminden ibâret olduğunun düşünüldüğü günümüzde varlığın çok katmanlı yapısı bulunduğuna dikkat çekmek ve insanların daha üst hakîkat düzeyleriyle bağlantıya geçmelerini sağlamak büyük önem taşımaktadır. Allah'ın halifesi olarak yeryüzüne gönderilen insanın yaratılmasındaki amaç, bu âlemleri kendi içinde idrâk ile kendi varlığını anlamlandırma yeteneğini elde etmektir. İnsanın varlığı ve âlemi hakikatiyle idrakı, şahsi aydınlanma ile mümkün olabilecek ve bu bilinç ile âleme baktığında eşyanın hakikatine vâkıf olabilecektir. (Büyükmenekşe, 2020, s.67-73). Tasavvufi öğretide "yakin" kelimesi, kesin, hiçbir surette sahibine şüphe getirmeyecek ilim demektir. Mutasavvıflara göre yakin, kalp gözünün açılmasıyla gaybı yani gizli olanı görmektir. Yakinin üç derecesi vardır: İlme'l yakin delillere dayanılarak öğrenilen kesin bilgi,

ayne'l yakin kesinliği gözle görülen bilgi ve hakke'l yakin kalp gözüyle görülerek alınan ilimdir. İlme'l yakin akıl sahiplerinin, ayne'l yakin ilim sahiplerinin ve hakke'l yakin marifet sahiplerinin ilmi olarak derecelendirilir. (Ateş, 2004, s.612).

Sufilere göre tevhid, Allah'tan başka bir var olan bilmemek, bütün varlıkları onun varlığında yok bilip onun varlığıyla var olmaktır. Bilgi, görüş ve oluşla idrak edilebilecek bu durum seyr-i sülukta ulaşılan manevi yoldur. (Gölpınarlı, Tasavvuf, 2012, s. 55) Kur'an vahyinin temasını ve referans noktasını oluşturan kelime-i şehadet, "Allah'tan başka ilah yoktur; Hz. Muhammed Allah'ın resulüdür." ifadesi ile iki formülün kesin bir şekilde birbirini tamamlayıcısıdır Tasavvufi yorumda kelime-i şehadet getiren bir mümin, yaratanın asli amacını taşımayan herhangi bir şeyin gerçekliğini reddeder, dış dünyanın ve varoluşunun arızi hallerinden ve hayali karakterinden haberdardır ve sonsuz ve mutlak olan yegane hakikate teslim olur. (Jean-Louıs Mıchon, 2014, s. 26-27) . Tasavvufi düşüncenin temel argümanlarından biri olan "Ben bir gizli hazine idim; bilinmeyi sevdim, bilinmek için halkı yarattım." kutsi hadisi sufilerin bakış açısından bir estetik teorisine dönüşmüş ve hadis üzerine son derece zengin yorumlar getirilmiştir. Allah'ın bilinmek istemesinin özü aşktır ve yokluk aynasında kendini temaşa eden bu ilk parıldayış onun isim ve sıfatlarının çokluğunu sağlamış böylece alem meydana gelmiştir. İbnü'l Arabi "Allah güzeldir güzeli sever." hadisini de bütün aşk ve sevginin temeli olarak güzelliğe bağlar. İlk hareket ettirici ve her şeyin özü olan aşk mutlak güzele ulaşmaya çağrıda bulunur. Mevlana göklerin dönüşünü bile aşka bağlar. İbnü'l Arabi'ye göre bütün aşk ve güzellik türlerinin mutlak kaynağı ilahi aşktır. Allah kendini sevmekle zatında gizli olan şeylerin idealarını da sevmiştir. Bütün görülen alem ilahi güzelliğin tecellisinden ibarettir. (Ayvazoğlu, 1995, s.66-67). İbn Arabi'nin anlayışına göre insanın Allah'a karşı tek doğru tutumu tenzih (batını) ve teşbih (zahiri)'ten oluşan ahenkli bir tevhittir ve böyle bir tevhid sadece keşiften doğan mistik bir sezgiye dayalı olarak gerçekleşebilir. İzutsu, Arabi'nin varlık bilgisi açısından dünya görüşünü şöyle özetler: Hakkın batını ve zahiri olmak üzere birbirine zıt gibi görünen iki veçhesi vardır, batını veçhesiyle Hakk, en üstün mertebeden keşif ehline dahi perdeli kalan bir bilinemezdir, Hakk beşerin bilgi alanına ancak zahiri veçhesiyle o da Allah ve Rab suretlerinde girmektedir. Bu iki veçhe arasında bulunan ayan-ı sabiteler aleminin yani nesnelerin var olduğu özel bölgenin mevcudiyeti hem var hem yok olarak kabul edilir. (İzutsu, 2005, s. 75-76). Tevhîd, Allah'ın fâni olana yani maddeye tavrın şuurunu veren ve bâkî olana yönlendiren bir bilinç hâlidir. Kişinin tevhîdi nasıl anlamlandırdığı ve yorumladığı Tanrı tasavvuruyla ve zannıyla doğrudan alâkalıdır. Madde-mâna dengesini kuramamış, varoluş sebebini idrak edememiş günümüz insanı, bireycilik, hümanizm, sekülerizm gibi önceleri Batı'da ortaya çıkan; fakat bugün bütün dünyâyı etkisi altına alan birtakım akımların etkisi ile, metafizik alandan ve kutsal olandan yüz çevirmiş; yabancılaşma, bencillik, anlamsızlık gibi buhran hallerini yaşamaktadır. Tevhid, âdemoğlunu her an ve her şeyde zorunlu olarak kuşatan bir hakikattir. Tasavvuf felsefesinin imkânları bağlamında modern çağda tevhîdi yorumlamak, kişinin anlam dünyasını ontolojik, kozmolojik ve psikolojik boyutta biçimlendirerek, düalist ögeleri ve zıtlıkları uzlaştırmasına yardım etmekte, dünyâyı anlamlandırmasını ve bir denge yakalamasını sağlamaktadır. (İzmirli, 2021, s. 372-373)

2. Sinema- Hakikat İlişkisi

Varlığı, görünüş yoluyla kurtarmak, ilk defa Aristo tarafından bir sanat teorisi olarak temellendirilen benzetme ve taklide dayalı "mimesis" anlayışıyla mümkündür. Mimesis e karşı çıkan ilk düşünür Eflatundur. Meşhur mağara alegorisinde güneşle temsil edilen iyi ideası bütün sistemi kapsar. Eflatun bu sistemi estetiğe de uygular ve duyularımızla kavradığımız dünyanın hiçbir gerçekliği bulunmuyorsa mimesis easasına dayalı sanatlar da ideaların ikinci elden taklitlerini; yani gölgelerin gölgelerini yansıtmaktadırlar. Gerçeğin değil görünenin benzetmecisi olan sanatçı da hakikati aksettirmekten uzaktır. Sanatçı mağaradaki zincirlenmiş esir gibi mağara dışına çıkıp gerçeği görebilse mimesisten vazgeçecektir.

(Ayvazoğlu, 1995, s.30) Bu noktada sanatçının misyonu da kendisine bahşedilen üstün anlayışı ve sezgisi sayesinde hakikati sanat yoluyla diğer esirlere anlatmaktır. Sanatçı bu geçiciliğin ardındaki aslolanı, kaosun ardındaki düzeni , duyularla kavranan yapının ardındaki gizi, nesneler dünyasının görünüşteki keyfiliğini aşarak mutlak olanı sanat vasıtasıyla taklide düşmeden ifade edebilmelidir. Günümüzde belirsizliğin ve düzensizliğin hakim olduğu posmodern dünya tasarımında, hakikatin var olup olmadığı konusunun tartışmalı hale geldiği ve var olduğu şüpheli olan bu hakikatin akılla bulunabileceğine ilişkin inancı sarsılan (Alpay, Yalanın Siyaseti , 2020, s. 37) insanoğlu, kendisini hırpalayan ve yalnızlaştıran gerçek yaşamdan kaçış aracı olarak, diğerleri arasında oldukça etkili ve etkileyici bir yalan söyleme yöntemi olan sinemayı seçmektedir. İmgelerden oluşan bir hakikati kabul edip sahte kahramanların kendisine gerçek duygular yaşatmasını arzulamaktadır. 'Gerçek ve düşsel', 'hakiki ve sahte' gibi modern felsefi düşünce alanına giren kavramların bu bağlamda ele alınması kaçınılmaz hale gelmektedir. (Adanır, 2015) Aristonun mimesis anlayışıyla sinema üreten Hollywood sineması, bu amaca hizmet eden sayısız film örnekleriyle film endüstirisinde liderliğini korumaktadır. Gerçekliği sunuş biçiminin, sinema sanatının oluşturduğu hem teknik-estetik kurallar hem de yazar ve yönetmenlerin gerçekliği sunma biçimiyle doğru orantılı olduğunu söylemek doğru olacaktır. Sinema, bir sanat dalı olarak hakikatin katmanlarına erişme, maneviyatın keşfi konusundaki potansiyeli ve kendi dilini oluşturabilme kabiliyeti ile diğer sanat dalları arasında en yetkin olanı olsa da bu imkanlarına rağmen, ruhun tekamülüne kapı aralayan ve maneviyata yaklaşım imkanı sunan film örneği çok az olabilmiştir. Didaktik bir anlatım ve dil oyunlarının ötesine geçemeyen deneme çabalarının dışına pek çıkılamamıştır. Gülşen, sinemanın bu imkanından yararlanabilmek için İbnü'l Arabi gibi mutasavvıfların hakikat ile kurulacak ilişki düzeylerinin katman katman açılması gibi, bilmenin ve deneyimin katmanlarını sanat eserinde oluşturabilmek gerekliliğinden bahseder. Bu katmanların bilinç ile ilişkisi o eserin içeriğini belirler. Bu katmanların ilki, eserin görünürdeki gerçek boyutu, ikincisi okuyucu ya da izleyici tarafından semboller olarak değerlendirilen şeylerin ardına gizlenmiş alegorik katman, üçüncüsü ise tinsellik olarak adlandırılabilecek boyutudur ki eser bu katmana açılabildiği oranda ve ikinci katmanın sembollerinden sıyrılıp saf şiirselliğe varabildiğinde başyapıt özelliği kazanır ve evrensel değer taşır. Gerçeklik katmanı yavaş yavaş yerini hakikate açılan tinsel katmana bırakır ve görünen anlama dönüşmeye başlar. Sinemada asıl hedeflenen ise son katman olan marifet katmanıdır. Hakikat ve hakikatin bilgisinin açığa çıktığı, marifet ve hakikati imleyebilen katmandır. Çoğu zaman sinemada dil engelinin, maneviyatın asıl alanına ulaşmayı zorlaştırdığı görülür. Sanatçı bu engeli ancak dilden bağımsız bir var oluş şekliyle sinemanın doğal ve içkin imkanlarından faydalanarak gerçekleştirebilir.(Gülşen,2011,s.38,39) Batı sinemasında Ingmar Bergman, Robert Bresson, Pier Paolo Pasolini, Alexanser Sokurov, Jean Luc Godard , Sergei Paradjanov gibi yönetmenler; Hint sinemasında Satyajid Ray, Jaon sinemasında Akira Kurosawa sinemada aşkın bir dil yaratmada katkıları olan sinemacılar arasında sayılmış; ancak Doğulu hikmet anlayışına en yakın ve aşkın bir dil yaratma konusunda en başarılı isim Rus yönetmen Andrei Tarkovsky olmuştur. (Gülşen, 2020, s. 277,278). Andrei Tarkovsky "Bütün diğer sanatlar gibi, sinemanın da kendine özgü bir şiirsel anlamı, kendine özgü bir önceden belirlenmişliği, kendine özgü bir yazgısı vardır. Sinema, hayatın özgül bir parçasını, dünyanın henüz kavranılmamış bir boyutunu, diğer sanatlar tarafından ifade edilmemiş bir boyutunu yansıtmak üzere doğmuştur." derken sinemanın ana akım ya da alternatif sanat sinemasına, tek başına bir karşı duruşu ortaya koyar. Tarkovsky'nin "dünyanın henüz kavranılmamış bir boyutu" ile ima etmeye çalıştığı, tasavvufun sinemaya açtığı ruhi alan ve hakikat boyutu; bu dünya hayatının ve nesnelerin bir hayal alemi olduğu ve görünmez olanı görünür kılmanın yolunu arayan bir sinema dili oluşturmak düşüncesinden bahsetmektedir. Tasavvufun sinemaya katacakları, varlığın diline ulaşma imkanı sağlamasındadır. (Gülşen, 2020, s.279,280). Tarkovsky, sinemayı bilincimizle

hakikat arasındaki denklem olarak tanımlar. Yeni bir dünya tasarımı, bir tasvir sürecidir sinema. Yeniden inşa edilmiş bir gerçekliktir. Ruha ayna tutan simgesel bir imlemedir. Dil aracılığıyla ifade edilemeyene ulaşmaktır. Sonsuzlaştırılmış an ve görüntünün mutlaklığı ile lehf-i mahfuzda tüm evrenin kaydedilmiş öyküsünü ilişkilendirir sinema. Maneviyata açılan ve tinsel katmanı yakalayabilen filmler az olsa da Tarkovsky, Bresson, Kieslowski, Paradjanov, gibi yönetmenler, Hristiyanlık ve Doğu mistisizmine dayalı maneviyata açılan filmler yapmışlar; ancak Türk sineması bu alanda epistomolojik ve retorik filmler düzeyinde kalmıştır. Gülşen, Türk sinemasında maneviyata açılan film çabalarının, tasavvufta ilme'l yakin seviyesinde kaldığını düşünür ki ortaya koyulanlar, bir tür söylem ya da propaganda aracı olmaktan öte gidemez. Gülşen, Hollywood ve Avrupa sinemasının gölgesinde var olmaya çalışan anlayışın yerine, kendi anlatım dilini bulup, kendi dilini konuşan ve dünyaya armağan edilebilir ölçekte bir sinema dilini ise Semih Kaplanoğlu'nun Yusuf Üçlemesi ile oluşturabildiği fikrindedir. (Gülşen, 2020, s.42,43,44). Tasavvufi öğretide hakikatten güzele, güzelden de hakikate ulaşılır ki güzelden hakikate ulaşmanın yetkin temsilini ise Gülşen'e göre Paradjanov'un sinema anlayışı temsil eder. Zamandan sadece anın ebediyetini aktarmak için yararlanır, zaman içinde donmuş bir anın güzelliğinin vardığı hakikattir bu anlayış. Onun Sayat Nova (Color of Pomegrenates) filmi, simge metafor ve alegori katmanlarını aşarak ruhsal katmanda deneyimlenen, dünyanın yüzeysel gerçekliğini aşıp hakikatle bağ kurabilen, güzelden hakikate ulaşan bir eser olarak örneklendirilir. (Gülşen, 2011, s. 120). Tarkovsky, Paradjanov, Mecid Mecidi, Sokurov, Nacer Khemir, Bergman, Bresson ve Dreyer Kim Ki Duk gibi sinemacılar, sembollere sığınmadan aklın sınırlandırıcı sembollerini aşıp sembol ötesinde sembol algısıyla, seyircinin kişisel zamanıyla birlikte akan, sezginin ve kalbin kapılarını açabilen filmler ortaya koyabilmiş ve değişmeyen insan hakikatini değişen kabuklarıyla seyirciye aktarabilmişlerdir. Yüzeysel gerçeklik, alegorik, tinsel, ve hakikat katmanlarının en mükemmel şekillerle ortaya konulabildiği filmlerden olan Stalker'ı bir sanat eserinin ulaşabileceği zirvelerin en yükseklerinden biri olarak yorumlar Enver Gülşen. (Gülşen, Hakikatin Sineması, 2011, s94-100) Tunuslu yönetmen Nacer Khemir'in Bab'Aziz'i, Türk sinemasından Metin Erksan'ın Sevmek Zamanı filmleri de din ve geleneklerin mistik boyutları ile çeşitli biçimlerde kurdukları ilişkiler açısından tasavvuf-sinema ilişkisi açısından okuma yapılabilecek filmlerdir. Yusuf Kaplan'ın ifadesi ile her medeniyetin kendine özgü bir hakikat tasavvurundan, varoluş yolculuğunun varlığından söz etmemiz mümkündür. Bir medeniyet meselesi olan sinema, var oluş alanıyla etnik, ulusal, bölgesel, entelektüel ve estetik sınırları aşarak evrensel olan hakikate ulaşabilir. Sinemacı kendisine hakikat kapısını açabilecek duygu, algı, sezgi, zihin ve gönül haritalarına sahipse, sineması bulunduğu yerin çok ötesine taşar ve başka coğrafyalara ulaşır. (Gülşen,2020 Sinemanın Hakikati, s.15). Diğer yandan Hollywood dünyasında kendini filmde sunulan hayatla bütünleştiren seyirci, gerçekliğin dışına çıkacak ve hakikatin kavranılmasına bir aracı olması gereken sinema, boş vakitlerde zaman geçirmeye yarayacak bir oyun ve eğlence aracına dönüşecektir. Bu durumun en önemli sonucu, beyazperdenin sahte kurgusunun gerçek hayatla buluşması neticesinde bu dünyanın da yapay bir yere yani simülasyona dönüşmesi; fakat seyircinin bunu idrak edememesidir. Sahte bir kurgu haline gelecek olan dünyada insan, kendiliğini kaybedecektir. (Sarmış, 2020) Ferdin kutsallaştırıldığı ve kadim kutsalların da hor görüldüğü çağımızda varlığın özünün madde olduğu iddiası bugün kuantum alanında yapılan çalışmalarla itibarını kaybetmektedir. Modern insanın tekrar özüne dönmesi gerektiği düşüncesi, Batı'nın, eksik yönü olan sezgisel görü konusunda yine Doğu'ya başvurmasını gerekli kılmaktadır.

3. Matrix- Hakikat İlişkisi

Wachowski Kardeşler'in Matrix'iyle 'hakikat' meselesi bambaşka bir boyuta taşınır. Filmde, evrenin aslında bir simülasyondan ibaret olduğu ve Matrix denilen bu simulasyonu kırmanın kişiyi hakikatine ulaştıracağı vurgusu yapılır. Filmin ilk sekansında Jean Baudrillerd'in Simularklar ve Simulasyon kitabının olması ve Neo'nun 'o kişi' olma

yolculuğunda çeşitli sınavlardan geçmesi noktasında, Hindu, Japon, tasavvuf geleneğine kadar birçok yerde retorik ve sinematografik düzeyde, zikredilen fikirlerin bir benzeri dile getirilmiş, Doğu mistisizminin bir etkisi olarak karşımıza çıkmıştır. (https://www.lacivertdergi.com/ E.T.12/05/2021). Baudrillard'ın insanlığın geldiği son durumun vehametini ortaya koyan simülasyon kuramı, günümüz Batı toplumlarındaki gerçeklik kavramının sorgulanmasına dayanmaktadır. Baudrillard'a göre, teknolojik ürünlerin yaşamın her noktasını kuşatması sonucunda hakikat, bir imgeler bulutu içinde gözden kaybolmuştur. Baudrillard'a göre, gerçeklikle hiçbir ilişkisi olmayan bir imge aşamasına geçildiği için artık yaşam ve ölüm bile hakikatle bağını yitirmiştir. (Çelik, Günümüz Felsefesinde Hakikat ve Eylem Olanakları, 2012).Sinemanın popülerleşme sürecinin bir parçası olan ve 1999 yılının en çok beğenilen ve üzerinde konuşulan yapımlarından biri olan Matrix; teknolojinin rasyonalitesine eleştirel bir yaklaşımda bulunmakla birlikte, yapay zekanın üretiği Matrix içinde yaşayan insanların geliştirdikleri sanal yaşamın eleştirisi üzerine kuruludur. Popüler kültür ürünlerinin de belirli çerçevelerde insan zihnini özgürleşirici ögeleri içerdiğini belirtmek ve hakikate ulaşma yolunda sunduğu ipuçlarından yararlanarak hayatın izdüşümlerini ortaya çıkartmak mümkündür. (Avcı, 2014, s.221). Matrix'in; Dini, felsefi, kültürel ve dünya tarihinde durmaksızın tekerrür etmiş, hiçbir zaman modası geçmemiş ve yaşadığımız dünyayı gerçeklik, uyanmak, sistem, özgürlük gibi kavramlar üzerinden pek çok öğretide ele alınmış meseleleri, kolektif bir şuur oluşturmak adına kurgusal, sinematografik ve retorik düzeyde sorgulayan bir film olduğu söylenebilir. Tasavvufu İslam mistisizmi bağlamında değerlendirdiğimizde Matrix'le ciddi bir ilişki kurmak mümkündür. Hakikatin tek olması gerçeği değişmemekle birlikte, mistik öğretiler boyutunda dışta görülen ayrılıklara rağmen iç yapılarındaki benzerliklerin bulunması, izleyicinin bilinç seviyesine göre hakikatin penceresinden bakabilme yetisi ve sezgisi, filmdeki tasavvufi unsurları, hakikatin sineması boyutunda okumayı mümkün kılar. Matrix, metafizik gerçekliğinden kopmuş postmodern zamanların insanının kendini arayışıdır denilebilir. Watchowski Kardeşler kutsal olana olmasa da ruhani olana ilgi duymaktadır. Ruh ve sezgi ile hakikate varmak için içgörünün arılaştırılması, zihnin ve ruhun kementlerinden kurtulması ile ilgili mesajları izleyicisine ulaştırabilmektedir. Matrix'in bu alemin illüzyon olduğu düşüncesi üzerine vurgusu, tasavvufta vahdet-i vücut anlayışıyla ifade edilir ki bu nazariyenin en büyük temsilcisi Muhyiddin İbnü'l Arabi'dir. Arabi'nin ontolojik anlayışından yapılacak bir Matrix okumasında, Morpheus'un: "Yola girmekle yolda yürümek farklı şeylerdir." sözünden hareketle yola çıkan Neo'nun, "One" yani tasavvufi terminolojide insan-ı kamil olma yolculuğunu izleriz. Platon'un mağara alegorisindeki hikayeyi dikkatleri daha yüksek bir gerçeklik düzlemine çekmeye çalışan Neo'nun, matrixten kurtuluşuna benzetebiliriz. Neo, mağaraya zincirlenmiş yanıltıcı gölge oyununu zihninde canlandıran Platon'un mahkumu gibi, siyah kablolara bağlanmış olduğunu ve pembe bir bulamacın içinde diğer bihaber mahkumlarla uyutulduğunu anladığında dehşete kapılır. Şimdi gördüğü şeyin gerçek oluğunu ve eskiden bir düş dünyasında yaşamış olduğunu kabullenmek istemez. Mahkum mağaradan, Neo matrixten dışarı çıkarılmıştır. Platon'un mahkumu güneş ışığındaki iyilik ve bilgi dünyasında kalabilecekken geri döner ve diğerlerini uyandırmaya çalışır. (Irwın, 2003, s.20) Neo da sahte bir hakikate dönmez ve nefsi talimlerden geçerek uykudaki insanları uyandırmak için matrixe geri döner. "Matrix nedir?" sorusu; hakikat nedir, insan nedir, zihin ve beden arasındaki ilişki nedir, özgür irade ile kader arasındaki bağlantı nedir, görünenin ardındaki gerçeklik nedir gibi soruların cevabı olarak metafiziğin kategorik bir sorusudur. Bu soruların cevabı aynı zamanda insanın kendini tanıması, bilmesini gerektirmektedir. Matrixin metafiziği, filme gönderimde bulunurken filmin gösterdiği dünyaya da gönderimde bulunur. (İrwin, 2003, s. 68)

Matrix filmi bize düalistik bir metafizik sunar. İkici metafizik, dünyanın nihai doğasına dair bir görüştür ve genellikle monoizmin karşıtı olarak ortaya koyulur. Matrix

filminin düalizmi, bir yanda görünüşler dünyasını, öte yanda makinelerle insanların savaşının yer aldığı gerçek dünyayı içerir. Bu iki dünyanın kategorileri birbirlerine indirgenemez, bir arada var olamaz; oysa metafizik, görünüş ve gerçekliği birbiriyle ilişkilendirmek, birbirine bağlamak amacındadır. Deneyimlediğimiz bu hayat yalnızca bir görünüş müdür yoksa bu görüntüler benzedikleri fiili şeylerin yansımaları mıdır? Zihinleri matrixe takılmış; fakat bedenleri gerçek dünyada tüplerin içinde olan mahkumlar için kurtuluş, zihin ve bedeni bütünleştirmek böylece görünüş ve gerçekliği birbirinden ayırt edebilmektir. (İrwin, 2003, s. 76-77). Neo'nun gerçek sandığı hayat aslında bilgisayar tarafından beyninde yapay olarak oluşturulan algılardan ibarettir. Robotların elinden kurtulmuş bir grup insan ve onlara önderlik yapan Morpheus isimli lider bu gerçeğin farkındadır. Morpheus, Neo'yu Matrix'in farkındalığına ulaştırır. Ayrıca ona bu konuda bilmediği pek çok şey öğretecektir. Ona şimdiye kadar gördüğü duyduğu kokladığı tadını aldı hissettiği şeylerin fiziksel bir gerçekliğin olmadığını, gerçek dediği şeyin aslında beyne iletilen elektrik sinyallerinin beş duyusu ile algıladığı; ancak dış dünyada maddesel karşılıkları olmayan illüzyonlarıdır. Neo Matrix e bağlıyken tüm o rengarenk ve canlı görüntüleri fiziksel bir gözle görmemiştir. Dolayısıyla içinde yaşadığımız dünya aslında zihnimizdeki bir hayalden ibarettir ve Neo'nun gerçek sandığı dünya aslında bir simülasyondan başka bir şey değildir. Bugün dünyada yaşayan milyarlarca insanın içinde bulunduğu durum, Neo'nun uyanışından önceki algısıdır. Bu algı, maddi dünyayı şuur mu yaratıyor, sorusunu akla getirmektedir. Matrix'te düşten uyanma motifinin sıkça yer aldığı görülür; Neo bilgisayar başında uyandırıldığında "Uyan Neo" mesajında, müşterisine teslimat yaparken "Hiç rüyadan uyandığında kuşkuya düştüğün oldu mu?" diye sorduğunda, işyerinde patronla konuşurken cam temizleyicilerinin bulanık camı temizleyip netleştirmesi ile bilincin bulanık halden berraklaşmasının metaforlaştırılmasında, kahinle buluşmasında evde çalan "I am Beggining To See The Light" şarkısının mesajında, Morpheus'un "Gerçek olduğuna inandığın bir rüya gördün mü Neo? Ya o rüyadan hiç uyanamazsan?" sorusunda hakikati perdeleyen düşsel bir dünyada yaşadığı fikrine sürekli gönderme yapılır. (Avcı, 2014, s. 230). Matrix, insanın kendi zannında yarattığı bir düş dünyasıdır. Öncelikle farkındalıkla bilinçaltını kontrol etmek gereklidir. Korku, endişe ve şüphe zanlarından kurtulup tam teslimiyet sağlandığında zihin özgürleşecek ve tam anlamıyla iman edilmiş olacaktır. Korku, inançsızlık ve şüphe pillerinden beslenen insan zanda kalmaya devam edecektir. Bir gökdelenden diğerine atlama sahnesinde ilk denemede Neo başarısız olur; çünkü henüz tam teslimiyet sağlayamamıştır. Korku, inançsızlık ve şüphelerinden kurtulamamıştır. Zihni, eski bildiklerini unutmamıştır ve özgürleşmeye hazır değildir. (Öztürk G., 2018, s. 192-193) Tek hakikat olarak var olan sadece Allah'tır idrakinde olan insan, uyanışını yaşar ve matrixten kalben, nefsen ve aklen "ümmi" olarak tam teslimiyet sağlanarak çıkılacağını bilir.

Her sanat eseri gibi sinemanın da bir "öz"e ya da saf bir "idea"ya sahip olmaması, sinema metinlerinin seyircisi tarafından her alımlandırıldığında farklı bir biçimde okunabilmesini mümkün kılmaktadır. Tarkovsky'nin, "Filmler yönetmenin bilinçli olarak yüklediği anlamdan her zaman daha fazlasını barındırırlar." sözü Matrix filmi için geçerli bir ifadedir. Her izleyicinin farklı yorumlar katabileceği metinlerarası bir metin olma özellliği taşıması, geniş anlam katmanlarına ve referanslara sahip olması, "Matrix nedir?" sorusunu her izleyenin farklı cevaplar verebileceği açık uçlu bir soru niteliğine dönüştürmektedir. (Avcı, What is The Matrix, 2014, s. 223). Bir simülasyondan ibaret olan Matrix'ten çıkışın yolu tasavvufi öğretide disipline dayalıdır. Bir disiplin olan din denilen sistem altında, İslami pratiklerle insanın duygu, düşünce ve bedensel durumu sürekli kontrol altında tutulmaya ve disipline edilip eğitilmeye çalışılmaktadır. Mümin olma yolundaki kişi, takva kavramının şemsiyesi altında, her an hem manen hem de madden bir disiplin altında hayatını kontrol etmekle mükelleftir. Kur'an'da ve İslami öğretide, Allah'tan sakınıp takvada bulunulması öğüdü, kişiyi kendi nefsinden korumak yani varoluşunu gerçekleştirme potansiyelini

gerçekleştirmesini engelleyecek durumlardan uzaklaştırmak ve matrix içinde bulunduğunu sürekli bir farkındalık hali oluşturarak hatırlatmaktır. Hz. Ali, Matrix alemini "Seni Rabbinden ne alıkoyuyorsa dünya odur." şeklinde tanımlamıştır. Filmde matrixin dışıyla kurulan irtibat telefon aracılığıyla sağlanmaktadır. Telefonla bağlantı kurmak karşı taraftan da aranmayı gerektirmektedir ve bu aranma merkezden yapılmaktadır. Tasavvufta metaforik olarak bahsi geçen Kaf dağı'nın ardında denilen varlık aleminde de bir irtibat merkezi bulunmaktadır. Rabıta hali kurulduğunda salik artık başka bir alemdedir. Kaf dağının ardında beslendiği kaynaksa Zion'dur. (Çıtlak, 2003, s.24) Sözlükte "bağlamak" mânasındaki rabt kökünden türeyen ve "iki şeyi birbirine bağlayan ip; alâka, bağ, münasebet" anlamlarına gelen râbıta kelimesi tasavvufta sâlikin kâmil bir mürşide gönlünü bağlaması, onun sûret ve sîretini düşünmesini ifade eder. (https://islamansiklopedisi.org.tr/ E.T.05707/2021) Alemleri seyreden, kendini bulma halini yaşayan Neo, ilerleyen zamanlarda bilgelik ve fedakarlığın son noktasına geldiğinde Kaf dağının ardındaki benliğin de kendisi olduğunu fark edecektir.

SONUÇ

Felsefenin düşünsel nesnesi olarak hakikat kavramının içi hemen her filozof ve düşünür tarafından doldurulmaya çalışılmıştır. Düşünce sistemleri ve teoriler çoğaldıkça, felsefi yöntem de gelişmesini sürdürmüştür. İslâm felsefe tarihinde ise hakikat daha çok ontolojik bir kavram olarak ele alınmıştır. Tasavvufta hakikat terimi "zâhirin ardındaki örtülü ve gizli mâna, dinî hayatın en yüksek seviyede yaşanarak ilâhî sırlara âşina olunması" gibi anlamlar ifade eder. Sûfîler hakikat terimini daha çok "ilâhî gerçeklere ve sırlara âşina olmak, Hakk'ın tecellilerini temaşa etmek" anlamında kullanmışlardır. Sözle anlatılamayacağını düşünerek, daha çok alâmet ve vasıflarını belirterek hakikatin ne olduğu konusunda bir fikir vermeye çalışmışlardır. İbnü'l Arabi'nin "vahdet-i vücûd" terimiyle kavramsallaştırılan varlık görüşüne göre hakiki manada Allah'tan başka varlık yoktur. Eşyanın ise göreceli bir varlığı vardır ve varlığını Allah'tan alan eşya, O'nun varlığının tecelli ettiği, yansıdığı bir ayna gibidir. Tevhit, görüntüdeki çeşitliliğe ve çokluğa rağmen hakikatte birlik olduğunu ve tek gerçek varlığın Allah olduğunu keşfetmek demektir. Şirk ise hakikatin veya varlığın çokluğunu düşünmek demektir. Tasavvufi ekolün sistematiğini meydana getiren Arabi'nin ontolojisi temel anlamda şöyle özetlenebilir: Hakkın batıni ve zahiri birbirine zıt görünen iki veçhesi vardır. Batıni veçhesi ile hak en yüce keşif ehline dahi perdeli kalan ezeli ve ebedi bir gayb ve bilinmezdir, zahiri veçhesi ile beşerin bilgi alanına girebilir ki o da Allah ve Rabb suretleridir. Bu iki veçhe arasında hem var hem yok sayılacak nesnelerin mevcut olduğu özel bir bölge yani ayan-ı sabiteler alanı vardır. Masiva'da en yüksek varlık ise hiç şüphesiz insandır. İnsan, bütün kainatın özetidir ve sahip olduğu akıl ve ruh yetileri sayesinde bütün varlıkların üzerine çıkabilmekte bu aşamada insan-ı kamil derecesine ulaşmaktadır. İnsan küçük bir kainat; kainat büyük bir insandır. Varlığın var olma nedeni tecellidir ve Tanrı kainatta isim ve sıfatları aracılığı ile bize kendisini gösterir. Varlık hakikatte varlığını tek gerçek var olan olan Tanrı'ya borçludur; diğer varlıklar onun birer gölgesidir. Bu gölgenin varlığı reddedilemez; fakat gerçek varlığın kendisi de değildir. Vucud ile mecvud bir ve aynı şey olmayıp; onun söz konusu ettiği birlik vücudun birliği olup, mevcudun birliği değildir. Tasavvuf, ahlaki ve zühdi hayatı amaç edinen kimselerin tuttukları yolu ifade eden disiplindir ve daha çok ahlaki bir karakter taşımaktadır. Mutlak varlık Allah, tüm varlıklardan aşkındır; varlık bilgi ve değer alanlarındaki tek hakikat ve tek kaynaktır. Tasavvuf söz değil özdür ve kaynağı Kur'an ve sünnettir. Bütün sufiler, Hak ile O'nun dışındaki varlıkları birbirinden ayırırlar. Bilgi kaynağının, akıl ve duyumdan farklı olduğuna inanırlar. Marifet; sezgi, basiret, ilahi ilhamla elde edilir. Akıl ve duyum, gerçek bilgi olarak kabul edilmez. Hakikatin bilgisine akıl ve duyumla ulaşılamadığı için fizik evren bir vehimden ibarettir ve batın zahire tercih edilmelidir. Sufi, Allah'ın kaza ve kaderine tamamen teslim olmuştur ve mutlak

hakikate ulaşmayı hedef edinir. Çağdaş insan, yaratıcı ve yaratılan arasındaki ontolojik mesafeyi ortadan kaldırdığı için kendini tanrılaştırmaya kalkmış ve azmanlaşmıştır. Mesafe fikrine sahip olan insanın meselesini hakikat, mesafeden yoksun olan insanınsa meselesi kendi hükümranlığı olmuştur. İslâm medeniyetinde ontolojik hiyerarşi hüküm vericidir. İlimden sanata, teknikten hayata kolaylıkla geçiş yapılır ve her şey birbirini besler, birbirinin önünü açar; böylelikle hakikate nüfûz etme gerçeğe dönüşür, insan hangi alandan bakarsa baksın, hakikatin farklı izdüşümlerini seyreder. Sanat ve sanatın bir dalı olan sinema da insanı manevi olarak buhranın içine düşmekten kurtaran, onun hakikate ulaşmasında aracı olan bir işlev görür. Bu anlamda sanatçı adeta peygambervari bir işleve sahiptir ve din ile sanat birbirinin kardeşidir. Sanat, bilgi ve ışığı dolaylı yoldan insana aktarır, sanatçı da hakikat ve insan arasında bir köprü vazifesi görür. Sanat, insanı hakikate ulaştırma çabası güttüğü sürece sanattır. Sanatçının misyonu, insanı karanlık ya da aydınlık taraflarıyla ele alırken aydınlık tarafa hizmet eden bir sanat eseri yaratmak, hakikati sezgi yoluyla ortaya koymaya çalışmaktır. Gerçekçilik ve biçimcilik olarak adlandırılan iki ana gelenek içerisinde kendi hakikat anlayışını ve üslup arayışlarını üreten sinema da içinde bulunulan koşullar itibariyle günümüzde yeni hakikat kavramları üretmektedir. Gerçekçilik, sinemanın seyirci ile yansıtılan evren arasında bir pencere görevi üstlendiğini düşünmüş, biçimcilik ise sinema perdesini bir çerçeve tablo olarak ele almış ve yansıtılan gerçeklik yerine, yansıtılan fikre ve yönetmenin bakış açısına öncelik vermiştir. Aristo'nun mimesis anlayışı ile ilham kaynağını tabiattan alan ve tabiatın taklidine dayalı bakış açısı, rasyonel aklı ön plana çıkarmış, varlığı bölüp parçalamıştır. Tasavvufi anlayışta marifet, varlığın asli birliğini ve bütünlüğünü kavramaktır. Yunus Emre bu durumu" Gönül gözü görmeyince hiç baş gözü görmeyiser." diyerek özetlemiştir. Gerçeğin dış yüzüyle uğraşma derdinde olmayan ve biçim iradesine yön veren bu anlayışla eser veren sanatçı da sanatın her alanında ortaya koydukları ile görünen alemin geçiciliğini ve baki olanın yaradan olduğuna devamlı bir imada bulunmalıdır. Gerçeğin aşkın olduğunu bilen sanatçı mimetik objeye takılmamalıdır. Gölge gerçekten hareket eden sanatçı tek tek nesneleri taklit ettiği sürece eşyanın yüzeyinde kalacak ve birliğe vakıf olamayacaktır. Mutlak güzelliğin ifade edilemez olduğunun bilincinde olan sanatçı, bütünden kopardığı parçalarla birleştirdiği şekillerin ardında gizlenmiş olan hakiki güzelliği ve şekilsiz şekli sezdirmeye çalışacaktır. Sinema ile tasavvuf ilişkisini kurabilmek için, sinema; düşünce, felsefe ve metafizik ile ilişkisi bağlamında ele alındığında, Tasavvufi doktrinde âlemin özü, özeti ve İlahi hakikatin yansıması olan insanın, Allah'ın halifesi olarak yaratıldığı ve geldiği yere, aslına; yani hakikatine ulaşma çabası içerisinde ve aşkın olanın peşinde olduğu anlaşılmaktadır. Kendisinde yaratılıştan var olan bu özelliği nedeniyle hakikate ulaşma çabası tüm insanlığın temel meselesidir. Bilerek veya bilmeyerek her insan bu yolda ilerler, sanat yoluyla da kendine yeni hakikat formları üretir ve bu formlar vasıtasıyla hakikat kapısını aralamak ister. Sinema bu noktada çağın ürettiği en önemli formlardan biridir. Sinema ile tasavvuf ilişkisi ise aşkın bir dil imkânını ima etmesi açısından önem taşımaktadır. İbnü'l Arabi'ye göre ruh ile beden arasında berzahta olan nefs, hayal mertebesindedir. Arabi hayali sadece zihne ait bir kurgu olarak ele almaz. Ontolojik düzeyde bütün alemle, duyular alemi ve metafizik alem arasında yer alan üçüncü bir aleme işaret eder. Suretler şeklinde algılanan rüya alemi de bir arabirim gibidir. Maddi dünyaya ait olanları değişik formlara ve sembollere dönüştürür. Metafizik dünyadan algıladıklarını, bilinç ve hayal gücü için kullanılabilir hale getirir. Maddi dünyanın ruhi aleme tercüme edilmesinde bir tercümandır rüya alemi. Sinema ile rüya ilişkisi sinemanın dilsiz anlatıma uygun oluşu, semboller üzerine kurulu olduğu düşünülen sinemanın aslında ontolojik ve mana boyutunda hakikatin, maddi düzlemde sembol olarak görünmesidir. Bu bağlamda sinemanın görüntü dünyasının hakikate kapı aralayabilecek imkana sahip olduğu anlaşılır. Sanat eserlerindeki anlam katmanlarını ve sembol dizgelerini yorumlamak için de "okuma" ve "tevil" e ihtiyaç vardır. Okuma kültürlü herhangi kültürlü bir insanın rasyonel bir yöntemi içerirken, tevil,

mistik ve irrasyonel anlamlarla yüklü bir okumadır. Tevil yapanın zahiri görünüm ile Batını anlam arasında ancak kendisinin sezgisine sır perdelerinin bulunduğunu bilmesi gereklidir. Buradaki temel argümanın zıll-i hayal olduğu, Tarkovsky gibi sinemaya metafizik boyut kazandıran yönetmenlerde ve İslam estetiğine ilişkin çağdaş tefsir yapanlarda görülebilir bir durum olduğu anlaşılır. "La mevcude illa Hu" argümanı yakin ve şuhud mertebesi bakımından eşyayı hayal derecesine indirir. Varlıklar birer gölge ve hayaldir. Sinemada hakikat meselesi, öncelikle sinemada dil sorunun çözülmesiyle mümkündür. Her sanat eseri, kendine has dili kullanırken aynı zamanda gerçekliği de sınırlamaktadır ki hakikat ancak bu sınırlar kaldırılınca erişilebilecek bir şeydir. Sanat, hakikate ulaşmada en başat araçlardan biridir ve insan ruhuna sızan ve kullandığı dilin sınırlarını aşan bir eser sanat eseri hüviyeti kazanır. Sanatçı dünyayı kendi gözünden nasılsa öyle görebilme yetisiyle donatılmıştır ve bir sufi deneyimiyle hayatı görür. Görülen şey sanatçının kabına göre hakikati görebilme yetisidir. Sanat teknik olarak öğrenilecek bir kavram değil, sanatçıya bahşedilmiş bir hediyedir. Dinsel ve mistik bir deneyim gibidir; çünkü sanatçı bir sufi gibi insanların çoğunun göremediği hakikatin sır perdelerini aralayarak görünenin ardındaki hakikate vakıf olabilendir. Bu durumda yönetmenin maneviyatı ve irfanı önemseyen bir sezgiye de sahip olması gereklidir. Sonuç olarak Watchovsky Kardeşlerin, dini, felsefi, kültürel ve dünya tarihinde durmaksızın tekerrür etmiş, hiçbir zaman modası geçmemiş ve yaşadığımız dünyayı gerçeklik, uyanmak, sistem, özgürlük gibi kavramlar üzerinden pek çok öğretide ele alınmış meseleleri, kolektif bir şuur oluşturmak adına kurgusal, sinematografik ve retorik düzeyde sorgulayan Matrix filminin hakikat ile ilişkisi değerlendirilmiş , dünyanın bir simulasyondan ibaret olduğu ve matrixi kırmanın kişiyi hakikatine ulaştıracağı mesajı verilen filmin ilk sekansında, Neo'nun "o kişi" olma yolculuğunda insan-ı kamile ulaşma aşamalarında verdiği mücadele ve gösterdiği gayret, mistik bir bakış açısıyla tasavvufi anlayış çerçevesinde okunmuş, tasavvufun âleme bakışı ile sinemanın hakikati ele alan yapısının örtüştüğüne ve irfani bir bakış açısının sinemanın imkânları ile izleyiciye manevi bir deneyim imkânı sunabileceği ve kalbin keşfine açılan bir kapı aralayabilecek yetkin bir sanat olduğu sonucuna varılmıştır.

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BİZANS'TA EĞİTİM VE ÖĞRETİME GENEL BİR BAKIŞ

A GENERAL OVERVIEW OF EDUCATION AND TEACHING IN BYZANTINE

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Özet

Bu araştırmada Bizans Devleti'nde, eğitim ve öğretim hayatının genel bir değerlendirmesinin yapılması hedeflenmiştir. Dolayısıyla bu çalışma ile Ortaçağ Avrupası'nın eğitim hayatı ve eğitim düşüncesinin Bizans Uygarlığı aracılığıyla değerlendirilmesine gayret edilmiştir. Ayrıca bu araştırma ile Bizans'ta aydınlanma düşüncesinin doğuşuna da tanıklık edilmesi hedeflenmiştir. Bu makalemizde, Bizans'ta eğitim ve öğrenime genel bir bakış denemesi yapmaya gayret ettik. Böylesine geniş bir konuyu mütevazı bir makalenin sınırları içinde tatmin edici bir şekilde açıklamanın imkânsızlığının farkındayız. Bizans üzerine yazılmış araştırma eserlerinde ve diğer bazı çalışmalarda eğitim konusuna değişik ölçeklerde yapılan değinmelere, küçük bir katkı sunmak amacındayız. Ortaçağ'ın büyük kısmına damgasını vuran, kurumları ve kültürüyle başta Slav dünyası olmak üzere, farklı coğrafyalarda etkilerde bulunmuş olan Bizans uygarlığında, temel eğitim ve yükseköğrenim nasıldı? Ne tür eğitim kurumları vardı? Hangi dersler okutulmaktaydı? Bizans tarihinin çeşitli dönemlerinde eğitim alanında yapılan reformlar nelerdi? Bu ve benzeri sorulara cevap oluşturacak bir katkı sunabilirsek, bundan bahtiyarlık duyarız. Bu araştırmada, yöntem olarak literatür incelemesine dayalı genel tarama modeli kullanılmıştır. Araştırma bağlamında, literatür taraması, araştırmanın konu alanını oluşturan Bizans Devleti'nde eğitim ve öğretim hayatının tarafsız tarihi kaynaklardan yararlanılarak belirlenmesi amacıyla kullanılmıştır. Bizans'ta eğitim, öğretim uygulamaları Ortaçağ Dönemi'nin kendine özgü koşulları içerisinde ve nesnel bir anlayışla objektif olarak değerlendirilmiştir. Makalede, Bizans Uygarlığının eğitim felsefesinin oluşumunda Antik Yunan kültürünün etkisi üzerinde durulmuştur. Araştırmada sıra ile Bizans Uygarlığı ile ilgili genel ve tanıtıcı bilgiler, öncelikle Bizans kavramının doğuşu vurgulanmıştır. Ardından çalışmanın I. Bölümünde Bizans Devleti'nde temel öğrenim üzerine ayrıntılı ve açıklayıcı bilgiler ile yorumlar paylaşılmıştır. Çalışmanın II. Bölümünde ise Bizans'ta yükseköğrenim hayatı üzerinde durulmuştur. Araştırma sonuçlarına göre, Bizans'ta eğitimin devlet yönetiminde, sosyal hayatta, politika ve ticarette; kısaca hayatın her alanında önemli olduğu saptanmıştır.

Anahtar Sözcükler: Bizans, Bizans Uygarlığı, Bizans'ta Temel Öğrenim, Bizans'ta Yükseköğrenim.

Abstract

In this research, it is aimed to make a general assessment of education and teaching life in the Byzantine State. Therefore, with this study, it was tried to evaluate the educational life and educational idea of Medieval Europe through Byzantine civilization. In addition, it is aimed to witness the birth of enlightenment thought in Byzantine with this research. In this article, we have tried to give an overview of education and training in Byzantine. We recognize the impossibility of satisfactorily explaining such a broad subject within the confines of a modest article. We aim to make a small contribution to the references made at different scales to the subject of education in research works on Byzantine and in some other studies. What was basic education and higher education like in the Byzantine civilization, which left its mark on most of the Medieval Period and had an impact on different geographies, especially the Slavic world, with its institutions and culture? What kinds of educational institutions were there? Which courses were taught? What were the reforms made in the field of education in various periods of Byzantine history? If we can make a contribution to answer these and similar questions, we will be happy. In this research, the general screening model based on literature review was used as a method. In the context of the research, the literature review was used to determine the education and teaching life in the Byzantine State, which constitutes the subject area of the research, by using impartial historical sources. In Byzantine, educational practices were objectively evaluated within the unique conditions of the Medieval Period and with an objective understanding. The article focused on the influence of ancient Greek culture in the formation of the educational philosophy of Byzantine Civilization. In the research, general and introductory information about Byzantine civilization, first of all, the birth of the Byzantine concept was emphasized. Then, in Chapter I of the study, detailed and explanatory information and comments on basic learning in the Byzantine State were shared. In chapter II of the study, the life of higher education in Byzantine was emphasized. According to the results of the research, education in Byzantine was in state administration, social life, politics and trade; in short, it has been determined that it is important in every aspect of life.

Keywords: Byzantine, Byzantine Civilization, Basic Learning in Byzantine, Higher Education in Byzantine.

GİRİŞ

1453 yılında Osmanlı hükümdârı Fatih Sultan Mehmed döneminde fethedilmesine kadar 1000 yıldan fazla yaşayan Bizans[1] İmparatorluğu, Dünya uygarlıkları arasında; Helen, Batı, Çin, Hind ve diğerleri gibi kendine özgü bir kimliği olan yirmi bir uygarlıktan birisi olarak tanımlanmıştır.[2] Bu makalemizde; coğrâfî mekân olarak Anadolu ve Balkanlar'da yerleşerek gelişmiş olan Bizans uygarlığının, kültürel olarak Antik Yunan temellerine dayanarak oluşturduğu eğitim ve öğretim dünyasını ana hatlarıyla anlatmaya çalışacağız. Bu çabamızın, Bizans uygarlığının genişleme ve başka kültürleri etkileme başarısını anlamamıza katkı

[1] XIX. Yüzyılın sonlarına kadar, Batı tarih yazımında Bizans'ın standart isimleri, ''Konstantinopolis İmparatorluğu'' ve ''Grek İmparatorluğu'' idi. Bizans terimi, XVI. Yüzyılda ortaya çıkmış ve sonrasında zaman zaman kullanılmış olsa da, ancak 1850'den sonra yaygınlık ve yerleşiklik kazanmıştır. Bu konuda yararlı olabilecek bir tartışma için bk. Kaldellis, Anthony, ***Bizans – Roma Diyarında Etnisite ve İmparatorluk***, Karakarga yay., İstanbul 2020, s. 33 – 63.

[2] Vryonis, Speros, ''Bir Dünya Uygarlığı: Bizans'', ***Bizans Özel Sayısı, Cogito***, YKY yay., İstanbul 1999, sa. 17, s. 37.

sağlayacağına inanıyoruz. Çalışmamızda; Giriş Kısmı'nın ardından I. Bölüm'de Bizans'ta Temel Öğrenim, ardından II. Bölüm'de ise Bizans'ta Yükseköğrenim ele alınacaktır.

I-BİZANS'TA TEMEL ÖĞRENİM

Bizans uygarlığı üzerine yaptığı çalışmalarıyla yetkin bir uzman olarak tanınan Speros Vryonis, bu kültüre olan âidiyetinin de etkisiyle ''bir dünya uygarlığı'' olarak nitelediği Bizans'ı; Antik Yunan dili, edebiyatı, felsefesi, bilimi, tıbbı, sanatı ve eğitimi ekseninde biçimlenen melez bir kültür olarak tanımlamaktadır. Ona göre, Bizans'ın politik – hukuksal kurumları Helen ve Roma kurumlarının kaynaşmasıyla oluşmuştur. Bu melezliğin bir önemli bileşeni de hâlâ önemini koruyan Ortodoks Yunan Kilisesi'nin temelini oluşturan Yahudi tektanrıcılığıdır. Bizans üzerindeki Yunan geleneğinin tesiri, Konstantinopolis (İstanbul)'in kurulduğu 324 – 330 yıllarından, şehrin Osmanlılarca fethedildiği 1453 yılına kadar varlığını muhafaza etmiştir. Yunan edebiyatının ve ilminin mirası, Antikçağ sonu Yunan dünyasından doğmuş ve İskenderiye'de biçimlenmiş olan eğitim sistemiyle sürmüştür. Bu eğitim sistemi, tüm imparatorluk sathında yayılmıştır. Bizans Devleti'nde, taşra ve merkezî yönetim temsilcileri büyük ölçüde bu sistemle eğitim görmüşlerdir. Bizans okul müfredatında, başta Homeros olmak üzere Antik Yunan şair ve yazarlarının, tarihçilerinin, filozoflarının ve bilim insanlarının çoğu kendisine yer bulabilmekteydi. Bizans üzerindeki bu klasik mirasın etkisi, Osmanlı fethine kadar, Bizans'taki eğitimin temelini oluşturmuştur.[3]

Bizans üzerindeki etkisi tartışmasız olan Yunan antik çağının büyük düşünürü Aristoteles (MÖ 422 – 384), **Politika** adlı ünlü yapıtında, eğitimle ilgili görüşlerini ifadeyle okuryazarlığın faydalı olduğuna değinerek: ''πρός χρηματισμόν και πρός οικονομιαν και παός μαθησιν και πρός πολιτικάς πράξεις πολλάς'' (ticaret, ekonomi ve politika için çok gerekli olan eğitim) olarak nitelendirmektedir.[4] Bizans toplumunda ve kamusal yaşamında yer alan farklı meslek gruplarına mensup insanların, mesleklerini lâyıkıyla icra edebilmeleri için okuma yazma becerilerine sahip olmaları kaçınılmaz bir gereklilikti. X. Yüzyılda, İmparator Konstantinos Porphyrogennetos'a göre, Bizans ordusunda görev yapan yüksek rütbeli subayların okuryazar olmaları bekleniyordu.[5] Daha yüksek konumlarda yer alanların, okuryazar olmalarına pek ihtiyaçları kalmıyordu. Bunların emri altında hizmet gören pek çok memur ve sekreter bulunmaktaydı. Yine de Bizans toplumunda okuma ve yazma becerilerinin, en azından XIII. Yüzyıla kadar Batı'dakinden daha yaygın olduğu anlaşılmaktadır. Okuryazar Bizanslılar, αγραμματοι / okuma yazma bilmez, câhillere karşı aşağılayıcı bir tavır takınmaktaydılar. XII. Yüzyılda yaşamış olan Komnenoslar hanedanına mensup tarihçi prenses Anna Komnena, Bizans'ta okuryazarlığa verilen önemle ilgili dikkat çekici bilgiler vermektedir. Anna Komnena, babası imparator Aleksios Komnenos (1081 – 1118) tarafından, bütün yetimlerin manastıra alınmasını ve onlara τα ιερα γραμματα / kutsal

[3] Vryonis, Speros, s. 38.

[4] Aristotle, ***Politics***, 8.1338a, s. 15 – 17; Browning, Robert, ''Bizans Toplumunda Okuryazarlık Üzerine Bir Kez Daha Düşünmek'', ***Cogito-Bizans Özel Sayısı***, *YKY* yay., İstanbul 1999. s. 17, s. 212.

[5] Constantine Porphyrogennetos, ***De administrando imperio***, (der.) Moravcsik, G., Dumbarton Oaks Papers, Washington D. C., 1967, 51, c. I, s. 93–102.

yazılar öğretilmesi buyruğunu yayımlamıştı.[6] Anna Komnena, Konstantinopolis Orphanotropheion (Yetimhâne)'da, her yerden toplanmış olan yetimlerin öğrenim gördüklerini ifade etmektedir: ''παιδευτήριον τών γραμματικών παισιν ορφανοις έκ παντοδαπού γένους συνειλιγμένοις έν ω παιδευτής τις προκάθηται και παιδες περι αύτόν έστάσιν, οι μέν περι έρωτήσεις έπτοημένοι γραμματικάς, οι δέ ξυγγραφεις τών λεγομένών σχεδών, και έστιν ιδειν και Λατινον ένταύθα παιδοτριβούμενον, και Σκύθην έλληνιζοντα και Ρωμαιον τά τών Ελλήνων συγγράμματα μεταχειριζόμενον και άγραμματον 'Ελληνα ορθώς έλληνιζοντα'' (Her yerden, her bölgenin insanından toplanan yetimlerin dil bilimleri öğrendiği ilkokul 'paideutérion' vardı; bu yerde, başta bir eğitmen 'paideutés' bulunur ve çocuklar, onun çevresinde durur; kimi, sorulan dilbilgisi soruları karşısında sus pus kalır, kimiyse yanıtlar ve çözümlemeleri yazardı. Orada, eğitim alan bir Latin, Hellen dili öğrenen bir İskit, Hellen dili metinleri üzerinde çalışan bir Roma'lı ya da kendi dilini doğru konuşmayı öğrenmekte olan câhil bir Hellen görülebilirdi).[7] Anna Komnena'nın bu ifadelerinden de anlaşılacağı üzere, XI. yüzyılda Aleksios Komnenos'un hükümdarlığı sırasında ücretsiz okullar etnik kökenine ya da sosyal sınıfına bakılmaksızın bütün çocuklara açıktı.[8]

Okuryazarlığa bunca önem verilen bir kültürde; Bizans tarihinin ünlü uzmanı Sir Steven Runciman'a göre, iyi bir eğitim her Bizanslının idealiydi ve άπαιδευσία / eğitimsizlik, zihinsel eğitim eksikliği, bir talihsizlik ve dezavantaj hatta neredeyse bir suç olarak kabul edilirdi. Bizans tarihi boyunca eğitimin konusu ve şekli çok fazla değişmemiştir. Altı yaşındayken bir çocuğa öğretilen ilk ders, dilbilgisi ya da 'dilini Helenleştirmek' idi. Bu, modern anlamda okuma ve yazma ile dilbilgisi ve sözdiziminin yanı sıra, Klasikler hakkında bilgi ve Klasikler, özellikle de eserleri ezbere öğrenilmesi gereken Homeros üzerine yorumlar içeriyordu. Yaklaşık on dört yaşında öğrenci Rhetorika (Hitâbet)'e geçmekteydi. Bu, doğru bir telaffuzu ve Demosthenes ve diğer birçok düzyazı yazarı gibi yazarların çalışmasını içeriyordu. Retorik'ten sonra üçüncü bilim olan Felsefe ve dört sanat olan Aritmetik, Geometri, Müzik ve Astronomi incelenecekti; bunlara Hukuk, Tıp ve Fizik eklenebilir. Din eğitimi, laik öğretimle yan yana yürütüldü, ancak her zaman ayrıydı, din adamları tarafından verildi. Çocuklar Mukaddes Kitabı iyice öğrendiler; Mukaddes Kitap, Homeros'tan sonra Bizans edebiyatındaki îmaların ve alıntıların başlıca kaynağıdır.[9] Bu bilgilerden de açıkça anlaşılacağı üzere, Bizanslılar klâsik dünyadan, öğrenmeye karşı büyük bir saygıyı miras almışlardı ve eski Yunan kültüründen özel bir zevk almaktaydılar.[10]

II- BİZANS'TA YÜKSEKÖĞRENİM

[6] Anna Komnena, ***Aleksiad***, (der. ve çev.) B. Leib, 4 cilt, Paris 1967–1976, III: 15.7.3; Türkçe terc. Umar, B., ***Anna Komnena, Alexiad***, İnkılâp yay., İstanbul 1996, s. 502; krş. Browning, Robert, s. 215.
[7] Anna Komnena, ***Aleksiad***, III: 15.7.3; Türkçe terc. Umar, B., ***Anna Komnena, Alexiad***, İnkılâp yay., İstanbul 1996, s. 502; krş. Browning, Robert, s. 215.
[8] Rice, Tamara Talbot, ***Bizans'ta Günlük Yaşam***, Türkçe terc. Altınok, Bilgi, Özne yay., İstanbul (tarihsiz), s. 188.
[9] Runciman, Steven, ***Byzantine Civilisation***, Edward Arnold & Co, London 1948, s. 223 – 224.
[10] Rice, Tamara Talbot, s. 187.

Okuma yazmaya büyük önem verilen Bizans toplumunda, temel okuma yazmanın ötesinde de öğrenim mümkündü ve başkentte eğitim; yönetim, ordu ve Kilise için yüksek nitelikli insanları yetiştiren düzeylere erişiyordu. Her alanda önde gelen pozisyonlar liyâkate bağlı olduğu için, eğitim, toplumsal hareketliliğin ve yüksek makamlara ulaşmanın anahtarı olarak görülüyordu. Dâiresel bir süreç içinde toplumun genç üyelerinin eğitimi, âile refâhında artışa yol açabiliyor, bu durumdan her türlü ilişki, yarar görüyor, dolayısıyla eğitime ve Bizans'ta bilim adamlarının statüsünü güçlendiren ve pekiştiren entelektüel etkinliklere yatırım yapılıyordu.[11] Öğretmenler, okullara veya üniversitelere bağlı olabilir veya özel öğretmen olabilirlerdi. Bizans'ın eğitim kurumuyla ilgili tüm sorun oldukça belirsizdir. İmparatorluğun ilk dönemlerinde ilk okuma eğitimi muhtemelen bir keşiş tarafından verildi, ancak öğrenci kısa süre sonra bir okula gider ve orada laik eğitiminin geri kalanını alırdı. Konstantinos (306 – 337) Stoa'da bir Okul kurdu ve Konstantius onu Capitol'e taşıdı. Mürted Iulianos (361–363), Hristiyanların burada eğitim vermesini yasakladı; ve yasağın kaldırılmasına rağmen, Beşinci Yüzyılın baş öğretmenleri pagan görünmektedir. II. Theodosios'un kurduğu Okulda on Yunan ve on Latin gramerci, beş Yunan ve üç Latin sofist, iki hukukçu ve bir filozof görevlendirildi. Okula bağlı olarak Iulianos tarafından kurulan ve 120.000 ciltlik bir halk kütüphanesi vardı. Bu, 476'da Basiliscus'un saltanatı sırasında yakıldı. Iustinianos (527–565)'tan sonra Okul'dan pek bahsedilmez. Hristiyanlığa olan tutkusu ve tekdüzelik ile Atina Okulu'nun bağışlanan fonlarına el koyarak kapattığını ve Konstantinopolis ve Roma dışında Hukukun öğretilmesini yasakladığını biliyoruz: Ve tüm üniversite öğretmenlerinin Hristiyan olması gerekiyordu.[12]

Bizans'ta yüksek öğrenim, yalnızca ruhbanlık kariyerini hedefleyenlerle sınırlı tutulan Batı'dakinden farklı olarak, yetenekli her erkek öğrenciye açıktı. Gündelik iletişim için sokağın aksanı ve sözcükleri yeterli olurken; yüksek öğrenime, Homeros destanlarını Ortaçağ Bizansı'nın diliyle bütünleştiren klasik Atina Yunan lehçesi egemendi. Bizanslı bilim adamları yazılarında eski Yunancayı kullanırlar ve hattâ konuşurlardı.[13] Üniversite, memurların ve yöneticilerin eğitim alanıydı ve genellikle devlet tarafından başka şekillerde olduğu gibi mâlî olarak da desteklendi. Kaynak eksikliğinden dolayı tarihi özellikleriyle her zaman yeniden inşa edilemez, ancak en çok beşinci ve altıncı yüzyıllarda ve daha sonra tekrar dokuzuncu yüzyılın ortasından on ikinci yüzyılın sonuna kadar geliştiği görülmektedir. Günümüze ulaşan en eksiksiz belgelerden biri, üniversitenin IX. Konstantinos Monomakhos (1042–1055) tarafından yeniden düzenlenmesi sırasında, 1045 yılında hevesli ve etkili bir bilim adamı grubunun teşvikiyle hazırlanan Hukuk Fakültesi tüzüğüdür.[14] IX. Konstantinos'un yüksek öğrenim reformu çerçevesinde, Hukuk fakültesinin yanı sıra rhetorika (hitâbet) ve felsefe alanlarında yeni kürsüler kuruldu. Dönemin önemli devlet adamlarından biri olan Konstantinos Leikhoudes, ''nomophylaks'' (hukukun koruyucusu) unvanıyla hukuk mektebinin başına getirildi. Dönemin en ünlü felsefeci ve tarihçilerinden biri olan Mikhail Psellos (1018 – 1081) ''filozofların konsülü '' unvanıyla Felsefe kürsüsünün

[11] Herrin, Judith, ***Bizans- Bir Ortaçağ İmparatorluğunun Şaşırtıcı Yaşamı***, Türkçe terc. Kocabaşoğlu, Uygur, İletişim yay., İstanbul 2016, s. 175–176.
[12] Runciman, Steven, s. 224 – 225.
[13] Herrin, Judith, s. 176.
[14] Hussey, J. M., ***The Byzantine World***, New York 1961, s. 147.

başına atandı.[15] Ernest Barker, IX. Konstantinos Monomakhos'un kurduğu yüksek öğrenim kurumlarının, Bizans'ın bütün ömründe, tam örgütlü bir üniversiteye en çok yaklaşan okullar olduğunu; bunların, Komnenoslar (1057–1185) yüzyılı boyunca ve Latin istilâsının vuku bulduğu 1204 yılına kadar yaşadıklarını ifade etmektedir.[16]

Latin istilâsı, Bizans eğitim hayatına en büyük darbeyi indirdi. Bu dönemde, öğretim Konstantinopolis (İstanbul)'ten İznik, Selanik Teselya, Trabzon gibi merkezlere kaydı. Palaiologoslar'ın (1259–1453) yönetimi altında, İmparatorluk politik yönden çökerken, Bizans öğretimde en parlak dönemini yaşıyordu. II. Andronikos (1282–1328) döneminde, yeniden organize edilen Üniversitede öğretim iç ve dış çekişmelere rağmen kesintiye uğramamış ve atılıma geçmiştir. Ancak bu döneme ait yeterli kaynak olmaması nedeniyle yükseköğretimin tarihini açıkça ortaya koyma imkânı maalesef yoktur. Buna rağmen, daha bu dönemde bile Bizans, özellikle İtalyanları çeken bir merkezdi. Örneğin, Pietro d'Abano (1250–1316) hayatının önemli bir kısmını Bizans başkentinde geçirmiştir. Yunancadan Latinceye ve Fransızcaya çeviriler yapmıştır. XIV. Yüzyılın sonları ve XV. Yüzyılın başlarında öğretimde büyük değişiklikler oldu. Bu genellikle II. Manuel (1391–1425)'in dönemine rastlar. Bu tarihlerde Konstantinopolis Üniversitesi, Doğunun Ermeni, Gürcü, Slav öğrencilerini çeken bir merkez olduğu kadar, Batılı öğrencilerin de ilgisini çeken bir merkezdi. Hattâ Bizans'ta bir süre kalmak iyi bir öğrenim görmüş olmak anlamına geliyordu.[17]

Bizans'ta klasik eğitim sistemine paralel olarak, manastırlar, ilk zamanlardan itibaren okuma – yazma bilmeyen ve kendisini Hristiyan hayatına adayan erkek ve kadınlara, Mezmurlar'ı ve Kutsal Kitap öykülerini ezberleterek, daha basit sözel eğitim veriyorlardı. Bununla birlikte bazı manastırlar, bünyelerine aldıkları kişilerin, âyinlere bilgili bir şekilde katılabilmelerini sağlamak açısından okumayı öğrenmesinde ısrar ediyordu. Çocuklar genellikle aile içinde biraz Hristiyan eğitimi alıyorlardı. Pekçoğu, yıllarca çalışmayı gerektiren yazmaktan çok okumayı öğreniyordu. Kimi kız çocukları da vasiyetnâme yazabilecek, mülk bağışlayabilecek ve manastır hayatında yer alabilecek kadar okuma yazma öğreniyorlardı. Okuma yazma üzerine yapılan araştırmalar, kadınlar arasında yazmanın olmasa bile okumanın Bizans'ta Ortaçağ Avrupası'ndan daha yaygın olduğunu göstermiştir.[18]

SONUÇ

Bizans'ta, eğitim ve öğretim hayatına genel bir bakışla eğilmeye çalıştığımız bu makalemizde, Ortaçağ dünyasının bu önemli uygarlığında, okuma yazma becerilerine ve eğitime büyük

[15] Cameron, Averil, ***Bizanslılar***, çev. Akpınar, Özkan, Türkiye İş Bankası Kültür Yay., İstanbul 2016, s. 173. Cameron, Bizans tarihinde kurulan yüksek öğrenim kurumlarının hiçbirisinin, Batı'da ortaya çıkmış olan Paris, Bologna, Oxford ve başka yerlerde gelişmeye başlamış olan; kendi tüzüklerine, müfredatlarına ve nizamnâmelerine sahip üniversitelere benzemediğini, ifade etmektedir, bk. Cameron, Averil, s. 174; Mango, Cyril, ***Bizans Yeni Roma İmparatorluğu***, çev. Güven, Gül Çağalı, YKY, İstanbul 2011, s. 157.

[16] Barker, Ernest, ***Bizans Toplumsal ve Siyasal Düşünüşü***, Türkçe terc. Tunçay, Mete, İmge yay., Ankara 1995, s. 59.

[17] Tekeli, Sevim, ***Modern Bilimin Doğuşunda Bizans'ın Etkisi***, Ankara 1975, s. 11 – 12.

[18] Herrin, Judith, s. 178-179.

önem verildiğini görüyoruz. Hem erkek hem de kız çocukları ilköğrenimden yararlandırılmış, günlük hayatta işe yarayacak okuma yazma becerilerini kazanmışlardır. Yüksek öğrenim daha çok elit kesimlere açık olmakla beraber, yetenekli insanların da öğrenim görerek yüksek makamlara ve görevlere ulaşabildikleri anlaşılmaktadır. Kimi araştırmacıların, Bizans yükseköğretim kurumlarını, Batılı muadillerinden daha aşağı düzeyde gördükleri bilinmekteyse de özellikle 1204'teki Latin istilasına kadar, Bizans yüksek öğrenim kurumlarının, Batı ve Doğudan yetenekli pek çok öğrenciyi çekebildiğini görmekteyiz. Son olarak, Antik Yunan kültür birikiminin de Bizans eğitimi üzerinde büyük etkiye sahip olduğu belirtilmesi gereken önemli bir husus olarak karşımıza çıkmaktadır.

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CHIROPRACTIC APPLICATIONS IN GERIATRIC POPULATION

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Geriatrics as a health principle that has gained importance along with the New shaping dynamics of the world population, is increasing its importance every day today. The increase in the geriatric population in the society necessitates the development of new modified health services for this group, and new scientific studies on applications to increase the quality of life and health level. According to the data of the World Health Organization, the number of people aged 60 and over in 2019 is around 1 billion. It is estimated that this figure will reach 1.4 billion in 2030 and 2.1 billion in 2050. However, integrating all therapeutic and preventive practices for the geriatric population into the health system will prevent health system crises that will occur in the following years.

Chiropractic is one of the preventive and curative health services that can be safely applied to every age group with specific techniques throughout the world. Integrating chiropractic practices into a rapidly growing geriatric population will significantly improve people's quality of life. Chiropractic's practice style, holistic philosophical approaches and preventive care services will allow it to gain an important place in the geriatric care team. Low-cost, protective chiropractic care is predicted by current scientific studies to both prolong life and improve quality of life.In doing so, the burden on the health system will also be reduced.

The aim of our study is to identify chiropractic methods that will provide the maximum benefit to the geriatric population in the environment of maximum trust within the chiropractic techniques and to put forward a review about them. For this purpose, it is aimed to shed light on current new studies by summarizing current safe techniques and their benefits to the geriatric population.

Keywords: Chiropractic, Geriatrics, Geriatric Chiropractic

GERİATRİK POPÜLASYONDA KAYROPRAKTİK UYGULAMALAR

ÖZET

Geriatri dünya nüfusunun yeni şekillenme dinamiği ile birlikte önem kazanan bir sağlık prensibi olarak günümüzde önemini her geçen gün arttırmaktadır. Geriatrik popülasyonun toplum içerisinde artması bu gruba yönelik yeni modifiye sağlık hizmetlerinin geliştirilmesini, yaşam kalitesini ve sağlıklılık düzeyini arttırmaya yönelik uygulamalar üzerinde yeni bilimsel çalışmalar yapılmasını zorunlu hale getirmektedir. Dünya sağlık örgütünün verilerine göre 2019 yılında 60 yaş ve üzerinde olan insanların sayısı 1 milyar civarındadır. Bu rakamın 2030 yılında 1,4 milyara, 2050 yılında ise 2,1 milyara ulaşması tahmin edilmektedir. Durum böyle iken geriatrik popülasyona yönelik tedavi edici ve önleyici uygulamaların tümünün sağlık sistemine entegre edilmesi ilerleyen yıllarda oluşacak sağlık sistemi krizlerinin önüne geçecektir.

Kayropraktik dünya genelinde her yaş grubuna belirli teknikler özelinde güvenle uygulanabilen koruyucu ve tedavi edici sağlık hizmetlerinden biridir. Sayısı hızla artan geriatrik popülasyona kayropraktik uygulamaların entegre edilmesi kişilerin yaşam kalitesini önemli ölçüde arttıracaktır. Kayroparktiğin uygulama tarzı, bütünsel felsefi yaklaşımları ve koruyucu bakım hizmetleri geriatrik bakım ekibi içerisinde önemli bir yer edinmesine olanak sağlayacaktır. Düşük maliyetli, koruyucu kayropraktik bakımın hem yaşam süresini uzatacağı hem de yaşam kalitesini arttıracağı güncel bilimsel çalışmalar tarafından ön görülmektedir.Bunu yaparken sağlık sistemi üzerine binen yük de azaltılmış olacaktır.

Çalışmamızın amacı kayropraktik teknikleri içerisinde geriatrik popülasyona maksimum güven ortamı içerisinde maksimum faydayı sağlayacak kayropraktik yöntemleri belirleyerek bunlar hakkında bir derleme ortaya koymaktır. Bu amaçla güncel güvenli teknikler ve bunların geriatrik popülasyona sağlayabileceği faydalar özetlenerek güncel yeni çalışmalar için ışık tutmak hedeflenmektedir.

Anahtar Kelimeler: Kayropraktik, Geriatri, Geriatrik Kayropraktik

1. GİRİŞ

Yaşlanma kavramı kişinin doğumu ile başlayarak her geçen gün devam eden bir olgudur. Cansız varlıklar olan nesneler zaman içerisinde eskirken canlı organizmalar yaş alır yani yaşlanır. Yaşlanma ile birlikte zaman içerisinde gelişme, büyüme ve en nihayetinde ölüm gibi kavramlar da bu sürecin içerisinde yerini alır.

Yaşlanma kavramı çok çeşitli faktörleri de beraberinde getirerek kendi bünyesinde barındırır. Yaşlanma şeklini etkileyen faktörlerin kapsamı geniş ve çok çeşitlidir. Biyolojik faktörler arasında genetik arka plan ve fiziksel sağlık; psikolojik etkiler arasında biliş düzeyi, zihinsel sağlık durumu ve genel iyilik hali; sosyolojik faktörlerde ise, kişisel ilişkilerden toplumu organize eden kültürlere, politikalara ve altyapıya kadar pek çok alt faktör yer alır. Bu noktada Geriatri veya Gerontoloji adı ile anılan bilim dalı devreye girer. Gerontoloji, bilinidiği üzere yaşlılık ve yaşlanma ile ilişkili biyolojik, psikolojik ve sosyolojik (biyopsikososyal) faktörleri inceleyen yaşlanmanın bilimsel çalışma alnıdır (Brossoie, 2010).

Geriatri biliminin pek çok ana amacından biri de yaşlı popülasyonlarda yaşam kalitesini arttırmak ve önlenebilir fiziksel bozukluklar karşısında gerekli önlemleri alarak muhtemel engelliliğin önüne geçmektir. Dünya Sağlık Örgütü tarafından Sağlıklı Yaşlanma On Yılı 2020-2030 (Who, 2021) için belirlenen önceliklerde belirtildiği gibi, sağlık sistemlerinin yaşlıların ihtiyaçlarına göre düzenlenmesi ve entegre sağlık hizmetinin sağlanması için

gereken insan kaynaklarının sağlanması gerekmektedir. Bu noktada kayropraktik uzmanları olarak bizler de bu bilime katkıda bulunmak, geriatrik popülasyonda koruyucu ve tedavi edici kayropraktik uygulamaların bir derlemesini çıkarmak amacı ile çalışmamızı ortaya koymaktayız.

2. KAYROPRAKTİK MESLEĞİ VE UYGULAMALARI

Kayropraktik Dünya Sağlık Örgütü tarafından yapılan tanımlamadaki hali ile; kas ve iskelet sistemlerinde karakterize hastalıkların teşhis ve tedavi edilmesi, koruyucu amaçla önlemlerin alınması ile ilgilenen bir sağlık mesleğidir. Bununla birlikte bu hastalıkların genel sağlık üzerindeki etkilerini de araştırır (WHO, 2005).

Kayropraktik manipülasyonlar temelde Yüksek Hızlı-Düşük Amplitüdlü (HVLA) uygulamalar ile karakterizedir. Uygulamanın şiddetinin düşük hızının yüksek olması uygulama esnasında oluşabilecek riskleri minimalize etmek için spesifik olarak tasarlanmıştır(Bergman, 2011). HVLA manipülasyonlar genellikle saniyenin 1/12`i veya daha kısa sürede sürede gerçekleştirilir. Hatta Aktivatör enstrümanı ile bu süre saniyenin 1/32`ine kadar düşürülebilir(Herzog, 2010).

Kayropraktik mesleği uygulamalarını diğer spinal manipülatif tedavilerden ayıran ikinici primer başlık ise kayropraktik tekniklerinin hepsinin Kısa Kollu Kaldıraç mekanizmalarını kullanıyor olmasıdır. Kısa kaldıraç kolu omurun tamamını değil yalnızca spesifik temas noktalarını kullanır. Bu noktalar spinöz veya lateral proseslerdir. Spinöz ve lateral proseslere uygun hızda verilen kuvvet ile bir segmenti diğeri üzerinde hareket ettirilir. Lezyona yakın olarak yapın temasın hastanın stabilizasyonunu da katkı sağlar. Kısa kaldıraç kolu tekniği uzun kaldıraç kolu tekniğine göre düzeltici itme manevrası için kullanılan amplütde olan kuvvet ihtiyacını azalmaktadır. Bu sayede hastanın fiziksel boyutu ne olursa olsun, uygulayıcı bu durum etkilememektedir(Heldeman 2005, Redwood 2003).

1896 yılında tanımlandığı günden bu yana Kayropraktik uygulamaları, HVLA temeli üzerinden pek çok farklı teknik ile uygulanarak günümüze gelmiştir. Diversified, Gonstead, Activator Method, Palmer Upper Cervical, Logan Basic, Thompson Drop başta olmak üzere 132 listelenmiş uygulama tekniği bulunmaktadır (Bergmann, 2011). Her klinisyen aldığı eğitime, el yeteneğine, kişisel görüşüne en uygun tekniği, hatta teknikleri benimsemiş bunlardan bir veya bir kaçı ile çalışmaya devam etmiştir.

3. STANDARDİZE EDİLMİŞ KAYROPRAKTİK UYGULAMALAR

Geriatrik popülsyonda osteoporoz ve benzeri risk faktörlerinin varlığı su götürmez bir gerçektir. Bu sebeple kayropraktik uygulamalar gerçekleştirilirken belli başlı standardizasyonların sağlanması hastayı riske atmamak açısından çok önelidir. Aşağıda kayropraktik mesleği uygulama tekniklerinden standardizasyon sağlayabilen bir kaçı detaylı olarak anlatılmıştır.

Kayropraktik teknikleri içerisinde standardizasyonu kesin ve net bir şekilde sağlanmış en güvenilir teknik Aktivatör metod tekniğidir. Çünkü bu tekniğin kullanımı sırasında klinisyen manipülasynu kendi eli ve vücut gücü ile değil cihaz ile gerçekleştirir. Bu sebeple her uygulama esnasında vuruş hızı ve kuvveti standardize edilmiş olup kişiye zarar verme riski minimalize edilir.

Bir kayropraktik uygulama tekniği olarak tescillenmiş olan Aktivatör enstrümanı en çok kullanılan kayropraktik uygulama tekniklerinden biri olarak kabul edilmektedir. Klinik çalışmalar ile etkinliği kanıtlanmış olan Aktivatör enstrümanının ana tasarlanma amacı, doğru hızda doğru kuvvetin tam olarak uygulanmasını sağlayarak yapılan işlemi standart hale getirmektir (Haldeman ve Dagenais 2004, s. 787).

Standardizasyonu bir örnek üzerinden açıklayacak olursak; çalışmada kullanılacak olan Aktivatör 5 modeli cihaz, 4 kademeli kuvvet ayarına sahiptir. Ve bu 4 kademe servikal,

dorsal, lomber ve sakral olmak üzere her bölgede o bölge için tanımlanmış kuvvet ile spesifik olarak uygulanmaktadır. Cihaz 1. kademe güç ayarında 40N, 2.kademe güç ayarında 50N, 3. kademe güç ayarında 70N, 4. kademe güç ayarında 150N itiş sağlamaktadır (Activator V User Manual Technical Specifications. 2012).

Benzer bir şekilde distraksiyon tekniklerinin uygulanabilmesi için standardize edilmiş tekniklerden biri olan Cox-Distraksiyon tekniği de geriatrik popülasyonda tedavi edici kayropraktik uygulamalar içerisinde kullanılabilecek tekniklerden biridir. Cox tekniği kayropraktik manipülasyon teknikleri ile birlikte mekanik yardımlı fleksiyon postüründe birleştirilen distraksiyon uygulamalarının da uygulandığı bir sistemdir. Teknik temelde fleksiyon/distraksiyon sistemini manipülasyon ile birleştirerek İVD patolojilerine iyileşmek için ortam hazırlar(Cox Technic, 2021)

Geriatrik popülasyonda minimal risk oluşturacak şekilde uygulanabilecek kayropraktik tekniklerinden bir diğeri de Sakro-Oksiputal Teknik (SOT)`tir. Sacro-Occipital Technique (SOT) aslen 1920'lerde Bertrand DeJarnette (The Major) tarafından formüle edilmiş bir tekniktir. Temelde sadece tek tek vücut segmentlerini değil, vücuttaki kalıpları ayarlama sisteminin uygulanmasıdır. Bu modelde en önemli kalıp sakrum ve oksiput arasındaki ilişkidir. SOT`un diğer tekniklerden en önemli ayrımı uygulamalar için göstergeleri kullanıyor olmasıdır. Örneğin, dizdeki kas gerginliği pelvisin düzeltilmesi gerektiğini gösterebilir. Sakrum ve oksiputa yansıyan mekanizmalara göre değerlendirmeler sağlar. Tespit ettiği disfonksiyonları düzeltmek için manipülatif tekniklerin yanında SOT blokları adı verilen düzeltme Bloklarını da kullanarak temel pozisyonlamalar ile vücut kalıplarına ayarlamaları da kullanır(Hesse N. 2013)

Bununla birlikte; Diversified Tekniği, Gonstead Tekniği, Palmer Upper Cervical Tekniği, Logan Basic Tekniği, Thompson Tekniği gibi bellirli başlı diğer teknikler de Geriatrip popülasyonda uygulanabilir ancak risk analizi çok düzgün bir şekilde yapılmalıdır. Sıralanmış bu tekniklerde uygulamada gerçekleştirilen kuvvet oranını klinisyen kendi eli ile ayarlamaktadır. Dolayısı ile insan faktörü işin içine giridiğinden hata payı da aynı şekilde artmaktadır. Bu tekniklerin kullanımı esnasında bizim meslek profesyonelleri olarak önerimiz, hastanın değerlendirmesinin çok iyi yapılması, kemik erimesi oranlarının çok iyi değerlendirilmiş olması, damar yapsında meydana gelmiş olabilecek bozuklukların iyi değerlendirilmiş olmasıdır.

4. SONUÇ VE TARTIŞMA

Geriatrik popülasyona dahil olan bireyler sistemik hastalıklar, romatizmal faktörler, damar yapısındaki yapısal bozukluklar, osteopoz risk faktörleri gibi çeşitli hastalıklar ve bozukluklara çok daha yatkındırlar. Bu sebeple kayropraktik uygulamalar bu popülasyona uygulanırken dikkat edilecek bazı önemli noktalar ortaya çıkar. Hipertansiyon ve diyabet gibi sistemik ve otonom sinir sistemi ile ilişkilendirilebilecek rahatsızlıklarlarda kayropraktik uygulamaların etkinliği bilimsel çalışmalarda kanıtlanmıştır(Caldir ve ark. 2019). Hawk ve arkadaşları 2017 yılında yaptıkları bir çalışmada kayropraktik bakımın yaşlı popülasyon üzerinde uygulanması hakkında gerçekleştirilen çalışmaları derlemiş, sonuç olarak manipülasyonun güvenli bir uygulama olduğunu ve bunun yanında kayropraktörlerin hastalara egzersiz konusunda tavsiyelerde bulunmasını ve manipülasyon ile mobilizasyonun yalnızca ağrıyı azaltmanın ötesinde genel olumlu sonuçlara katkıda bulunduğunu Kayropraktik uygulamaların bu gibi durumlarda sağlıklı yaşamı destekleyici tedavinin bir parçası olarak yaşama dahil edilmesi kişinin yararına olacağını öne sürmüşlerdir. Gleberzon da 2001 yılında yayınladığı yazısında kayropraktiğin yaşlı popülasyonda uygulanabileceğini kanıtlarıyla öne sürmüştür. Yine Killinger`in 2004 yılında gerçekleştirmiş olduğu çalışmada yukarıdaki tekniklerde bahsettiğimiz uygulama yöntemlerinin pek çoğundan bahsedilmiştir. Ancak tüm bunların yanında uygulamalar gerçekleştirilirken de tüm olası risk faktörleri

elenmeli, hastayı riske atmayacak teknikler seçilmelidir. Bu sebeple tüm teknikler detaylı olarak incelenirken standardize edilmiş hatta mümkünse belirli cihazlarla uygulanıp insan faktörünün en aza indirildiği tekniklerin seçilmesi bu çalışmanın yazarları olarak bizim önerimizdir.

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INFRARED THERMOGRAPHY FOR PRE-DIAGNOSIS IN MONUMENTS BUILT FROM PYROCLASTIC BUILDING STONES

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Abstract

Scientific bases and diagnostic studies are important for the preservation of the present condition of the monuments. These studies consist of visual deterioration studies in the laboratory and in the field. However, the limited number of samples taken from historical buildings for laboratory studies cannot represent the whole structure. In order to overcome this problem, non-destructive test (NDT) techniques, which have become widespread recently, offer significant advantages both in the laboratory and in-site. Infrared thermography, one of the NDT methods, is a method used to detect both surface and sub-surface defects. This method is widely preferred in the literature because it is practical, inexpensive, and easy to use. In this study, the weathering process in pyroclastic rocks that are weak and sensitive to atmospheric processes was investigated. For this purpose, the types and origins of deterioration observed in the Sirçalı Madrasa (Konya, Turkey), which is on the UNESCO tentative list, were investigated by means of infrared thermography. In the study, it was determined that there were temperature differences in the capillary and infiltration regions of the monument. These differences increased the deterioration of the monument and caused the development of contour scaling, flaking, deposit and moist area types. The findings obtained from the study showed that infrared thermography method is a practical method for preliminary evaluation in the current situation analysis of historical buildings.

Keywords: Infrared thermography, monument, Sırçalı Madrasa, Portal.

1. INTRODUCTION

It is very important in the preservation and transfer of cultural heritage to future generations, but as a result of atmospheric processes, the building blocks that make up the cultural heritage are partially or completely weathering (Fener and İnce, 2015). Diagnostic studies are carried out to determine the deterioration of these monuments and to plan restorations. In these studies, non-destructive testing (NDT) techniques can be a solution when sampling from the building blocks that make up the monuments is limited and/or not possible. Infrared thermography, one of the NDT methods, is a method used to detect both surface and sub-surface defects. Infrared thermography method has recently been used to detect cracks (Paoletti et al., 2013) and deposit (Korkanç et al., 2019) in historical buildings. However, it was used for the first time in this study to determine the deterioration types. For this purpose, infrared thermography determinability of the deterioration observed in the Sırçalı Madrasa Portal (Konya, Turkey) was investigated.

2. MATERIALS AND METHODS

The experimental research in this study was carried out in two stages as in-site and in laboratory. In laboratory studies, index (porosity, dry density, P-wave velocity and capillary water absorption) and strength (uniaxial compressive strength and Schmidt hammer rebound test) properties were determined according to the relevant standards (ISRM, 2007; TS EN-1925, 2000; ASTM D7012, 2014; ASTM D5873, 2014). A thin section according to TS EN-12407 (2019) was prepared in order to determine the petrographic and textural properties of the rock from which the Portal was made. The thermal imaging process on the portal of the monument was obtained using the Flir E5 brand thermal camera, which can measure between -20 and +400 °C. In addition, the weathering types observed in the Portal were defined according to ICOMOS-ISCS (2008).

3. DESCRIPTION OF THE SIRÇALI MADRASA

Anatolia is located in the west end of Asia. It is a geography that has been the cradle of civilizations through the history of the mankind. To the south of this region is the city of Konya (Figure 1), which was the capital of the Anatolian Seljuk state. Konya is a city of remarkable cultural and architectural texture. The architectural works reaching the present day such as the Alaaddin Mosque, Sırçalı Madrasa, Karatay Madrasa, Ince Minareli Madrasa and Mevlana mausoleum have been put under protection along with the other Seljuk monuments in the historical city center under the title of 'Konya-A capital of Seljuk civilization' in the tentative list of the UNESCO. Sırçalı Madrasa was built in 1242 (Figure 2). The monument is a two-storey madrasah with an open courtyard, two iwans. Tile mosaic decorations can be seen on the courtyard porches and the main iwan façade. Sırçalı Madrasa portal is framed with borders dominated by geometric ornaments (Figure 3). There are niches with stalactites surrounded by geometric borders on the right and left of the door. At the corners, there are two rows of corinthian capped colonnades with corrugated stems.

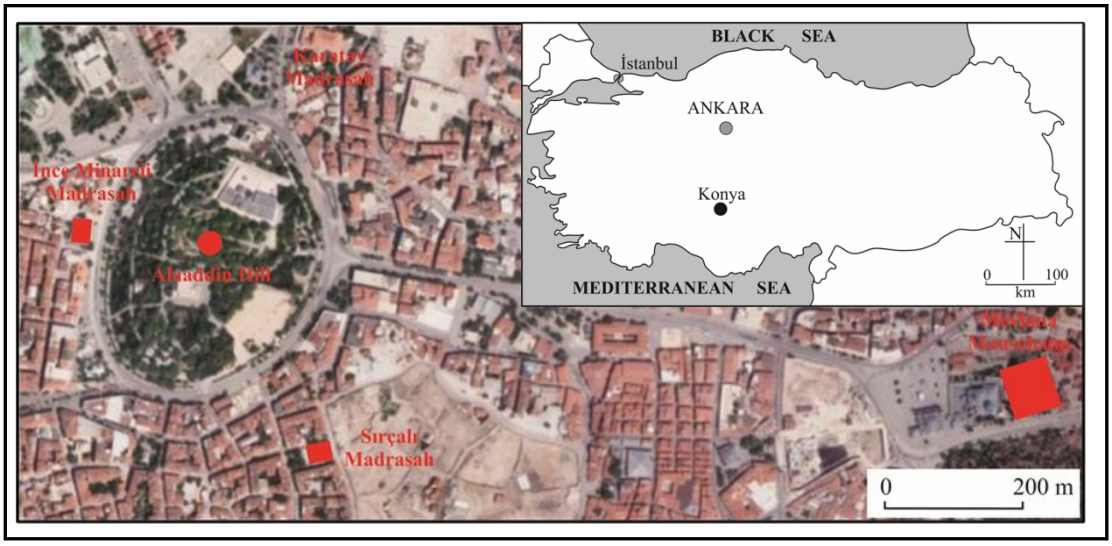


Figure 1. Locations of Madrasas and Mevlana Mausoleum in Konya (Turkey).

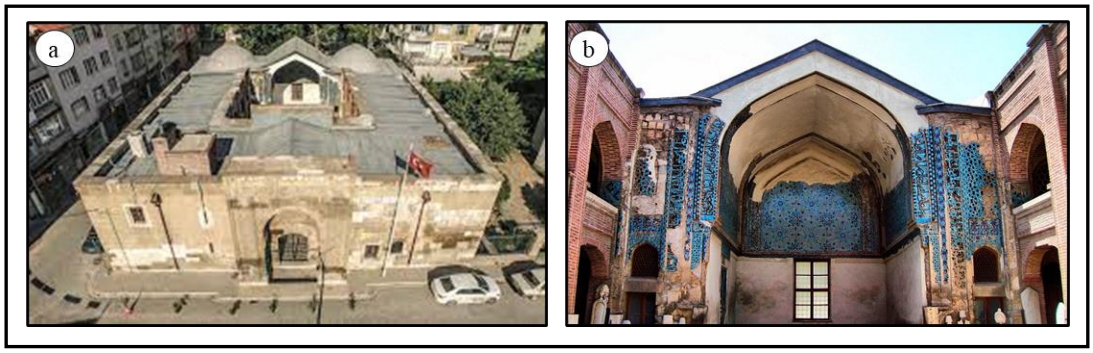


Figure 2. General view of Sırçalı Madrasa.

4. RESULTS

4.1. Geological and petrography features of pyroclastic stone

The portal was built of pyroclastic building stone, which is one of the indispensable building materials among the works that make up the cultural texture of Konya. These pyroclastics belong to the Küçükmuhsine formation and this formation consists of tuff, tuffite, volcanic breccia and volcanogenic sandstone. The age of the Küçükmuhsine formation is Upper Miocene-Lower Pliocene. Pyroclastic stone microscopically includes 41% volcanic glass, 22% plagioclase, 11% hornblende, 9% quartz, 9% rock fragment, 7% biotite, and 1% opaque minerals (Figure 4). The rock shows porphyritic texture properties (Figure 4b). The rock is called crystal tuff according to Schmid (1981) classification (Figure 4c).

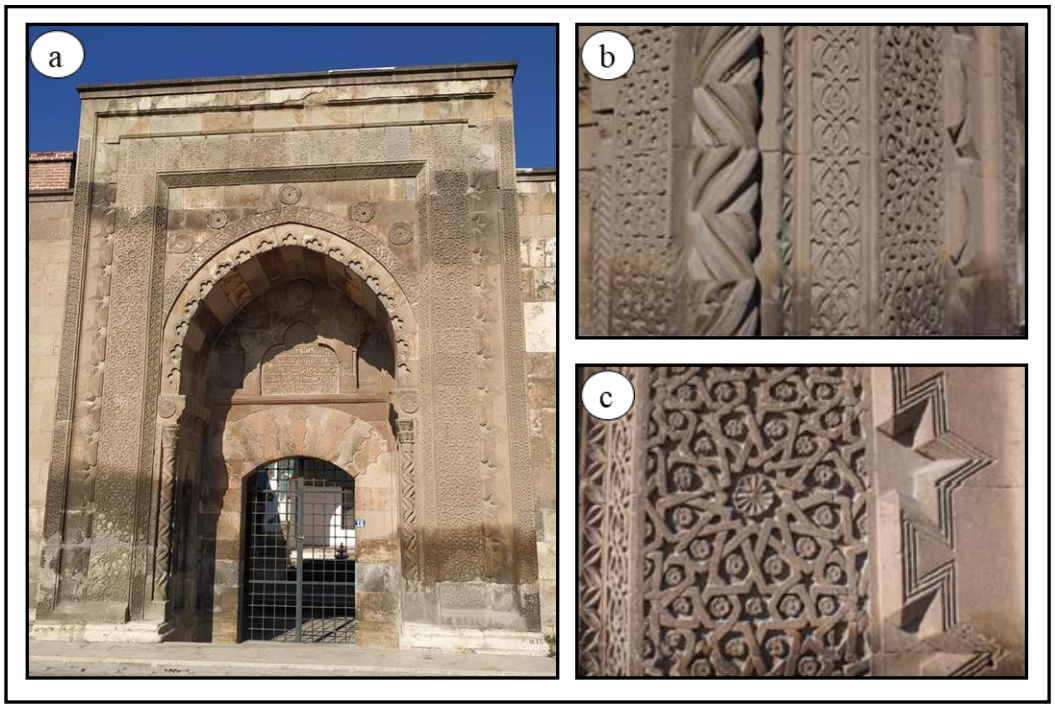


Figure 3. a) General view of Sırçalı Madrasa Portal, b-c) detail view of the Portal.

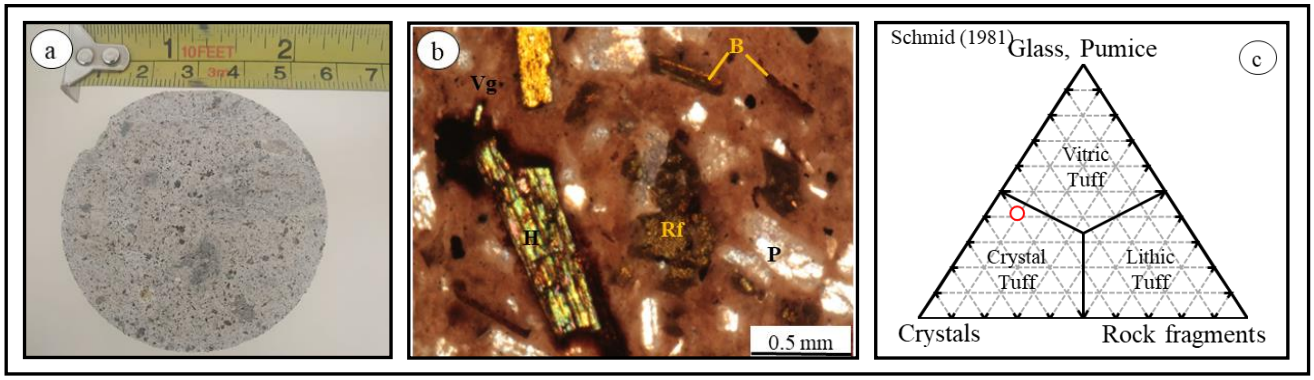


Figure 4. Building stone; a) macroscopic appearance, b) thin section view, (B: biotite, H: hornblende, P: plagioclase, Rf: rock fragment, Vg: volcanic glass) (cross nikol), c) Schmid (1981) classification diagram of the rock.

4.2. Index and strength properties of building stones used in the portal

Index and strength properties of Portal's stone are given in Table 1. The density($\square_d$) and porosity (n) values of the building stone are 1.90 g/cm^3 and 24.7%, respectively. The capillary water absorption (C) test results of the samples used in this study 96.85 g/m^{2}s$^{0.5}$. According to Snethlage's (2005) C classification, the sample are classified as highly absorbing rock.

Table 1 Index and strength properties of the building stone ($\square_d$: dry density, n: porosity, Vp: P-wave velocity, C: capillary water absorption, UCS: Uniaxial compressive strength, SHR: Schmidt hammer rebound test).

$\square_d$-g/cm^3	n-%	Vp-km/s	C-g/m^{2}s$^{0.5}$	UCS-MPa	SHR
1.90	24.50	2.60	96.85	32.50	26

4.3. Investigation of the portal using a thermal camera

Deteriorations in the Portal were defined according to the methods suggested in ICOMOS-ISCS (2008). The main types of deterioration determined observationally in the monument are presented on Figure 5.

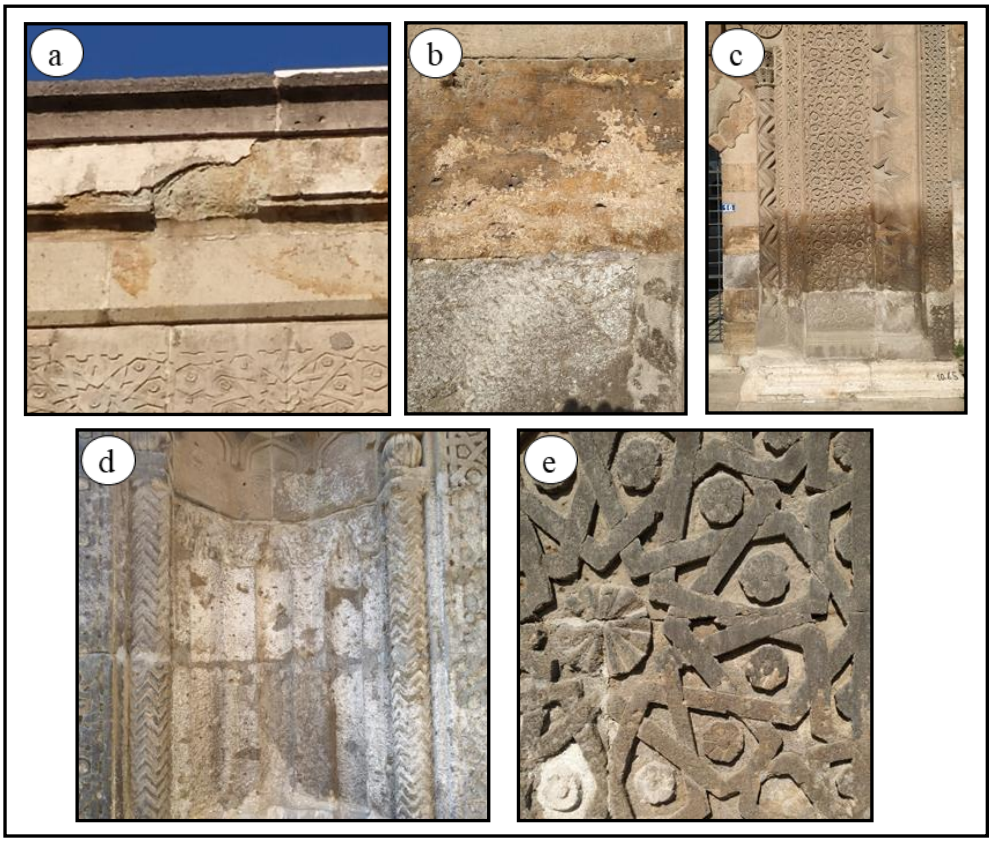


Figure 5. Common weathering types in the Sırçalı Madrasa Portal: a) contour scaling, b) flaking, c) moist area, d) salt crust, e). black crust.

For the thermal examination of the portal, firstly, the general view of the portal was taken by means of a thermal camera (Figure 6). The surface temperature of the portal was determined between 26.2 ^{o}C and 50.9 ^{o}C. In the next step, detailed thermal images were obtained from the regions where the deteriorations were found (Figure 7). In the thermal images, the regions with black crust were found to be 10 ^{o}C hotter (Figure 7a). In the thermal camera, it was determined that the regions containing the salt crust were approximately 20 ^{o}C colder (Figure 7b). The temperature in the flaking areas is 2-3 ^{o}C lower than the rest of the monument (Figure 7c). Moist areas in thermal images were determined to be at lower temperatures (Figure 7d).



Figure 6. Thermal and normal image of the portal.

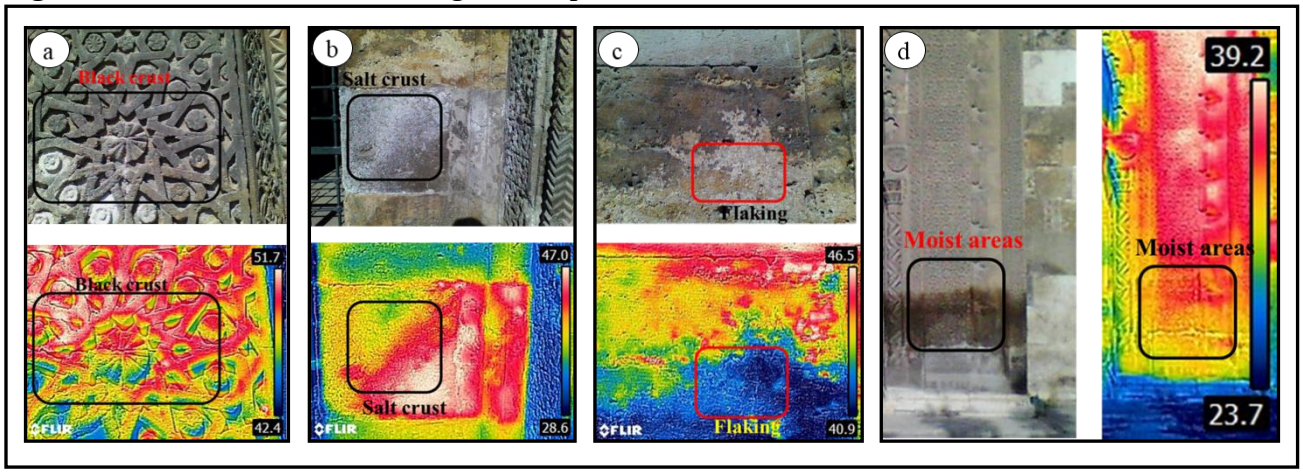


Figure 7. Thermal and normal image; a) black crust, b) salt crust, c) flaking, d) moist area.

5. CONCLUSION

Pyroclastics belonging to the Küçükmuhsine formation were used as building material on the portal of the monument. The rock is called crystal tuff according to Schmid (1981) classification. The building stone is classified as a highly absorbent rock. This feature of the rock accelerated the deterioration process in the building block. As a result of accelerating the weathering process in the monument, deteriorations in contour scaling, flaking, deposit (black and salt crust) and moist area types developed.

In the thermal images of the monument, the deterioration areas showed different warming properties. This made it possible to detect different types of deterioration using a thermal camera.

The findings obtained from the study showed that infrared thermography method is a practical method for preliminary evaluation in the current situation analysis of historical buildings.

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VIKOR METHOD AS ONE OF THE MULTI-CRITERIAL DECISION MAKING TECHNIQUES AND ITS USAGE IN LOCATION SELECTION

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ABSTRACT

In the research, first of all, the criteria to be used in the study were determined by taking into account the opinions of the business owner and the literature knowledges. The criteria used in the research are office size (m2), price (Turkish Lira), location (distance to tax office) and visibility (floor). In the next step of the research, three alternative office locations were identified in the Gölhisar town of Burdur city. The values of the alternatives according to criteria were obtained by interviewing the building owners and through an internet-based satellite application. In the last step of the study, the steps of the VIKOR method were applied through a software program, and the appropriate solution set of the most suitable alternatives was obtained. According to the study result; alternative 2 and alternative 3 are included in the ideal solution set.

ÖZET

Bu çalışmanın amacı; Burdur'un Gölhisar ilçesinde faaliyet gösteren küçük ve orta büyüklükteki işletmeler sınıfına dahil bir muhasebe ofisinin açmayı planladığı yeni ofis için, VİKOR yöntemi ile lokasyon belirleme faaliyetini gerçekleştirmektir. Araştırmada öncelikle, iş yeri sahibinin görüşleri ve literatür bilgisi ışığında ele alınacak olan kriterler belirlenmiştir. Araştırmada kullanılan kriterler; ofis büyüklüğü (m2), fiyat (TL), konum (vergi dairesine uzaklık) ve görünürlük (kat) şeklindedir. Araştırmanın bir sonraki adımında, Burdur'un Gölhisar ilçesinde, üç alternatif ofis lokasyonu tespit edilmiştir. Alternatiflerin, kriterler doğrultusunda sahip olduğu değerler, bina sahipleriyle görüşülerek ve internet tabanlı bir uydu uygulaması aracılığıyla elde edilmiştir. Araştırmanın en son adımında ise, VİKOR yönteminin adımları bir bilgisayar programı aracılığıyla uygulanarak, en uygun alternatiflerin uygun çözüm kümesi elde edilmiştir. Araştırma sonucuna göre, alternatif 2 ve alternatif 3 uygun çözüm kümesine dahildir.

1. INTRODUCTION

The success of early operations research studies was partly due to their approach of operational problems such as production scheduling and inventory control. As the application area of numerical management science improves from these operational decision-making situations to higher-level managerial planning and decision-making, a number of problems have emerged and decision-making goals have become increasingly uncertain. Multi-criteria decision making methods was emerged as a result of these uncertainties and started to be

applied in solving complex problems and finding the most ideal alternatives. Multi-criteria decision-making methods have become a discipline on its own in progress of time (Stewart, 1992: 569). Multi-criteria decision-making methods are based on the decision-maker's choosing among different alternatives according to a set of determined criteria by using numerical methods (Köksalan, Wallenius, & Zionts, 2013: 87). The Analytical Hierarchy Process method, known as the first of the multi-criteria decision making methods, was developed by Saaty in 1977. (Al-Harbi, 2001: 19). The VIKOR method used in this study was developed as a multi-criteria decision-making method to solve a discrete decision problem with immeasurable and contradictory criteria (Opricovic and Tzeng, 2004). This method focuses on sorting and choosing among a number of alternatives and can help decision makers reach a final decision. The method identifies compromise solutions for a problem with conflicting criteria. Here, the compromise solution is the closest to the ideal and applicable solution, and the compromise means an agreement established with mutual concessions (Opricovic and Tzeng, 2007: 515). In this study, location determination activity was applied by the VİKOR method for the new office planned to be opened by an accounting office included in the class of small and medium-sized enterprises. Small and medium-sized enterprises are an important factor for both our country and the world economy. SMEs constitute 99.8% of enterprises in Turkey (Çetinkaya and Gülbahar, 2019: 350). For this reason, it is considered important to apply multi-criteria decision-making methods in decision-making situations faced by SMEs.

1.1. Multi-Criteria Decision Making Methods

Multi- criteria decision making methods are a solution method way used by decision makers in the face of uncertainty, complexity and conflicting goals (Hahn, 2003: 443).

1.2. VIKOR Method

The VIKOR method (Vise Kriterijumska Optizacija I Kompromisno Resenje; Multi-Criteria Optimization and Compromise Solution) was thrown out for consideration by Opricovic in 1998 (Soba et al., 2016: 115). The method is based on sorting and choosing among a set of alternatives, based on the solution closest to the ideal solution, when there are conflicting criteria (Opricovic and Tzeng, 2004: 447). The main purpose of the method; is to obtain a compromise solution that will provide maximum group benefit and minimum individual regret (Ömürbek, Karaatlı and Yetim, 2014: 196).

2. METHOD

The steps of the Vikor method are as follows, respectively (Opricovic and Tzeng, 2004: 447-448);

Step 1: Determining of the best (fi*) and the worst (fi$^-$) values for each criterion. The best (fi*) and worst (fi$^-$) values are calculated by the following equations;

(1) fi* and fi$^-$ values are determined by the equations fi* = maxjfij and fi$^-$ = minjfij when the i_{th} criterion represents a benefit (maximum directional criteria)

(2) fi* and fi$^-$ values are determined by the equations fi* = minjfij and fi$^-$ = max$jfij$. when the i_{th} criterion represents a cost (minimum directional criteria)

Step 2: Calculation of Sj and Rj values for each alternative. Sj and Rj values are calculated by the following equations;

(3) $S_j = \sum_{i=1}^{n} wi\ (f_i^* - f_{ij}) / (f_i^* - f_i^-)$

(4) $R_j = \max_i [\ wi\ (f_i^* - f_{ij}) / (f_i^* - f_i^-)]$

Step 3: Calculation of the Qj value for each alternative. Qj value is calculated with the following formula;

(5) $Q_j = v\ ((S_j - S^*) / (S^- - S^*)) + ((1- v)\ (R_j - R^*))$

Note: The value of v in the formula expresses the weight for the strategy that provides the maximum group benefit, while (1-v) expresses the weight of the minimum regret of the opponents. Majority vote can be achieved by (v> 0.5), consensus (v= 0.5), and veto (v< 0.5). In studies, the v value is generally accepted as 0.5 (Lezki et al., 2019: 144). Also S^*, S^-, R^*, R^- values used in the calculation of the Qj value are determined by the equalizations as follows;

(6) $S^* = min_j\ Sj$

$S^- = max_j\ Sj$

(7) $R^* = min_j\ Rj$

$R^- = max_j\ Rj$

Step 4: Step 4: Ordering the obtained Qj, Sj, Rj values from smallest to largest and assuming the alternative with the smallest Qj value in the list represents the best alternative found as a steps of the VIKOR's result.

Step 5: Evaluation of the results' validities obtained according to the acceptable advantage condition and the acceptable stability condition.

- **Acceptable Advantage Condition**

The condition **(8)** Q (a'') - (a') ≥ DQ must be satisfied. In the inequality, a' is the best alternative with the least Qj, and a'' is the second best alternative with second least Qj value. The DQ value is obtained by means of the formula DQ = 1/(J - 1). The value of J in the formula represents the number of alternatives.

- **Acceptable Stability Condition**

Alternative a' with the best Qj value must have achieved the best score in at least one or both of the Sj, Rj values. If Condition 2 (Acceptable Stability Condition) is not supplied, alternatives a' and a'' are both considered best alternatives. If Condition 1 (Acceptable Advantage Condition) is not supplied, the best alternatives from a' to $a^{(M)}$ ($a^{(M)}$ = last alternative satisfying the inequality) are determined by the following inequality; Q ($a^{(M)}$) - Q (a') < DQ . All alternatives from a' to $a^{(M)}$ (all alternatives satisfying the inequality) are considered the best alternatives.

3. FINDINGS

3.1. Creating the Decision Matrix

The decision matrix showing the criteria and the values of the alternatives is given in Table 1. With the data obtained, a decision matrix was created showing the criteria and the criteria values of the alternatives.

Table 1. Decision Matrix

Weights (Wi)	**0,5**	**0,5**	**0,5**	**0,5**
Criteria	**Office Size (m2)**	**Price (Turkish Lira)**	**Location (Distance to Tax Office)**	**Visibility (Floor)**
Values	**Maximum**	**Minimum**	**Minimum**	**Minimum**
Alternative 1	90	550000	400	2
Alternative 2	22	305000	150	1
Alternative 3	180	650000	1752	1

3.2. Determining of The Best (fi*) and Worst (fi⁻) Values

The best (fi*) and worst (fi⁻) values of the alternatives for each criterion are given in Table 2. The best (fi*) and worst (fi⁻) values are calculated by the following equations;

- fi* and fi⁻ values are determined by the equations fi* = maxjfij and fi⁻ = minjfij when the i_{th} criterion represents a benefit (maximum directional criteria);

- fi* and fi⁻ values are determined by the equations fi* = minjfij and fi⁻ = max$jfij$. when the i_{th} criterion represents a cost (minimum directional criteria).

According to these formulas, the best (fi*) and worst (fi⁻) values are as follows;

Table 2. The Best (fi*) and Worst (fi⁻) Values

Criteria	**Office Size (m2)**	**Price (Turkish Lira)**	**Location (Distance to Tax Office)**	**Visibility (Floor)**
Values	**Maximum**	**Minimum**	**Minimum**	**Minimum**
Alternative 1	90	550000	400	2
Alternative 2	22	305000	150	1
Alternative 3	180	650000	1752	1
fi*	180	305000	150	1
fi-	22	650000	1752	2
(fi* - fi-)	158	-345000	-1602	-1

3.3. Normalized Decision Matrix

The normalization process performed to separate the criteria from their eigen units is given in Table 3. The normalization process is obtained by means of the formula {wi ((fi* - fi) / (fi* - fi-))}.

Table 3. Normalized Decision Matrix

Weights (Wi)	0,5	0,5	0,5	0,5
Criteria	**Office Size (m2)**	**Price (Turkish Lira)**	**Location (Distance to Tax Office)**	**Visibility (Floor)**
Values	**Maximum**	**Minimum**	**Minimum**	**Minimum**
Alternative 1	0,284810127	0,355072	0,078027466	0,5
Alternative 2	0,5	0	0	0
Alternative 3	0	0,5	0,5	0
fi*	180	305000	150	1
fi-	22	650000	1752	2
(fi*-fi-)	158	-345000	-1602	-1

3.4. Calculation of Sj and Rj Values

In this step, Sj and Rj values are calculated.

Sj value: Sj = $\Sigma_{ni=1}$ {wi (fi* - fij) / (fi* - fi-)}

Rj value: Rj = $\max_i$ {wi (fi* - fij) / (fi* - fi-)}

Calculated Sj and Rj values are given in Table 4. Also S*, S-, R*, R- values used in the calculation of the Qj value are determined by the equalizations as follows;

S* = minjSj and S- = maxjSj

R* = minjRj and R- = maxjRj

S* = 0,5

S- = 1,21791

R* = 0,5

R- = 0,5 in the study.

Table 4. Values of S_j and R_j

Weights (Wi)	(0,5	0,5	0,5	(0,5		
Criteria	**Office Size (m2)**	**Price (Turkish Lira)**	**Location (Distance to Tax Office)**	**Visibility (Floor)**		
Values	**Maximum**	**Minimum**	**Minimum**	**Minimum**	**Sj**	**Rj**
Alternative 1	0,28481012758	0,355072	0,078027466	0,5	1,21791	0,5
Alternative 2	0,5	0	0	0	0,5	0,5
Alternative 3	0	0,5	0,5	0	1	0,5

3.5. Calculation of Qj Value

In this step, the value of Qj is determined (for j = 1,2, …, J). The calculation of the Qj value is determined by the formula $Qj = \{v ((Sj - S^*) / (S^- - S^*)) + ((1- v).(Rj - R^*))\}$.

Note: The value of v in the formula expresses the weight for the strategy that provides the maximum group benefit, while (1-v) expresses the weight of the minimum regret of the opponents. Majority vote can be achieved by (v> 0.5), consensus (v= 0.5), and veto (v< 0.5). In studies, the v value is generally accepted as 0.5 (Lezki et al., 2019: 144).

The Qj values calculated according to the formula for each alternative are shown in Table 5.

Table 5. Values of Qj

Weights (Wi)	(0,5	0,5	0,5				
Criteria	**Office Size (m2)**	**Price (Turkish Lira)**	**Location (Distance to Tax Office)**	**Visibility (Floor)**			
Values	**Maximum**	**Minimum**	**Minimum**	**Minimum**	**Sj**	**Rj**	**Qj**
Alternative 1	0,28481012758	0,355072	0,078027466	0,5	1,21791	0,5	0,5
Alternative 2	0,5	0	0	0	0,5	0,5	0
Alternative 3	0	0,5	0,5	0	1	0,5	0,348233

3.6. Ordering of Obtained Qj, Sj, Rj Values from Smallest to Largest

In this step, the Qj, Sj, Rj values obtained for each alternative were ordered from smallest to largest and checked for acceptable advantage condition and acceptable stability condition. The order of the Qj, Sj, Rj values obtained for each alternative from the smallest to the largest is given in Table 6.

Table 6. Ordering Qj, Sj, Rj Values from Smallest to Largest

	Sj	Rj	Qj
Alternative 2	0,5	0,5	0
Alternative 3	1	0,5	0,348233
Alternative 1	1,21791	0,5	0,5

3.7. Checking The Acceptable Advantage Condition and Acceptable Stability Condition

3.7.1. Acceptable Advantage Condition

The condition Q (a") - (a') ≥ DQ must be satisfied. In the inequality, a' is the best alternative with the least Qj, and a" is the second best alternative with second least Qj value. The DQ value is obtained by means of the formula DQ = 1/(J - 1). The value of J in the formula represents the number of alternatives.

3.7.2. Acceptable Stability Condition

Alternative a' with the best Qj value must have achieved the best score in at least one or both of the Sj, Rj values.

NOTE: If Condition 2 (Acceptable Stability Condition) is not supplied, alternatives a' and a" are both considered best alternatives. If Condition 1 (Acceptable Advantage Condition) is not supplied, the best alternatives from a' to $a^{(M)}$ ($a^{(M)}$ = last alternative satisfying the inequality) are determined by the following inequality; Q ($a^{(M)}$) - Q (a') < DQ . All alternatives from a' to $a^{(M)}$ (all alternatives satisfying the inequality) are considered the best alternatives.

In Table 6, the alternative with the smallest Qj value is alternative 2. The alternative with the second smallest Qj value is Alternative 3. In order for the acceptable advantage condition to be satisfied, the condition specified by the inequality Q (a") - (a') ≥ DQ must be satisfied. In the inequality, a' is the best alternative with the least Qj value and a" is the second best alternative with second least Qj value. The DQ value in the inequality is obtained by the formula DQ = 1/(J - 1). The value of J in the formula represents the number of alternatives. According to the inequality and DQ formula; Q (A3) - Q (A2) = 0,348233. DQ is 0,5. Since 0,348233 < 0.5 (DQ), the acceptable advantage condition could not be satisfied. Therefore according to this formula; Q ($a^{(M)}$) - Q (a') < DQ all alternatives from a' to $a^{(M)}$ (all alternatives satisfying the inequality) should be considered the best alternatives. When the formula is applied, it is seen that alternative 2 and alternative 3 are in the appropriate solution set (Alternative 2 and alternative 3 satisfy the inequality of Q ($a^{(M)}$) - Q (a') < DQ). When the acceptable stability condition is examined, it is seen that alternative 2 with the smallest Qj value also has the smallest values in Sj and Rj values. Therefore, acceptable stability

condition is also provided. The ideal solution set includes alternative 2 and alternative 3. Both alternatives can be chosen for the location of the accounting office. Alternative 1 is not included in the ideal solution set because it does not provide the acceptable advantage condition.

4. DISCUSSION AND CONCLUSIONS

Before proceeding to the implementation step of the study, the criteria to be discussed in the study were determined according to the opinions of the employer and the literature. The criteria used in the study are office size (m2- K1), price (TL- K2), location (Distance to Tax Office- K3) and visibility (Floor - K4). Then, the phase of identifying the alternatives was started and three alternative offices were identified in the Gölhisar town of Burdur city. The values of the alternatives according to the office size (m2- K1), price (TLK2) and visibility (Floor - K4) criteria were obtained by interviewing the office owners. A map was obtained from a satellite program. Then, by applying the steps of the Vikor method, the ideal solution set of the most suitable alternatives was obtained. According to the study result; alternative 2 and alternative 3 are included in the ideal solution set. The aim of this study is to select the most suitable location for an accounting office operating in the service sector, included in the small and medium-sized enterprises class, by the Vikor method. The research is limited to the Gölhisar town, the year of 2021th, the opinions of the accounting office owner, the three alternative office locations determined for the research, the criteria prepared according to the literature. The Vikor method is a method that can be easily applied because it is easy to calculate and does not require a special software program. Therefore, every company can easily apply the method in the face of location selection and other multi-criteria decision making problems. When the literature is examined, it is observed that the studies on determining the location by the Vikor method are generally carried out for enterprises in the manufacturing sector and large enterprises in the service sector. Next studies can apply the method by harmonizing it with other multi-criteria decision making methods. Due to the deficiency in the literature, the application of the method with different criteria and more alternatives by receiving experts' opinions in different sectors and different locations for small and medium-sized service enterprises will make a great contribution to the literature.

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PARTICIPANTS' SATISFACTION LEVELS OF GREEK DANCE LESSONS

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Abstract

The aim of this research was to investigate satisfaction's level that gain the participants who involved in dancing activities, as well as if gender differentiates this satisfaction. The sample of this work consisted of 312 male (146 or 46.8%) and female (166 or 53.2%) of ages between 17 and 60 years old. All participants have attended Greek traditional dance courses in dancing associations among North Greece. For data's collection the Greek version (Filippou et al., 2021) of "Physical Activity Class Satisfaction Questionnaire" (PACSQ) (Cunningham, 2007) was used. The scale consists of 45 questions which explore the satisfaction's meaning and constitute nine factors. For the statistical analysis of the data, descriptive statistics data were used to broadly examine the degree of satisfaction, T-test for independent samples to examine if the gender differences on satisfaction and reliability analysis (Cronbach's α) was carried out. From the statistical analysis of the research data, it's seems that: a. The questionnaire indicated particularly good internal consistency since Cronbach's α ranges from .88 (Relaxation) to .93 (Improvement of Health & Fitness). b. "Teaching" (M= 4.74 & S.D= .46), "Fun & Enjoyment" (M= 4.60 & S.D= .64) and "Interaction with Others" (M= 4.51 & S.D= .61) are the most significant satisfaction's factors from the dancing courses. c. dancer's satisfaction recruiting is not differentiated from gender. From research's data's analysis we claim that: a. The dancers are interested in, and they evaluate both the teacher as a personality and his lesson. At the same time, they care about the climate during the lesson and if that offers them Fun and Enjoyment and helps those to improve their communication with the other participants. b. gender is not a factor in diversifying pupil satisfaction.

Key-words: Teaching; Mastery Experiences; Cognitive Development; Diversionary Experiences

INTRODUCTION

Dance groups have emerged as an institution that has replaced the institutions of traditional Greek society in terms of socializing young people and transmitting its values and beliefs. Especially when this happened through participation in practices such as various dance events. Their role in the rescue and dissemination of Greek dance is important, especially from the 70's onwards. Through the fields that are active, they reproduce, even in the context of a distinct folklore, the Greek dance, they spread it and make it known everywhere through their participation in dance performances. But an equally important offer is that they are places of meeting, recreation and socialization, since in their rooms they have the opportunity,

especially the elderly, to meet old friends, to make new ones or to have fun taking part in the excursions they organize since the dance in this case is treated as a leisure activity (Gatsou, 2015; Gatsou & Filippou, 2017).

According to Filippou et al. (2021), the proper running of the associations, relies heavily on the contributions paid by the members, since the state subsidies, which were their main source of income, paused several years ago. Thus, not only the stay of the existing members in the association, but also the attendance of new people is considered imperative. Factors that probably contribute to both the stay of old and the arrival of new members, are the number and quality of activities offered as well as the pleasure and satisfaction that members receive from their participation in them.

Scanlan and Simmons (1992) describe satisfaction as the positive state in which interest and love for something/an activity or the fun and pleasure that comes from engaging in that activity are reflected. Hashim, Grove, and Whipp (2008) define it as a complex and polysemous construction that includes concepts such as excitement, joy, cognitive perceptions, and attitudes toward a particular activity.

One of the factors that significantly affects both the chances of participating in a physical activity and the development of intrinsic motivation is the feeling of satisfaction/pleasure that one enjoys when participating in an activity (Gråstén & Watt, 2017; Barkoukis et al ., 2008; Yli-Piipari, 2011). A large number of those who interrupt their participation in a physical activity, show as the main reason the unattractiveness of the course and therefore the low degree of satisfaction from their participation in it (Iconomescu, Mindrescu, & Popovici, 2018).

The aim of this research was to investigate satisfaction's level that gain the participants who involved in dancing activities, as well as if gender differentiates this satisfaction.

MATERIALS AND METHODS

Participants

The sample of this work consisted of 312 male (146 or 46.8%) and female (166 or 53.2%) of ages between 17 and 60 years old. All participants have attended Greek traditional dance courses in dancing associations among North Greece.

Tools

For data's collection the Greek version (Filippou et al., 2021) of "Physical Activity Class Satisfaction Questionnaire" (PACSQ) (Cunningham, 2007) was used. The scale consists of 45 statements which explore the satisfaction's meaning and constitute nine factors. These factors are a. "Mastery Experiences": it consists of five different questions (e.g., How much I learned about how to perform better in this activity). b. "Cognitive Development": it consists of five different statements (e.g., The knowledge about the fundamentals of the activity I have gained). c. "Teaching": it consists of five different statements (e.g., The instructor's ability to effectively communicate content matter). d. "Normative Success": it consists of five different statements (e.g., My dancing skills compared to others in the class). e. "Interaction with Others": it consists of six different statements (e.g., The chance I had to socialize with others). f. "Fun and Enjoyment": it consists of four different statements (e.g., The pleasant experiences I had in the class). g. "Improvement of Health & Fitness" it consists of five different statements (e.g., The development of greater fitness as a result of this class). h. "Diversionary Experiences" (it consists of six different statements (e.g., The way the class makes me feel re-energized). j. "Relaxation" it consists of four statements (e.g., The way the

activity helped me to relieve stress). The answers were given on a 5-point Likert scale from 1 (not at all satisfied) to 5 (completely satisfied).

The questionnaire presented an acceptable reliability coefficient in all its uses. Thus, in Cunningham (2007) research, Cronbach's α index ranged from .85 (Relaxation) to .95 (Improvement of Health & Fitness), in the research of Masadi et al. (2019) ranged from .89 (Cognitive Development) to .97 (Teaching), in the research of Karakouta et al. (2021) ranged from .89 (Mastery Experiences) to .94 (Improvement of Health & Fitness) and in research by Filippou et al. (2021) ranged from .77 (Improvement of Health & Fitness) until .96 (Interaction with Others).

The reason that this questionnaire was chosen for the collection of research data, was that its manufacturer understands the concept of satisfaction as a multidimensional concept and not exclusively in terms of pleasure.

Procedure

The research was carried out at a time when special conditions prevailed due to COVID-19 and which did not allow the coexistence/gathering of people indoors and therefore the operation of dance groups. Thus, the research was conducted through the Google-Form platform. The link that was created, was given to the leaders of the dance groups, as well as to dance teachers with the encouragement to be given to their dancers to complete it. In addition, they were assured, that the complete anonymity of the participants is guaranteed and that the results will be used exclusively for research purposes.

Statistical analysis

For the statistical analysis of the data, descriptive statistics data (Mean & Standard Deviation) were used to broadly examine the degree of satisfaction, T-test for independent samples to examine if the gender differences on satisfaction and reliability analysis (Cronbach's α) was carried out.

RESULTS

Reliability analysis

The questionnaire indicated particularly good internal consistency since Cronbach's α ranges from .88 (Relaxation) to .93 (Improvement of Health & Fitness) (Table 1).

Table 1. Cronbach's α & gender as a specific distinction of the satisfaction

Factors	Cronbach's α	Total		Men		Women		Gender differences	
		M	SD	M	SD	M	SD	$t_{(310)}$	p
Teaching	.90	4.74	.46	4.70	.51	4.78	.40	1.67	.097
Fun and Enjoyment	.90	4.60	.64	4.66	.60	4.54	.67	1.59	.112
Interaction with Others	.89	4.51	.61	4.55	.63	4.47	.59	1.17	.245
Diversionar	.91	4.40	.68	4.40	.73	4.39	.64		.872

y Experiences								.961	
Mastery Experiences	.89	4.32	.67	4.29	.63	4.35	.72	.811	.418
Cognitive Development	.92	4.31	.68	4.26	.72	4.37	.61	1.46	.145
Relaxation	.88	4.30	.70	4.32	.70	4.28	.70	.482	.630
Improvement of Health & Fitness	.93	4.17	.80	4.22	.81	4.12	.79	1.084	.279
Normative Success	.89	3.82	.95	4.28	.91	3.36	.98	.718	.474

As shown in Table 1, the factor that gathers the most preferences of the sample is the factor "Teaching" followed by the factors "Interaction with Others" and "Diversionary Experiences". On the contrary, the "Normative Success" factor gathers the least preferences of the sample.

Gender as a specific distinction of the satisfaction

The results presented in Table 1 show that there are no statistically significant differences due to gender for any factor.

DISCUSSION

The aim of this research was to investigate satisfaction's level that gain the participants who involved in dancing activities, as well as if gender differentiates this satisfaction. The statistical analysis of the data reveals the very good internal coherence of the factors, a fact that makes the questionnaire a reliable and valid tool to be used in the Greek dance environment. The results of the research are in line with the results of both the original manufacturer of the Cunningham scale (2007) and the other researches carried out in Greece, although only the research of Filippou et al. (2021) took place in the field of Greek traditional dance. Of the other studies, that of Masadis et al. (2019) the sample consisted of 5th and 6th grade students while in the research of Karakouta et al. (2021) the sample consisted of 8th and 9th grade students.

Regarding the satisfaction from the participation in the course, it should be mentioned that the only factor that was evaluated with a low score is the "Normative Success" since all the other factors scored more than 4 (highest possible value 5). We could claim that the result was expected, since the traditional dance in general and the Greek one in particular, is not a place for self-promotion. On the contrary, what stands out is the ethnic group and its cohesion. The factors that gather the most preferences of the sample are "Teaching" followed by the factors "Interaction with Others" and "Diversionary Experiences". However, as mentioned above, the other factors also scored satisfactorily taking into account the very small differences observed in their means. This means that the dance teachers, through the programs they produced and implemented, achieved their goal which was to produce and implement a dance program that is aimed at all participants and has a variety of goals. Thus, the participants were satisfied with the opportunities offered to them to develop and improve their movement skills but at the

same time to be enjoyable and fun, to provide the opportunity to develop social relationships among dancers and to offer opportunities for unprecedented experiences. The results of the research are partially in line with the results of both Cunningham (2007) and Filippou et al. (2021) according to which "teaching", "fun and enjoyment" are the factors that gather the most preferences of the participants.

Regarding gender as a factor in differentiating the degree of satisfaction, the results show that this is not a differentiating factor for any factor, proving that traditional dance is a natural activity suitable and effective for both sexes.

CONCLUSION

From research's data's analysis we claim that: a. The dancers are interested in, and they evaluate both the teacher as a personality and his lesson. At the same time, they care about the climate during the lesson and if that offers them Fun and Enjoyment and helps those to improve their communication with the other participants. b. gender is not a factor in diversifying pupil satisfaction.

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REVIEW STUDY: THE DANCE AS A MEANS OF IMPROVING BODY HEALTH AND QUALITY OF LIFE CANCER PATIENT

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Abstract

The purpose of this research was, through the review of scientific research to establish the positive and beneficial results of systematic participation in organized dance activities, in patients who disease from various types of cancer, in their physical health and quality of life. For the needs of the present research, the method of bibliographic review was followed, in order to ensure the maximum possible objectivity of the subject under consideration by the researchers. Scientific articles and conference proceedings of the last decade were reviewed, in electronic databases and search engines: PubMed, Scopus, Medical, Research Gate, Google Scholar as well as at the National Documentation Center combining keywords of the central axes of the issue: "Cancer", "dance", traditional, Latin, ball room, Zumba, belly dance, aerobic dance, yoga, Pilates, tai chi, "physical health", "quality of life" and the combination of these. From the initial bibliography search, emerged 25 publications related to the subject under investigation, of which 3 were rejected. From the indexing of the researches and their categorization are found a) dance programs were applied to all types of cancer, with breast cancer being the most common (11), b) belly, social, Latin, and traditional dance, are the types of dance used in the intervention programs and c) positive effects were observed on both the physical and mental health of the participants. More specifically in terms of physical health, it was observed that general physical function was improved, the strength was increased, lower limb mobility and endurance was improved. All this has resulted in the reduction of perceived physical fatigue and the improvement of perceived quality of life. There was also an improvement in body image, self-esteem, self-confidence, and overall psychological well-being. The results provide the authors with the opportunity to claim that the participation of cancer patients in dance programs of any kind has positive effects on both their physical and mental health.

Key-words: traditional dance, bally dance, Latin dance, cancer, breast cancer.

INTRODUCTION

"Cancer" is a term referring to diseases in which cells of the body multiply uncontrollably and can invade nearby tissues and/or be transported and spread to other parts of the body, through the blood and lymphatic systems (Cancer Council Australia, 2017). An

estimated 19,292,789 cases of cancer were diagnosed in 2020, according to Sung et al. (2021), 11.4% of which were breast cancer, followed by anus cancer (10%), prostate cancer (7.3%), stomach cancer (5%) and liver cancer with 4.6%. Furthermore, the research conducted by Siegel, Miller and Jemal (2020) found that the most common cancers are breast, lung and colon cancers. Men are more prone to lung (14.5%) and prostate (13.5) cancers, while in women the most prevalent types of cancer are breast (24.2%) and colon (9.5%).

For many years cancer was considered an incurable disease and the diagnosis of the disease gave basically no hope for life, since the mortality rate was high. However, the long-term research that aimed to understand carcinogenesis and its causes led the scientists to apply methods of hospitalization and treatment that have spectacular results. Today, cancer in most forms is treatable with high survival rates and from an incurable disease it has turned into a chronic disease (Karathanou, 2020). Most cancers today are treated with a combination of topical treatments, which aim to destroy cancer cells throughout the body (Katsikari & Breki, 2006). This combination includes surgery, chemotherapy, radiotherapy, immunotherapy, hormone therapy, laser therapy, hyperthermia and cryotherapy (Karathanou, Bebetsos, Filippou, Psyrri, & Konaks, 2020). These treatments, however, can also have a series of painful side effects. These collateral effects are related to the physical, as well as the psychosocial health of the patients. According to Liu and Yang (2015), the gradual decrease of the patients' daily functionality leads to a deterioration of their quality of life levels; as a result, the execution of their daily needs becomes a challenge (Fleischer & Howell, 2017). Fatigue, dry mouth, nausea, constipation, anxiety, pain, vomiting and sadness are some of the side effects that a patient undergoing treatment or who has survived cancer must overcome (Tian, Lu, Lin, & Hu, 2015).

Participating in physical activities is considered an effective antidote to facing the negative side effects aforementioned. According to research (Miller et al., 2016; Mustian et al., 2017; Segal et al., 2017), exercise helps to improve aerobic capacity, muscle strength and functional capacity of cancer patients, while, according to Segal et al. al. (2017), exercise has beneficial effects as it improves their physical condition and quality of life levels, whereas it can reduce side effects or injuries. Furthermore, according to Pitsi, Smilios, Tokmakidis, Serbezis and Goulimaris (2008) and Sivvas et al. (2020), dance of any form and of any kind is a type of moderate-intensity aerobic exercise. The body's burdens are the same as participating in physical activities such as archery, golf and sailing (Howley & Franks, 1997). For this reason, dancing is a physical activity suitable and effective for both the healthy and the sick, contributing to the improvement of physical health and the fight against sedentary life, as well (Bruyneel, 2019).

In conclusion, the purpose of this research is, through the review of scientific research, to establish the beneficial results of systematic participation in organized dancing activities in patients with various types of cancer, in relation to their physical health and quality of life.

MATERIALS AND METHODS

Data collection

For the needs of the present research, the method of bibliographic review was followed, in order to ensure the maximum possible objectivity of the subject under consideration by the researchers. Scientific articles and conference proceedings of the last decade were reviewed in Greek and English language in the following electronic databases and search engines: PubMed, Scopus (Elsevier), Medical, Research Gate, Google Scholar, as well as at the National Documentation Center, combining keywords of the central axes of the issue:

"Cancer", "dance", traditional, Latin, ball room, Zumba, belly dance, aerobic dance, yoga, Pilates, tai chi, "physical health", "quality of life" and the combination of these and the corresponding ones in English. It is noted that the data search did not focus only on electronically published studies and articles, but also extended to electronically archived master's and doctoral dissertations, on topics related to the present research.

From the initial bibliography research, 25 publications related to the subject under investigation emerged -based on title and keywords-, three of which were rejected (two concerned researches with questionnaires without an intervention program and one of them was a review). From the indexing of the researches and their categorization are found that a) dance programs were applied to all types of cancer, with breast cancer being the most common (11), and b) belly dance, social dance -waltz, tango, cha -cha-, Latin and traditional dances - Chinese, Greek, Celtic, Reggae-, are the types of dance used in the intervention programs.

RESULTS - DISCUSSION

As previously mentioned, the literature review revealed a total of 25 studies, 22 of which are empirical, one is a review and two were conducted using a questionnaire. Given the purpose of this paper, as well as the research question, investigating the impact of dance programs on the physical health and quality of life of cancer patients, the research did not focus on a single type of dance. The aim of the researchers was to present all kinds of dance that can influence physical health, as well as the quality of life of cancer patients.

In order to achieve the aims of the research but also for a clearer and more comprehensible representation of its results, the chronological classification and presentation of the studies (from the newest to the oldest) was chosen, while they were classified taking into account the effect of dance on physical health or on the quality of life. More specifically, the first group presents and analyzes the researches that investigate the effect of dance on the physical health of cancer patients, while the second group investigates the effect of dance on the quality of life.

The effect of dance on the physical health of cancer patients

The purpose of the research of Karkou et al. (2021) was to investigate the effect of the Dancing with Health program on the physical health of women recovering from breast cancer, with respect to anthropometric measures, cardiorespiratory fitness, muscle strength, balance, flexibility and levels activity. The program was implemented in the United Kingdom, Italy, Lithuania, Bulgaria and the Netherlands and lasted for 16 weeks. The frequency of the lessons was two lessons per week with a 60-minute-duration each and included a variety of dance genres, such as merengue, bachata, cha-cha, salsa, rumba and tango. From the results of the research, the researchers concluded that the Dancing with Health program had physical benefits on anthropometric measures and fitness levels for women with breast cancer. They found positive changes on weight, hip and forearms, as well as changes on cardiorespiratory fitness, overall flexibility and strength.

Thiagarajan and Mokthar (2021) conducted a study involving women with cancer participating in Latin and Bollywood dance programs. The program was attended by 30 women aged 40-73 years old. The aim of the research was to investigate the reasons why cancer patients participate in the program, how they construct meaning through the relative dance activities and to explore the effects of the program. According to the answers of the participants, "Dance is both a practice and an event that not only promotes health and well-

being, but builds solidarity and powerful communities of women, who then aspire to make significant contribution to society".

Greek Traditional dance used by Sivvas et al. (2020) in their intervention program aimed at women who survived breast cancer and had undergone mastectomy, chemotherapy or radiation. The program lasted for three months with a frequency of 3 lessons per week with duration of 50 minutes each. The program was developed in collaboration with the treating physicians and was based on the principles of interval training. The aim of the program was to explore the possibilities provided by such a program to improve the parameters that compose the perceived fatigue of breast cancer patients. The results of the research show that Greek traditional dance is a pleasant form of aerobic physical activity, which can improve all the factors that compose the perceived fatigue of patients with breast cancer.

The aim of Boing et al. (2020) research was to provide a Pilates solo and a belly dance protocol for women undergoing breast cancer treatment. The program lasted for 16 weeks and 48 lessons were held (three classes per week). The research data concerned cardiorespiratory fitness (6-min walk test and cycle ergometer), lymphedema (sum of arm circumference), physical activity (IPAQ short version), disabilities of the arm (DASH), range of motion (goniometer test), muscular strength (dynamometer test) and flexibility (sit and reach test). Additionally, it related to psychological aspects such as depressive symptoms (Beck Depression Inventory), body image (Body Image After Breast Cancer Questionnaire), self-esteem (Rosenberg), fatigue (FACT-F), pain (VAS), sexual function (FSFI), and sleep quality (Pittsburgh Sleep Quality Index). From the results of the research, the authors conclude that Pilates solo and belly dance are physical activities that can offer supportive care to women with breast cancer by improving their physical health.

Cerulli et al. (2019) implemented a dance program - including tango and cha-cha - for cancer patients in order to explore the possibilities it offers to maintain or even improve their physical health. The main participants were breast cancer patients with a mean age of 48.3 (SD ± 5.2) years and the program lasted for four months. During the program, there were 32 lessons (2 lessons per week) of 80 - 90 minutes each. The cardiorespiratory fitness was tested with the six-minute walk test, as well as some other functional capacities with hand grip test, 30s sit-to-stand, Scratch Test. According to the researchers, there were statistically significant differences at the end of the program, which prompted the authors to suggest that, through their participation in dance programs, cancer patients can only reap benefits.

The dance program implemented by Loo et al. (2019) in order to investigate its effect on improving their physical activity was also addressed to patients with breast cancer. The study involved 11 women aged 63 (SD ± 10.2) years. The program lasted for 6 months and included Hula Dance lessons - Polynesian traditional dance - with a frequency of two lessons per week of 60 minutes each. In addition, it included practicing at home three times a week for 15 minutes. The results show that participating in a program with traditional Hawaiian dances seems to have a positive effect on the physical activity of women with breast cancer, while it can improve their well-being, increase vigor and reduce cytokine levels associated with obesity.

Ballroom dance is the intervention program implemented by Pisu et al. (2017), which involved 31 women aged 57.9 years who survived cancer at a 68 percentage. During the program, 10 private weekly dance lessons and 2 practice parties took place, over a period of 12 weeks. The main outcomes were physical activity (Godin Leisure Time Exercise Questionnaire), functional capacity (6 Minute Walk Test), QOL (SF-36), Couples' trust (Dyadic Trust Scale) and other dyadic outcomes. From the results of the research the authors concluded that light intensity ballroom dancing has the potential to improve cancer survivors'

QOL and larger trials are needed to build strong support for this ubiquitous and acceptable activity.

The research of Ho, Lo and Luk (2016) involved 104 cancer patients who participated in Dance Movement Therapy programs. Two groups were created, one of which participated in the program during radiotherapy, while the second participated after finishing the radiotherapy. The main goal of the research was to investigate the effects of the program on the levels of fatigue and pain symptoms to patients who received radiotherapy. From the analysis of the research data, the researchers concluded that «the pleasure of dancing and the psychological and physical relief from DMT help patients cope with daily radiation treatments. This could decrease treatment dropout rates when administered in clinical settings».

In the same vein, it was observed that a dance program can help regulate stress and pain during radiation therapy in women with breast cancer (Ho, Fong, & Yip, 2016), while in other research studies (Mirandola et al., Odis, 2015) the reduction of pain and increased mobility of the upper limbs in patients with breast cancer were also confirmed.

According to the results of the research of Sturm, Baak, Storek, Traore and Thuss-Patience (2014), dance, as a holistic sportive activity, might be an appropriate, effective approach for treatment of cancer-related fatigue. The study involved 40 patients receiving anti-cancer treatment. There were 10 dance lessons over a 5 weeks period and the research data concerned fatigue, quality of life and physical performance.

Greek traditional dance was used in the intervention program developed by Kaltsatou, Mamenetzi and Douka (2011), in order to investigate the influence of a mixed exercise program, including Greek traditional dances and upper body training, in relation to physical function, strength and psychological condition of breast cancer survivors. The study involved 27 women who were divided into two groups. The experimental group consisted of 14 women with a mean age 56.6 (SD ± 4.2) years. The control group consisted of 13 women with average age 57.1 (SD ± 4.1) years. The experimental group attended an intervention program that lasted for 24 weeks with a frequency of three 60-minute-lessons per week. The data collection concerned blood pressure, heart rate, physical function (6-min walking test), handgrip strength, arm volume and psychological condition (Life Satisfaction Inventory and Beck Depression Inventory) and was done before the start and at the end of the program. From the statistical analysis of the data (Repeated Measures Anova) the researchers found that «aerobic exercise with Greek traditional dances and upper body training could be an alternative choice of physical activity for breast cancer survivors, thus promoting benefits in physical function, strength and psychological condition».

The effect of dance on the quality of life and health of cancer patients

The aim of the work of Thieser, Defer, Rudolph, Wozniak, Schmidt, and Hübner (2021) was to investigate the effects on fatigue, body image, self-efficacy and functional exercise capacity to cancer patients participating in a ballroom dance program. The program lasted for 11 months (September 2018 - July 2019) with a frequency of one 90-minute-session per week. The research data were collected using: a. the questionnaire German Version of the Brief Fatigue inventory (BFI) and The Short Scale for Measuring General Self-efficacy Beliefs (ASKU) b. the 6-min walking test (6-MWT). From the analysis of the research data, the authors came to the following conclusions: a. patients with dance experience showed higher self-efficacy scores than patients without, b. patients rated the influence of dancing on partnership positively, c. the dancing programme had no significant effects on fatigue or body

image, d. ballroom dancing may improve functional exercise capacity, and dance experience may be associated with a high self-efficacy and active lifestyle.

Moschen, Lyra, Stein, Boing, Marinho, and Guimarães (2021) implemented an interventional dance program (belly dance) as a complementary therapy to women undergoing hormonal anti-cancer therapy, with the ultimate goal of exploring the effects on optimism and self-esteem. The study involved 14 women aged 40-71 years and, during the belly dance intervention program, 48 lessons of 60 minutes each (three per week for 16 weeks) were performed. The positive effect of the program on improving the self-esteem of the participants was confirmed by both quantitative and qualitative analysis of the data, which had a positive impact on their quality of life levels. On the contrary, the improvement in the levels of optimism was confirmed only by the quantitative data of the research and not by the qualitative one.

The purpose of the research of Filippou et al. (2020) was to examine if participating in a Greek traditional dance program can improve the quality of life of women who have survived breast cancer. The study included 30 women who survived breast cancer aged 48–59 (average 53.97 years). The women in the experimental group attended three 50-minute-lessons per week for three months, while the control group followed their daily program. Statistical processing of the data showed a significant improvement in all the factors that constitute the concept of "quality of life": "mobility", "self-service", "normal activities", "pain/discomfort", "stress/depression" and "health profile" ", while for the control group no significant improvement was observed.

Furthermore, the intervention program implemented by Karathanou (2020) for cancer patients also contained Greek dance. The program lasted for 8 weeks, with a frequency of sessions twice a week. From the results of her research, the researcher found that there was a significant improvement on anxiety and stress factors, thus contributing positively to the quality of life of cancer patients.

The purpose of the pilot study by Carminatti et al. (2019) was to investigate the influence of belly dancing program on the body image and self-esteem of women during and after breast cancer treatment. The study involved 19 women who had either finished or were still under treatment. The experimental group attended an interventional belly dance program for 12 weeks, with a frequency of two 60-minute-lessons per week. From the analysis of the research data it was found that there were statistically significant changes in the body image of the members of the experimental group, while no increase in self-esteem was observed.

Boing et al. (2018) implemented an intervention program over a period of 12 weeks with a frequency of two 60-minute-lessons per week. In addition to improving self-image, participating in belly dance classes contributes positively to the quality of life, reducing fatigue levels and depressive symptoms of cancer patients.

Ballroom dances -cha-cha, tango, waltz, mambo, fox-trot - were also used in the research of Schmidt, Rudolph, Wozniak, Rütters, Mackelenbergh and Huebner (2018), as well as in the research of Rudolph et al. (2018). In the research of Schmidt et al. 27 patients and their partners took part. The program included 90-minute-lessons and the results of the research showed the maintenance or improvement of the quality of life of the patients, while it returned to the pre-program levels 6 months after its end. The research of Rudolph et al. (2018) is a continuation of the research of Schmidt et al. (2018). This research also revealed the contribution of an interventional dance program to improving the quality of life of cancer patients.

Another intervention program with belly dance in women with cancer can be used as a complementary method of rehabilitation and improvement of the quality of life, social support and general enjoyment of life (Szalai, Levay, Szirmai, Papp, Premusz, & Bodis, 2015).

The purpose of the research of Mannheim, Helmes, and Weis (2013) was to evaluate the impact of a program Dance Movement Therapy in the quality of life, anxiety and depression, as well as self-concept of cancer patients. The 3-month study involved 115 cancer patients. The results show that there was a statistically significant improvement in both quality of life and psychological well-being.

CONCLUSIONS

From the previous discussion, the following can be ascertained:

a. Most intervention programs relating to various types of dance were developed for breast cancer patients (11 out of 22).

b. Six intervention programs used ballroom dances (tsa-tsa, tango, waltz, mambo, fox-trot), five programs used traditional dance (Greek and Hula), four were based on belly dance, in two programs the content of the courses was Dance movement therapy, while in one, dance was used as a holistic sportive activity. Finally, four studies do not indicate the type of dance they used.

c. Participation in dance programs contributes directly to a significant improvement on the levels of both physical health and quality of life of cancer patients of all types.

d. Participation in dance programs contributes indirectly to a significant improvement on the levels of both physical health and quality of life of cancer patients of all types, as it helps to improve their psychological state by reducing anxiety, stress and depression.

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İRAN VƏ TÜRKMƏNİSTAN ARASINDA İQTİSADİ ƏMƏKDAŞLIĞIN ƏSAS XÜSUSİYYƏTLƏRİ (1979-2000)

MAIN FEATURES OF ECONOMIC COOPERATION BETWEEN IRAN AND TURKMENISTAN (1979-2000)

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ÖZET

Neft-qaz və energetika sahələrində birgə layihələrin həyata keçirilməsi iki ölkə arasında əməkdaşlığın mühüm istiqaməti olmuşdur. İki ölkə arasında imzalanmış sazişə görə Türkmənistanın qaz və neft boru kəmərlərinin İrandan keçməsi, İranın türkmən neftini üçüncü ölkələrə satması, iki ölkə arasında enerji böhranını aradan qaldırmaq üçün yeni elektrik xətlərinin çəkilməsi nəzərdə tutulmuşdu. İranın şimal vilayətlərinə əhalinin ehtiyacları üçün enerji, qaz tədarükünə kəskin ehtiyac duyulurdu. İran həmçinin təbii qaz ixracatı sahəsində Türkmənistanın qarşılaşdığı çətinliklərdən istifadə edərək, bu ölkədən böyük həcmdə qaz idxal etmək niyyətində idi.

İran neft və qazın nəqli sahəsində Türkmənistan ilə sabit münasibətlər qurmuşdur. Bu, ikitərəfli əməkdaşlığın ən perspektivli sahələrindən biri idi. Bu sahədə bir neçə mühüm birgə layihə həyata keçirilirdi. Qazın emalı və ixracı sahəsində İran ilə əməkdaşlıq Türkmənistan üçün həyati əhəmiyyət kəsb edirdi.

İran ilə əməkdaşlıq Türkmənistan təbii qazın həm bu ölkəyə, həm də oradan tranzit yolu ilə Aralıq dənizi ölkələrinə, Avropaya, Fars körfəzindəki limanlar vasitəsilə Uzaq Şərq və Cənub-Şərqi Asiya regionuna ixrac edilməsi üçün də geniş imkanlar açdı. İran «dəhlizi», türkmən qazının tranzitində Rusiyanın inhisarını ləğv etməyə və postsovet məkanından kənarda real surətdə qaz bazarına çıxmaq imkanı verdi. Türkmənistan geostrateji səbəblərə görə təbii qazın xarici bazarlara ixracında İran ilə birgə fəaliyyət göstərmək xətti yeridirdi. Nizama salınmış bank münasibətləri, həm də işlənib hazırlanmış müqavilə-hüquqi baza kimi təkanverici amillər də iki ölkə arasında münasibətlərinin inkişafına müsbət təsir göstərmişdir.

İran-Türkmənistan münasibətləri bir çox cəhətdən qarşılıqlı faydalı xarakter daşımış və o qədər də problemlərə malik olmamışdır. İran Türkmənistan üçün iş ortağı, texniki mütəxəssis və dünyaya açılan qapıdır. Türkmənistanın mühüm pambıq tədarükçüsü olmasını İran tərəfi layiqincə dəyərləndirmiş və onlar ortaq bir iplik sənayesi yaratmışlar.

Açar sözlər: neft, təbii qaz, boru kəməri, İran, Türkmənistan, əməkdaşlıq.

ABSTRACT

Implementation of joint projects in the oil and gas and energy sectors has been an important area of cooperation between the two countries. According to the agreement signed between the two countries, Turkmenistan's gas and oil pipelines would pass through Iran, Iran would sell Turkmen oil to third countries, and new power lines would be built to overcome the energy crisis between the two countries. The northern provinces of Iran were in dire need of energy and gas supplies. Iran also intended to import large volumes of natural gas from Turkmenistan, taking advantage of the difficulties it faces.

Iran has established stable relations with Turkmenistan in the field of oil and gas transportation. This was one of the most promising areas of bilateral cooperation. Several important joint projects were implemented in this area. Cooperation with Iran in the field of gas processing and export was of vital importance for Turkmenistan.

Cooperation with Iran has opened up vast opportunities for Turkmenistan to export natural gas both to this country and from there to transit to the Mediterranean countries, Europe, the Far East and Southeast Asia through ports in the Persian Gulf. Iran's "corridor" has allowed Russia to break its monopoly on Turkmen gas transit and enter the real gas market outside the post-Soviet space. For geostrategic reasons, Turkmenistan has been cooperating with Iran in exporting natural gas to foreign markets.

Regulated banking relations, as well as motivating factors such as the developed legal framework, also had a positive impact on the development of relations between the two countries. Iran-Turkmenistan relations have been mutually beneficial in many respects and have not had many problems. Iran is a business partner, technical specialist and a gateway to Turkmenistan for Turkmenistan. The fact that Turkmenistan is an important supplier of cotton was appreciated by the Iranian side, and they created a joint yarn industry.

Keywords: oil, natural gas, pipeline, Iran, Turkmenistan, cooperation.

1. GİRİŞ

İranda islam inqilabının qələbəsindən sonra rəsmi Tehranın xarici siyasət doktrinasında həmsərhəd ölkələrlə qarşılıqlı münasibətlərin inkişaf etdirilməsinə xüsusi diqqət yetirilməyə başlandı. Təbii ki, bu siyasət həm ölkənin mühüm daxili, həm də xarici geosiyasi maraqlarının təmin edilməsinə yönəldilmişdi. İnqilabdan sonra çoxsaylı problemlərlə üzləşmiş yeni İran hakimiyyəti ölkənin mövcud geosiyasi və geoiqtisadi mövqeyindən istifadə edərək qonşu ölkələrlə iqtisadi problemlərin həllinə xüsusi önəm verməyə başladı.

İran İslam Cümhuriyyətinin xarici siyasətində yenicə dövlət müstəqilliyini elan etmiş post-sovet respublikaları ilə münasibətlərə ciddi fikir verilirdi. Belə ki, post-sovet məkanında Tehran özünün ixracat mallarının satışı üçün 280 milyonluq bir bazar əldə etmiş oldu. Lakin İran-İraq müharibəsi (1980-1988) illərində ölkənin demək olar ki, bütün maddi ehtiyatları bu qanlı savaşın ehtiyaclarının qarşılanmasına sərf edildi. Buna görə də ilk dövrlərdə əsas diqqət post-sovet cümhuriyyətlərlə qarşılıqlı münasibətlərin hüquqi bazasının möhkəmləndirilməsinə yönəldildi.

Belə bir şəraitdə İranın qərbində və Fars körfəzi zonasında müharibə vəziyyəti olduğuna görə, Əfqanıstan isə Sovet qoşunları tərəfindən yenicə işğal edildiyinə görə yeni yaranmış islam dövlətinin mövcudluğu xəritə üzərinə qoyulmuşdu. Ölkənin xarici siyasətində çevik addımlar atmaq, ölkə iqtisadiyyatını ayaqda saxlamaq, daxili tələbatı ödəmək Tehran rəhbərliyinin qarşısında mühüm bir vəzifə kimi dururdu. İlk günlərdən İranda baş verən hadisələri bu ölkənin daxili işləri hesab edən rəsmi Ankara xarici siyasət sahəsində müxtəlif qütblərdə durmalarına baxmayaraq, bu qonşu dövlətə qarşı iqtisadi sanksiyalara və embarqolara qoşulmadı, Tehrana humanitar yardımlar almasında və xarici iqtisadi əlaqələrini davam etdirməsində transit ölkə rolunu oynadı. Belə bir şəraitdə İranın xarici siyasət xəttində Cənubi Qafqaz və Orta Asiya bölgələrinin geostrateji əhəmiyyəti daha da artdı. Bu siyasətin içində təbii-coğrafi mövqeyi ilə İranın Orta Asiyaya açılan qapısı rolunu oynayan və təbii-enerji qaynaqları ilə xüsusi əhəmiyyət kəsb edən Türkmənistan ilə iqtisadi münasibətlərin daha da inkişaf etdirilməsi həyati zərurətə çevrildi.

Türkmənistan Mərkəzi Asiya ölkələri arasında mühüm enerji istehsalçısıdır. Ancaq onun böyük ehtiyatlarına baxmayaraq, Aşqabad dövlət müstəqilliyi əldə etdikdən sonra məhdud ixracat imkanları ilə toqquşdu. İran tərəfi bu məhdudiyyətlərin bəzilərini aradan qaldırmaq üçün Türkmənistan ilə əməkdaşlığa hazır olduğunu bildirdi. Tehran aşağıdakı sahələrdə Aşqabada kömək edə biləcəyini təklif etdi: neft-qaz mühəndis xidməti sahəsində

əhəmiyyətli iş təcrübəsi, enerji istehlak edən ölkələrə yaxınlığı, İranın müxtəlif bölgələrində enerjiyə tələbatın olması, Türkmənistan ilə təbii qaz mübadiləsi imkanlarının mövcudluğu, beynəlxalq sulara və beynəlxalq bazara giriş imkanları, yuxarıda sadalanan sahələrdə texniki biliklərə dair təcrübənin olması (Bolverdi: 2006).

2. QARŞILIQLI İQTİSADİ ƏMƏKDAŞLIĞIN ƏSAS SAHƏLƏRİ

1990-cı illərin əvvəllərindən Yaxın və Orta Şərqdə hərbi-siyasi vəziyyətin daha da gərginləşməsi İran ilə Türkmənistan arasında hərtərəfli əməkdaşlığın, xüsusilə də iqtisadiyyatın müxtəlif sahələrində əlaqələrin inkişaf etdirilməsini zəruri edirdi. Artıq 1992-ci ilin əvvəllərində İran ilə Türkmənistan arasında yalnız ticarət sahəsində 9 saziş imzalanmışdı. Xüsusilə, Türkmənistan hökumət nümayəndə heyətinin İrana ilk səfəri zamanı Türkmənistan Prezidenti Saparmurad Niyazov demişdi ki, "Bizim fəal və çox şaxəli əməkdaşlıqda həyati maraqlarımız var. Biz, nəqliyyat, sərhədboyu ticarətin inkişafında, mədəniyyət və elm sahəsində sərhəd çayları üzərində bəndlərin birgə inşası kimi sahələrdə İran ilə ciddi əməkdaşlıq etməyə hazırıq" (Туркменистан: 2019).

Belə bir şəraitdə iki ölkə arasında bir sıra iqtisadi layihələrin həyata keçirilməsi gündəmə gəldi. Bunların arasında təbii qaz və xam neftin tranziti, satışı və qarşılıqlı mübadiləsi sahəsində əməkdaşlığı qeyd etmək olar. Bu elə bir dövrə təsadüf edirdi ki, İranın iştirak etdiyi uzun və üzücü müharibə, iqtisadi sanksiya və ebmarqolar nəticəsində ölkənin iqtisadi infrastrukturları demək olar ki, dağıdılmış, maliyyə ehtiyatları tükənmiş, əhalinin enerjiyə olan tələbatında ciddi problemlər yaranmışdı. Məlum olduğu kimi, İranın əsas enerji qaynaqları ölkənin cənub-qərbində, Xuzistanda yerləşirdi. Oradan ölkənin şimal-şərqinə neft, qaz boru kəmərlərinin çəkilişi isə böyük xərclər tələb edirdi. Bu isə müharibədən yenicə çıxmış bir ölkə üçün qeyri-mümkün idi. Ən yaxşı çıxış yolu isə İranın Xorasan əyalətinə həmsərhəd olan Türkmənistan ilə bu məsələləri birlikdə müzakirə edib çözmək idi.

Bu zaman təbii qazın hasilatı və tədarükü ilə bağlı Türkmənistan da ciddi problemlərlə üzləşmişdi. Mavi yanacağın əhəmiyyətli ehtiyatlarına malik olan Türkmənistan onun tədarük yollarını şaxələndirə bilmirdi. Respublika 1990-cı ilədək Sovet İttifaqının mərkəzləşdirilmiş bazarına 85-90 milyard kub metr qaz hasil edib tədarük edirdi. SSRİ-nin süqutundan sonra faktiki olaraq təbii qaz bazarlarından təcrid olunması Türkmənistanda hasilatın həcminin azalmasına səbəb oldu (Лалетин Ю.П.). Belə ki, ölkədə qaz hasilatının həcmi 1995-1996-cı illərdə 35-38 milyard kub metrə düşdü. Hasil olunan təbii qaz Rusiya boru kəməri sistemi ilə MDB ("Müstəqil Dövlətlər Birliyi") ölkələrinə (əsasən Ukraynaya) tədarük edilirdi. 1997-ci ilin martında Türkmənistan "Qazprom"un xidmətindən imtina etdi. Bundan sonra qaz hasilatı ildə 12-15 milyard kub metr səviyyəsinə düşdü və bu da Türkmənistanın yanacaq-enerji kompleksinin inkişafına və demək olar ki, onun bütün milli iqtisadiyyatına son dərəcə mənfi təsir göstərdi. Aşqabad məhz belə bir vəziyyətdə Tehran ilə geniş əməkdaşlıq əlaqələri qurmalı idi. Bunun üçün hüquqi zəmin isə müstəqilliyin ilk çağlarından yaradılmağa başlanmışdı.

Belə ki, İran 90-cı illərin əvvəllərindən etibarən neft və təbii qazın nəqli sahəsində Türkmənistan ilə sabit münasibətlər qurmuşdu. Bu, ikitərəfli iqtisadi əməkdaşlığın ən perspektivli sahələrindən biri idi. Həmçinin bu sahədə bir neçə mühüm birgə layihə həyata keçirilirdi. Təbii qazın hasilatı və ixracı sahəsində İran ilə əməkdaşlığa Türkmənistanın böyük maraqları vardı. İran ilə əməkdaşlıq Türkmənistan üçün təbii qazın həm bu ölkəyə, həm də İrandan tranzit yolu ilə Aralıq dənizi ölkələrinə, Avropaya, Uzaq Şərq ölkələrinə, xüsusilə Yaponiyaya və Cənub-Şərqi Asiya regionuna ixrac edilməsinə də geniş imkanlar açdı. Əslində İran ərazisi vasitəsi ilə türkmən qazının tranziti dünyanın ən iri təbii qaz ehtiyatlarından birinə malik olan, həmçinin aparıcı ixracatçı dünya ölkələrindən biri olan Rusiya ilə gərgin rəqabət şəraitində baş verirdi. Belə bir şəraitdə Türkmənistan yaranmış

əlverişli vəziyyətdən və imkanlardan istifadə edərək dünya qaz bazarına çıxmaq imkanı əldə etdi.

Nəticədə 1992-ci ildə iki ölkə arasında əldə edilmiş razılığa əsasən Türkmənistan qaz və neft boru kəmərlərinin İrandan keçməsi, İranın türkmən neftini dünya bazarında satması, iki ölkə arasında enerji böhranını aradan qaldırmaq üçün yeni elektrik xətlərinin çəkilməsi və s. barəsində bir sıra sazişlər əldə edildi (DEİK: 1994).

Türkmənistan tərəfi xoş məram nümayiş etdirərək Xəzər dənizi ətrafında bərqərar olmuş vəziyyətin tələb etdiyi imkanları İrana vermişdi. Bu həm də İranın şimal vilayətlərinə əhalinin ehtiyacları üçün kəskin ehtiyac duyulan elektrik enerjisinin, təbii qazın göndərilməsi problemini həll etmiş oldu. İran həmçinin Türkmənistanın təbii qaz ixracatı sahəsində üzləşdiyi çətinliklərdən istifadə edərək, bu ölkədən böyük həcmdə mavi yanacaq idxal etmək niyyətində idi (Iran News: 1996).

Təsadüfi deyil ki, 1996-cı ilin dekabrında Tehranda İran, Türkiyə və Türkmənistan nazirləri arasında keçirilən görüşlərdə əsas mövzu qaz hasilatı və nəqli sahəsində regional əməkdaşlığın inkişaf etdirilməsi oldu. Qeyd etmək lazımdır ki, bu dövrdə Türkmənistanın xarici ticarət siyasəti enerji mənbələrinin hasilatı və ixracına yönəldilmişdi. Məhz bu səbəbdən Türkmənistan geostrateji mülahizələri əsas götürərək təbii qazın xarici bazarlara ixrac edilməsində İran ilə birgə fəaliyyət göstərmək xətti yeridirdi. O, 1997-ci ilin iyununda Beynəlxalq Enerji Birliyinin vasitəçiliyi ilə Ukraynaya olan ixracatını, bu şirkət ilə ortaq satış sazişinin müddəti sona çatdığı üçün dondurmuşdu.

Qarşıda açılmış imkanları real dəyəndirən hər iki ölkə 1996-cı ilin payızında uzunluğu 200 km və buraxıcılıq qabiliyyəti ildə 6 milyard kub metr olan Körpəcə-Qurd-quyu qaz kəmərinin birgə tikintisinə başladı. İran tərəfi dəyəri 190 milyon dollardan çox olan bu tikintinin xərclərinin 80 faizini öz üzərinə götürdü və 25 il ərzində nəql ediləcək qazı satın almağı da öhdəsinə aldı. Türkmənistan isə İrana pulsuz qaz ixrac edilməsi yolu ilə hesablaşma apardı. Türkmən təbii qazı İranın yerli qazından ucuz başa gəldiyinə görə Tehran üçün də faydalı idi və ildə 500 milyon dollara qənaət etməyə imkan verirdi.

Bu qaz kəmərinin işə salınması mərasimi 1997-ci il dekabrın 29-da oldu. Türkmənistan və İran liderləri bu qaz kəmərini istismara verdilər və onu "Dostluq" kəməri adlandırdılar. Qeyd etmək lazımdır ki, 1997-ci ildə Türkmənistan lideri Saparmurat Niyazov və onun İranlı həmkarı Məhəmməd Hatəmi tərəfindən 25 il müddətində imzalanmış bu müqavilənin sonralar Aşqabad tərəfindən davamlı olaraq yenidən nəzərdən keçirilməsi Tehranı çox qıcıqlandırırdı.

Bundan əlavə, İranın yardımı ilə Xəzərin Türkmənbaşı limanında (keçmiş Krasnovodsk) 220 miyon dollar sərmayə qoyuluşu tələb edən neft emalı zavodunun əsaslı surətdə modernləşməsi həyata keçirildi. Təsadüfi deyil ki, 1998-ci ilin birinci yarısında Türkmənistan Körpəcə-Qurd-quyu qaz boru kəmərinin köməyi ilə İranın həmsərhəd ostanlarına 1 milyard kub metr təbii qaz ixrac etmişdi (Avrasya Dosyası: 1999). Bu qazın ilkin ixrac qiyməti hər 1.000 kub metr üçün 40 dollar müəyyən edilmişdi. Boru kəmərinin illik buraxıcılıq qabiliyyəti isə 1,5 milyard kub metr təşkil edirdi. Bu göstərici İran Milli Neft Şirkəti (NİOC) tərəfindən bəyənilmişdi. İranlı mütəxəssislər Türkmənistanda «Körpəcə» qaz emalı zavodunun tikintisini də başa çatdırmışdılar.

Qeyd etmək lazımdır ki, İran obyektiv amillərin təsiri altında Türkmənistandan daha çox təbii qaz idxal etməyə meyl edirdi. Belə ki, 1998-ci il avqustun 14-də prezident S.Niyazov ilə keçirilən görüşdə İran tərəfindən 1.000 kub metr qaz üçün təklif olunan 32 dollarlıq məbləğ isə rədd edilmişdi (Turkmenistan:1998).

Tədqiqatçı Verner Qampel qeyd edirdi ki, İran hakimiyyəti Türkmənistan-Əfqanıstan-Pakistan-Hindistan regional qaz kəmərinin çəkilişinə yol verməmək üçün fəal siyasət yeridirdi (Verner:1998). Bu amil Tehranın enerji sahəsində Türkmənistan ilə əməkdaşlığı gücləndirməkdə nə qədər maraqlı olduğuna aydınlıq gətirir. Əlavə edək ki, İran bu zaman

ölkənin cənubundan Ərəbistan dənizinin dibi ilə Hindistana qaz boru kəməri çəkməyi nəzərdə tutmuşdu. Cənub istiqamətində türkmən qazının ixracının təcrid olunması bu regionda İran siyasətinin mühüm ünsürü idi. Rus müəllifi İ.A.Novikov qeyd edirdi ki, İran özünün Əfqanıstan ilə dialoqunda Rusiya ilə yanaşı vasitəçi kimi Türkmənistanın imkanlarından istifadə etmişdir. Bu vasitəçilik xidmətlərinin nə qədər dərin və predmetli olduğunu söyləmək çətindir (Новиков И.А.: 2004).

90-cı illərin ikinci yarısında İran hasil etdiyi təbii qazın xeyli hissəsini ixrac etməyə hələ hazır deyildi. Türkmənistan İrana iki ölkəni birləşdirəcək qaz boru kəmərinin inşa edilməsini təklif etmişdi. Həmçinin Prezident S. Niyazov öz növbəsində belə bir bəyanatla çıxış etmişdi. Bu, digər məsələlərlə yanaşı Türkmənistan prezidentinin İranın xarici işlər naziri K. Hərrazi ilə görüşü zamanı müzakirə olunmuşdu. Prezident S. Niyazov həmçinin İran tərəfinə Türkmənistan neft-kimya sənayesinin, xüsusilə də, polipropilen və sıxılmış qaz istehsalının yaradılması və onun istehsal gücünün artırılması üzrə yeni layihələrdə iştirak etməyi təklif etmişdi.

İki ölkə arasında maliyyə sistemi və bank münasibətləri sahəsində əlaqələrin nizama salınması, həm də belə bir əməkdaşlığın müqavilə-hüquqi bazasının möhkəmləndirilməsi kimi təkanverici amillər də 1990-cı illərdə Türkmənistan-İran iqtisadi münasibətlərinin inkişafına müsbət təsir göstərmişdi. Nəticədə 20-dək iqtisadi layihənin maliyyələşdirilməsi üçün münbit şərait yaranmış oldu. Əldə edilmiş müsbət razılaşmalara görə iki ölkə arasında maliyyə və bank işi sahəsində işbirliyi fəaliyyətinə başlandı. İran Saderat (İxracat) Bankının 1993-cü ildə Aşqabadda filialı açıldı. İlk vaxtlar 5 milyon dollar həcmində zəruri əsas fond kapitalını təmin etmədiyinə görə Türkmənistan tərəfi onun fəaliyyətinə müəyyən məhdudiyyətlər qoydu (The Few: 2009). Bu bank Türkmənistanda fəaliyyət göstərən bir neçə İran müəssisəsinə xidmət göstərirdi. Həmçnin İranın Saderat bankı Türkmənistanda ortaq banklar yaratmışdır ki, bunların da fəaliyyəti sayəsində ölkə iqtisadiyyatının inkişafına təkan verə biləcək bir sıra irimiqyaslı layihələrin yerli maliyyələşməsi mümkün olmuşdu. 1996-cı ildə hər iki dövlətin mərkəzi bankları arasında əldə olunmuş razılığa əsasən iki ölkə arasındakı iqtisadi əməkdaşlığın sadələşdirilməsini nəzərdə tutan normalar müəyyən edilmişdi.

Digər tərəfdən İranın özəl bölməsi də Türkmənistanda bir sıra sahələrdə iqtisadi fəaliyyətini genişləndirmişdi. Bunun üçün hər iki tərəfin müvafiq hökumət və dövlət strukturları güzəştli və imtiyazlı şərait və işgüzar mühit yaratmışdılar. Hələ 1992-ci ildə İranın 30-a yaxın firması Türkmənistanda qeydiyyata alınaraq fəaliyyət göstərdiyi halda, 90-cı illərin ikinci yarısında onların sayı 100-ü ötüb keçmişdi.

1997-ci ilin dekabrında İran kompaniyalarından biri tərəfindən salınmış, uzunluğu 715 km olan Transasiya-Avropa lifli-optik xəttin türkmən sahəsi istismara verildi. Bu, Türkmənistana özünün telekommunikasiya imkanlarını xeyli artırmaq imkanı verdi.

Bu dövrdə Türkmənistan sənayesi üçün mühüm olan Aşqabad rayonunda kaolinin (ağ çini gil) zənginləşdirilməsi üzrə fabrikin tikintisi başa çatdırıldı. Həmçinin 1997-ci ilin mayında İİR Prezidenti Haşimi-Rəfsəncaninin Aşqabada rəsmi səfəri zamanı İranın köməyi ilə dəyəri 500 milyon dollar olan 14 sənaye obyektinin tikintisi haqqında sazişlər imzalandı. Onların sırasında Aşqabad transformator zavodu, Bayram-Əlidə tibb preparatları zavodu, elevator, Marıda su təmizləyici müəssisə, inşaat materialları istehsal edən bir neçə zavod, Tecan çayı üzərində su bəndini misal çəkmək olar.

1980-1990-cı illərdə İran-Türkmənistan iqtisadi münasibətləri bir çox cəhətdən qarşılıqlı faydalı xarakter daşımış və o qədər də problemlərə malik olmamışdır. Prezident S. Niyazovun dinc, bitərəf siyasəti İran tərəfini tamamilə təmin edirdi. Türk müəllifi Mustafa Aydının fikrincə, İran, bu ehtiyatlı və elmli diplomatiyasının nəticələrindən bəhrələnməyə başlamış Türkmənistan ilə ikitərəfli yaxşı əlaqələr qurmaq yolunda əhəmiyyətli məsafələr qət etmişdir (Mustafa: 2000).

Rus müəllifi İ.A.Novikovun fikrincə, "İran Türkmənistan ilə daha sıx münasibətlərə ümid edə bilməz və buna ehtiyac da hiss etmir". Lakin onun belə bir fikri ilə razılaşmaq olmaz. Çünki, Tehran Orta Asiya dövlətləri ilə əlaqələrini daha da inkişaf etdirmək üçün Türkmənistanın malik olduğu strateji mövqeyindən həmişə bəhrələnmişdir. O, sonra qeyd edirdi ki, «bunlarla yanaşı İran tərəfi Azərbaycanın və Özbəkistanın maraqlarına qarşı durmaq üçün Türkmənistandan qətiyyətlə, amma əbəs yerə istifadə etməyə çalışmışdır. Lakin Tehran hələlik bu məsələdə tərəqqiyə nail olmamışdır» (Новиков И.А.: 2004).

İran həmçinin bu dövrdə Xəzər dənizi problemlərinin çözülməsi üzrə Türkmənistana böyük ümidlər bəsləyirdi. Tehran təbii qazın ixracı və neft yataqlarının istismarı sahəsində üstünlük əldə etmək üçün Xəzər problemindən istifadə etməyə çalışırdı. 1996-cı ildə hər iki dövlətin başçıları Xəzər dənizinin statusunun müəyyənləşdirilməsini, Xəzər sahili ölkələrin xarici işlər nazirlərinin iclasının keçirilməsini və dənizin çirklənməsinin qarşısını almaq üçün lazımi tədbirlərin həyata keçirilməsini təklif etdilər.

90-cı illərdə İran-Türkmənistan iqtisadi əməkdaşlığı yüksələn xətlə inkişaf etmişdi. Bunu qarşılıqlı olaraq hər iki tərəfin iqtisadi və həm də siyasi maraqları diqtə edirdi. Hər iki dövlət dünyanın böyük bir hissəsini bir-birinin üzünə açan qapı rolunu oynayırdı. Yenicə müstəqil iqtisadi strukturlarını yaradan Türkmənistan üçün İranın texniki imkanları və təcrübəsi mühüm əhəmiyyət kəsb edirdi.

Həmçinin Türkmənistanın mühüm pambıq xammalı tədarükçüsü olmasını İran tərəfi layiqincə dəyərləndirdi. Nəticədə onlar ortaq bir pambıq-parça, iplik sənayesi yaratdılar. Həmçinin toxuculuq sənayesi sahələrini xammal ilə təmin etməkdən ötrü Türkmənistanda irriqasiya sistemlərinin yenidən qurulmasına diqqət artırıldı. Nəticədə əlavə 220-250 min ton pambığın istehsalına nail olundu. Digər tərəfdən Türkmənistan müəssisələrində iplik-pambıq istehsalında və bu xammaldan İranın toxuculuq sənayesi müəssisələrində istifadə olunmasında İranın iştirakı da nəzərdə tutulmuşdu.

Müstəqilliyinin ilk illərindən etibarən Türkmənistan ilə İran arasında əkinçiliyə əsaslanan sənaye sahələrinin inkişaf etdirilməsi məsələsində işbirliyi yaranmağa başladı. Bu sahədə iki ölkənin ərazilərini birləşdirən sərhəd çaylarının suyundan ortaq istifadə olunması nəzərdə tutulurdu. Hələ 1926-cı ilin fevralında İran ilə Türkmənistan arasında imzalanmış müqavilə öz qüvvəsində qalırdı. Bu sənədə əsasən Türkmənistan hər il Tecan çayının ümumi orta axınının 70 faizini, Atrek çayının ümumi orta axınının isə 50 faizini istehlak edirdi (FAO. 2012).

Tərəflər Tecan çayının timsalında qarşılıqlı faydalı məqsədlərlə su ehtiyatlarından istifadənin harmonik bir modelini işləyib hazırladılar. Tecan çayı öz başlanğıcını (Türkmənistan hüdudlarından kənarda – Heri-Rud adlanır) Əfqanıstan ərazisindən götürür, sonra İran və Türkmənistan əraziləri ilə axır. Çayın tam sulu dövrləri mart-may aylarında müşahidə olunur. Su bəndinin və su anbarının birgə tikintisi ideyası Türkmənistanın dövlət müstəqilliyi qazandığı ilk illərdə yaranmışdı. 1996-cı ildə tərəflər bu barədə tam razılığa nail oldular. 1996-cı ilin iyulunda İran və Türkmənistan prezidentləri Türkmənistanın sərhədboyu Serahs şəhərindən 75 km aralıda yerləşən Pulixatum qəsəbəsində gələcək hidrotexniki qurğunun təməlini qoydular. 2000-ci ildə İran ilə Türkmənistan arasında paritet əsaslarda "Dostluq" su bəndinin və su anbarının inşasına başlandı (tikintinin ümumi dəyəri 168 milyon dollar təşkil etdi).

Bu əməkdaçlıqda dövlət qurumları ilə yanaşı özəl şirkətlər də fəal iştirak etdilər. Özəl bölmələr arasında imzalanmış sazişlər əsasında keramika, sağlamlıq və gigiyena üçün məmulatların istehsalına dair ortaq sərmayələr qoyulması təcrübəsi vardır.

İran 1990-cı illərin ortalarında iqtisadi həyatın müxtəlif sahələrində Türkmənistan ilə daha sıx, qarşılıqlı faydalı və kifayət dərəcədə etibarlı münasibətlər qurmuşdu. Türkmənistanın İqtisadi Əməkdaşlıq Təşkilatına (İƏT) üzv olması, xüsusilə tranzit sahəsində

İƏT layihələrinin həyata keçirilməsində onun başlıca rolu və digər amillər İranın bu ölkəyə böyük marağına səbəb olmuşdu. (Morteza:2009).

Həmçinin bu dövrdə «Böyük ipək yolu» transasiya dəmir yol magistralının yaradılması ideyası dirçəldildi. Nəticədə İran tərəfi 1995-ci ildə Bəfk-Bəndər-Abbas dəmir yolunun 700 kilometrlik sahəsini istismara verdi, 1996-cı ildə isə İran və Mərkəzi Asiyanın dəmir yol şəbəkələrini birləşdirən Məşhəd-Sərəhs-Tecan sahəsinin tikintisi başa çatdırıldı. Bu yol Mərkəzi Asiyadan Yaxın Şərq regionuna ən qısa yol açmış və işdə Böyük ipək yolunu bir növ bərpa etmiş oldu. Təkcə bu yolun istismarı Türkmənistana hər il 20 milyon dollardan artıq gəlir gətirməyə başladı. 1996-cı ilin yanvar-fevral aylarında hər iki ölkə prezidentlərinin görüşü zamanı onlar bölgədə beynəlxalq əməkdaşlığın inkişafı üçün bu dəmir yolunun straieji əhəmiyyətini dünya ölkələrinin və beynəlxalq təşkilatların nəzərinə çatdırdılar. Qeyd edək ki, uzunluğu 65 km olan bu yola 33 milyard rial sərmayə qoyulmuşdu. Dəmir yolunun 24 kilometr uzunluğunda olan üçüncü hissəsinə 7 milyard rial vəsait xərclənmişdir (İİR: 1996). 1996-cı ildə İran və Türkmənistan prezidentləri Hərirud çayı üzərində körpü tikintisinə başlamaq haqqında razılığa gəldilər. Tərəflər həmçinin Ənzəli limanından Türkmənbaşıya və Ola dəniz paromlarının açılması planlarına böyük əhəmiyyət verirdilər.

3. SONUCLAR

İranın xarici iqtisadi əlaqələrində Türkmənistanın mühüm yerlərdən birini tutması bir sıra iqtisadi və siyasi şərtlərin təsiri altında mümkün olmuşdur. Hadisələrin inkişafı prosesi göstərdi ki, iki ölkə arasında iqtisadi tərəfdaşlığın güclənməsini həm daxili, həm də xarici amillər şərtləndirir;

İran İslam Cümhuriyyəti Türkmənistan Respublikası ilə iqtisadi əlaqələrin müxtəlif sahələrdə genişləndirilməsinə ölkənin şimal-şərq bölgəsinin sosial-iqtisadi problemlərinin həlli vasitəsi kimi baxırdı;

Tehran hakimiyyəti SSRİ dağıldıqdan sonra Türkiyə Cümhuriyyətinin Cənubi Qafqaza, xüsusilə Azərbaycan Respublikasına və Orta Asiyanın türk respublikalarına təsirinin artmasına qısqanclıqla yanaşırdı. Eyni zamanda Türkiyənin Azərbaycanda təşəbbüsü ələ keçirməsi halına Türkmənistanda yol verməməyə çalışan rəsmi Tehran Türkmənistan ilə sərhədboyu əməkdaşlığı daha da gücləndirməyə çalışırdı;

Qarşılıqlı fayda və maraqlara əsaslanan iqtisadi əməkdaşlığın genişlənməsi həm İranın, həm də Türkmənistanın tranzit ölkə kimi əhəmiyyətini daha da artırdı;

İranın Türkmənistan ilə çox şaxəli iqtisadi əməkdaşlığı inkişaf etdirməyə çalışması Qərb dövlətlərinin bu ölkədə ehtimal olunan iştirakının güclənməsinin qarşısını almaq məqsədi güdürdü. Eyni zamanda İranın beynəlxalq sanksiya və qadağalara məruz qalması da onu Türkmənistan ilə hərtərəfli iqtisadi əməkdaşlığı genişləndirməyə vadar edirdi;

Rəsmi Tehran ölkənin şimal-şərqində yaşayan türkmən milli azlığının maraqlarının nəzərə alınması, onların mövcud hakimiyyətə loyallığının gücləndirilməsi üçün Türkmənistan ilə iqtisadi əməkdaşlığın inkişafında maraqlı idi;

Qarşılıqlı iqtisadi əlaqələrin genişlənməsi hər iki tərəfdə sənaye və kənd təsərrüfatı ilə bağlı infrastruktur sahələrin inkişafına da münbit şərait yaratdı;

İki ölkə arasında birgə enerji layihələrinin həyata keçirilməsi hər iki tərəfin daxili problemlərinin tezliklə aradan qaldırılmasına müsbət təsir göstərdi;

Qarşılıqlı iqtisadi əlaqələrin dirçəldilməsi eyni zamanda bir sıra beynəlxalq iqtisadi layihələrin, xüsusilə də tarixi "İpək yolu" layihəsi ilə əlaqədar proseslərin tezliklə öz həllini tapmasına şərait yaratdı.

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ISSUES IN PERFORMING OBSERVATIONAL RESEARCH ON HUMANS

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Abstract

There are numerous strengths to using an ethological approach to study human behavior, given it relies on methods that are typically used in biology including observation and experimentation in natural settings, comparative primate and other-animal models, and cross-cultural approaches. However, there are situations when using such an approach fails to yield meaningful conclusions due to unanticipated factors. Here we report two investigative attempts to examine women's receptivity to men with high versus low financial status, as indicated by conspicuously placed automatic teller machine receipts. The receipts contained a masculine name and a telephone number, and we measured whether women tried to communicate with the man or not. These studies were intended to provide additional support for the large body of literature that documents women's preference for men with resources. Our first study, while initially successful, started eliciting suspicious and probing behaviours after approximately ten weeks. The second study was confounded by participants' attempting to engage in conversation with the researcher to obtain information that would bias the study result. We present and explore some of the known situational and contextual issues that may have influenced receptivity and speculate on possible reasons for why using an ethological approach failed in this context, and some of the ways these limitations may be addressed in the future. Our studies show that while observational studies in naturalistic environments may reveal more realistic behaviour, the lack of control that is provided by laboratory settings can be a significant detriment to the successful exploration of research hypotheses.

Keywords: Ethology, Situational Limits, Sex Differences, Mate Preferences, Resources

INTRODUCTION

Human ethology is distinct from other areas within psychology (and the social sciences more generally) in that it is grounded in evolutionary theory and direct observations of behavior (Richer et al., 2017). Human ethology according to founder Eibl-Eibesfeldt (1979) relies on methods that are typically used in biology, including observation and experimentation in natural settings, comparative primate and other-animal behavior studies, and cross-cultural research. Ultimately, the goal is to understand universal phylogenetic adaptations, but also cultural patterns in behavior that contribute to survival. The value of using an ethological approach to study human behavior cannot be denied.

However, although ethology is a powerful and highly effective research methodology, it can be difficult to perform successfully. Richer (2017) describes several impediments to conducting human ethology. For example, he outlines that it is time consuming, expensive, or that specific research hypotheses may seem lacking. We had two experimental attempts, described next, both of which failed. We then successfully conducted a survey-based

investigation which led to greater experimental control (Hunter et al., 2019). Although our ethological approach failed, the lessons we learned are of value to other researchers and may enable ethology to be use more widely and successfully.

In keeping with Eibl-Eibesfeldt's perspective, we created a naturalistic investigation to examine women's receptivity to men based on their apparent financial status. Our hypothesis was that women would be most inclined to pursue communication with men who had higher monetary wealth as indicated by bank account balances. We collected automatic teller machine (ATM) receipts, filtered them so that we used only the highest and lowest valued receipts, and on the reverse, wrote a common male name with a short message and phone number. We then waited for the women to contact the number (which was linked to the experimenter's phone via a generated "burner" number) and intended to use the number of received texts or calls as the dependent variable. We note that we did not systematically observe the women in the studies, although we did record their general reactions to the event described. Instead, our goal was to perform an experiment in a natural setting and use women's responses as the dependent variable.

Before we present the studies, it is critical to provide sufficient context regarding our hypothesis. Theoretically, according to parental investment theory (Trivers, 1972), females of many species are the more heavily investing sex, not only in terms anisogamy but also with respect to gestation, lactation, and postnatal childcare (but see Gowaty, 2013; Heywood, 2013; Liesen, 2013). Women's heavier parental investment leads to potential issues in securing sufficient resources for themselves and/or their children. Consequently, women theoretically rely on men's resources and time to help with children. There is at least some support for this conjecture; Hazda men tend to supplement a mother's ability to gather resources during the period she is breastfeeding, the most sensitive period of investment (Marlowe, 2000). According to sexual selection theory, women select mates based on their ability to provide additional parental investment that enhances their reproductive success (Walters & Crawford, 1994). Therefore, a desirable mate is one who is capable of providing a woman and her children with sufficient resources. Indeed, there exists a large body of literature that documents women's preference for men with resources, including Buss' (1989) widely cited cross-cultural study, which revealed that women self-reported men's financial status as more important than did men (for a review, see Hunter et al., 2019).

STUDY 1: LIBRARY CONTEXT

Our goal in the first study was to test the hypothesis that women would be significantly more receptive to men's advances when the men were reported to have higher financial status, as compared to lower financial status. To test this hypothesis, we first collected approximately 300 discarded ATM receipts that were then sorted and categorized based upon value. For the purposes of this experiment, values of fifty dollars and under, as well as five thousand and above were kept, with the rest being discarded. We then created two telephone numbers through a cellular application called Burner Phone, which enabled the researchers to have two anonymous and newly created numbers linked to their own cellular devices. This application allowed the researchers to receive and record incoming communications. Next, we had a male confederate write a standard message on the reverse of the receipt along with a fictitious name and one of the burner telephone numbers. The names were one of two common ones selected from a website of the most popular male names for 20 year-olds (i.e., Noah or Tyler) and each name was linked to the same telephone number. Thus, one number was always Noah, the man with a low bank account balance, while the other number was always Tyler, who had a high

bank account balance. The researchers recorded any communications they received on the burner application as a measure of the womens' interest in either poor Noah or wealthy Tyler.

Libraries, at four different universities, were selected for the setting of this study, given that people using the study pods will typically leave their belongings unattended for a short time period (e.g., to use the restroom or make a call). This practice of leaving one's belongings unattended was important to the experimental design, as these moments created a window during which the researchers could unobtrusively drop a receipt, message side facing up, on a woman's belongings. Sex was first assumed based upon the items left at the study pod (e.g., feminine-looking binders, backpacks, jackets and scarves that featured floral designs, pink coloration, or were sparkly), but confirmed through observation after the receipt was dropped.

The receipts were dropped by researchers in pairs. One researcher was responsible for leaving the receipt in the study pod, while the other researcher waited to ensure the user of the pod did not reappear immediately. If she reappeared, the researcher had prepared a standard cover-story as a distraction, but there was no instance of the pod user reappearing unexpectedly. There was one instance where the researchers suspected that they had been spotted, but it could not be verified. To minimise the risk of being identified (and generally reduce suspicion) six researchers dropped receipts in alternating pairs. The floors on which receipts were dropped were alternated daily, as well as the times of day and the drop locations within the university libraries. The four universities were all within a one hour driving radius of the researchers' home institution.

A total of 30 receipts were dropped, 15 designated as poor Noah, and 15 as wealthy Tyler, over a three-month period. Initially, the telephone number associated with Tyler received more communications (i.e., n = 8), than did the number associated with Noah (n = 0). After around 10 weeks of running the study, the responses from women changed drastically. We began to receive more responses than notes distributed for both numbers. It seemed women were either replying multiple times using different numbers (e.g., borrowing a friend's telephone perhaps), or multiple people were responding to one receipt. Overnight, these messages went from a casual "Hi! You left a note?" or "Are you cute, too?" to being highly suspicious and probing in nature, questioning the identity of Noah or Tyler, how they knew them, or what they wanted from them. In some cases (n = 3), women made repeated calls for approximately two days, accompanied by text messages saying that they wanted more information about Noah or Tyler. The study was immediately terminated, as we felt we were unexpectedly and unintentionally causing mild distress.

Initially the study appeared to be working well. The only issue we faced during the execution of the study was that it took longer than anticipated to find a study pod containing unattended feminine belongings. At times, the researchers would wander through the library and be unsuccessful in finding a place to deposit a receipt. We also cannot rule out the possibility that word-of-mouth led to a rumour about two men using the study area as a place to pick up women. If such a rumour existed, it may have inspired curiosity not only by the women in the study but also their friends who then started to contact the telephone numbers, in an effort to uncover the identity of these two 'men of mystery.' This possibility is key because it may have served as a confounding factor, such that the communications from genuine recipients who received the receipts were indistinguishable from these extraneous people. Further, there was another factor: an alleged sexual assault had happened at one of the universities around the time of the shift in the study, with a second soon after at another university we had used. These events had the potential to cause university women to be increasingly suspicious of unknown men.

We did not ask men to actually approach women due to a number of factors. Women might not find the same man as attractive, for example, which would likely impact on their receptivity. We also did not want to make women feel that they were in danger in any way. Other researchers have documented women's receptivity to men's advances and reported that it depends on the question asked (Clark & Hatfield, 1989), as well as the potential context (Voracek, Hofhansl, & Fisher, 2005), but not due to age or romantic relationship status (Voracek, Fisher, Hofhansl, Rekkas, & Ritthammer, 2006).

The importance of this study is that it highlights how situational factors influence design consideration. We could not control the fact that the women's behaviour changed during the course of the study, such that they became increasingly suspicious or concerned. We had no ability to limit contact to being only the intended receiver of the ATM receipt, and we could not predict that local universities would tell women within their institution to be on heightened alert regarding sexual offenders. In light of these concerns, we decided to re-design the study a few months later. We moved the study outside of a university setting and into an environment where women were thought to have more receptive attitudes towards dating behaviour: a local bar.

STUDY 2: BAR CONTEXT

Study 2 entailed the same hypothesis as Study 1. We used ATM receipts from the same collection process and manipulated the receipts in the same way (i.e., Noah with a low bank account balance and Tyler with a high bank account balance). The same message was used, written by the same male confederate.

In this version of the study, four different bars were chosen as the locations for the study. These bars were selected primarily based on location, as they were close to the researchers' home institution and featured a young adult clientele. Rather than using the inconspicuously dropped receipt method, we instead had a female researcher approach a woman who was observed to be alone in the bar. The researcher told the woman that "my cousin wanted you to have this" while handing the receipt over. The researcher would then leave the bar immediately to limit any further interaction. The phrase specifically contained the word cousin as it linked the researcher to the receipt via a familial relationship and would not arouse suspicion of a possible romantic connection.

The same researcher interacted with each woman, while five other covert female researchers observed their responses. We sought to document reactions to the interaction, such as whether the woman pocketed the receipt, discarded it, and so on. The interactions occurred between the hours of 21:00 and 23:00 in an effort to control for excessive alcohol consumption but in a busy environment to provide a reasonable chance that the women would not have noticed the observers in attendance.

Only three interactions were completed before the study was terminated. During that time, we received one response. Women tried to interact with the researcher after she handed over the receipt and attempted to gather more information regarding the whereabouts of the fictional 'cousin.' It was decided that although the bar setting could possibly provide higher receptivity from women with respect to men making advances, as compared to the university library setting, the exchanging of the receipt was not as natural or unobtrusive as planned. Further, the potential confound of alcohol use, as well as the presence of others in close proximity, created strong limitations for the study design.

The strength of Study 2 is that we moved the experiment to an appropriate location for dating behaviour. However, it was not possible to execute the investigation in a naturalistic

manner. Therefore, in light of the two failed study designs, we decided to redesign the study one final time (i.e., Study 3). We opted for an online study using simulated dating profiles that ultimately lead to greatly increased control over the confounds we had documented. Those results were then published, showing that women's perceptions of men were not as clear cut as the prior literature had suggested (Hunter et al., 2019). Men with money were considered by some women in a highly negative manner, possibly because they were perceived to be bragging. While we eventually achieved some success in our research, after multiple studies, we learned that this area of research was far more complex and difficult than we had anticipated.

DISCUSSION

Our experiences as outlined in Study 1 (the library) and Study 2 (the bar) confirm the perspective of Richer (2017); we spent seven months to obtain a very small sample of responses. We ended up travelling quite extensively from our home institution; up to two hours one way to perform drops at another university where we would be unlikely to be recognized. We carefully collected ATM receipts from garbage cans outside of many different financial institutes, selected names that were highly common, and even had a male confederate write the messages. However, despite careful design and considerable effort, we were unable to obtain any significant results.

We were reluctant to use a survey approach. Oberzaucher (2017) argues that relying on self-report data is problematic because not only is there the potential bias of the scientist asking the questions, but also the behavior being studied may have been determined by the participants. She outlines that participants may respond in socially desirable ways, report on intention rather than actual actions, be unaware of motivations behind actions due to ignorance, or simply be intentionally dishonest. Observation clearly removes these forms of error but may introduce other sources of bias such as the introduction of the observer's expectations (Richer, 2017), or mistakenly omitting some key behaviors from observation while focusing on less relevant ones (Oberzaucher, 2017). Although we admittedly were not performing a truly observational study, the potential advantages of using a design reliant on actual behavior was considered stronger and more accurate, as compared to hypothetical self-reports on receptivity.

There are alternative designs we could likely have employed that would have been ethological. For example, we could have left receipts in a women's washroom with a name and number on the reverse, and then waited to see which number was called. We thought about this option but decided not to proceed because of the questions that would be raised by finding a note written by a man in the women's washroom.

Our studies were unsuccessful for several reasons. We could not have anticipated that sexual assaults would potentially occur at the time of the study. While we expected to perform our research in a 'normal' environment, it is a reality that the unexpected happens far more often than researchers plan.

Secondly, both studies attempted to use a form of deception as there was no actual Tyler or Noah. In doing so we may have aroused the suspicions of the women. In removing one confound, the potential that the participants would not find a male researcher attractive, we introduced an alternative one. Although we attempted to explore mate-selection behaviour naturalistically, the use of deception may have caused participants to act in ways that they would not if they were in the presence of a potential dating partner.

Third, as noted, our hypotheses are very difficult to test. It may be of value to perform a controlled survey-style experiment (e.g., Study 3) to assess the overall hypotheses before attempting more naturalistic experiments (e.g., Studies 1 and 2). It is common in many disciplines for experts to be biased in their decision making (Dror, Kukucka, Kassin, & Zapf, 2018) and unfortunately, though we are experienced researchers, we were biased in our beliefs that we had designed an experiment that accounted for all confounding factors. Performing a laboratory-based exploration of the hypotheses may help avoid these biases.

What we have learned is that participants react realistically in a naturalistic environment, but that their reactions are not easily controlled. We expected participants to mediate their behaviour based on the monetary value listed on the ATM receipt. While they may have done so in part, they may also have reacted with curiosity, wanting to know more, suspicion due to the unknown nature of the male, and perhaps fear, in response to the unexpected potential sexual assaults. It is difficult to anticipate every possible response and design a situation such that the most probably responses are those of interest to researchers.

If we were to attempt another experiment in a naturalistic setting, we would include dependent variables that reflect a broader range of responses. For example, in the bar setting, we had the researcher leave immediately after passing the note and not permit women to directly respond to the researcher. We also limited participants to responding via telephone and did consider alternative actions, such as seeking information about Noah and Tyler before responding.

While pilot testing of the experiments may have helped us discover some of the unexpected issues we encountered, it is difficult to pilot test an observational study. Students at local universities interact, creating the possibility that a pilot test at one university will become known at another university and thus produce invalid results when the study is performed to collect analysable data. We could have possibly pilot-tested at a university much further away, but the cost and time associated would have exceeded the resources we had available.

We realize that it is highly unconventional to publish articles based on failure. However, we believe there is value in sharing our experiences with other researchers. First, it reflects the scientific process, in that a research design can at times need revision and that initial failure does not always doom a project to the proverbial scrap heap. It also demonstrates the some of the potential challenges in conducting real world research, both for the variables that can be thought of, as well as the unanticipated confounds that can arise from participants themselves, or the society in which they live. This paper, if anything, demonstrates the application of creativity in attempting to tackle real-world research from an observational and ethological standpoint and attempts at research design problem-solving, and how prior failures in one's design can help to better inform future designs.

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200^{O}C'DE ISIL İŞLEM GÖRMÜŞ KIRMIZI KARAAĞAÇ (ULMUS RUBRA MUHL) ODUNUNDA BAZI YÜZEY ÖZELLİKLERİNİN VE SHORE D SERTLİK DEĞERİNİN ARAŞTIRILMASI

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Özet

Isıl işlem uygulaması çevre dostu bir uygulama olmaktadır. Günümüzde bir çok ısıl işlem metodları geliştirilmiştir. Ahşap malzemeye ait olan renk, parlaklık, yüzey pürüzlülüğü ve sertlik özellikleri ısıl işlem uygulaması ile değişmektedir. Kırmızı karaağaç (Ulmus rubra Muhl) odunu bağlar, çit direkleri ve tarım aletleri için kullanılmaktadır. Literatürde birçok ağaç türüne ısıl işlem uygulanmış olsa da bu ağaç türüne ait ısıl işlem uygulamasının yapılmadığı görülmektedir. Bu çalışmada, 200^{o}C'de 3 saat süre ile ısıl işlem görmüş kırmızı karaağaç (Ulmus rubra Muhl) odununda bazı yüzey özellikleri ve shore D sertlik değeri araştırılmıştır. Bu amaç ile ısıl işlem görmüş ve görmemiş kırmızı karaağaç odununa ait malzemeler üzerinde renk parametreleri (L*, b* ve a*), 20^{o}, 60^{o} ve 85^{o}'de liflere paralel (//) parlaklık, yüzey pürüzlülüğü parametreleri (R_a, R_z ve R_q) ve shore D sertlik özellikleri belirlenmiştir. Araştırma sonuçlarına göre, toplam renk farkı değeri (ΔE*) 25.93 olarak bulunurken, uygulanmış olan ısıl işlem ile çalışmada yapılan bütün testlere (ışıklılık: L*, kırmızı renk tonu: a*, sarı renk tonu: b*, R_a, R_z ve R_q parametreleri, shore D sertlik ve parlaklık) ait sonuçların azaldığı belirlenmiştir. Çalışmada uygulanmış olan 200^{o}C'de 3 saat süredeki ısıl işlem ile ahşabın sahip olduğu özelliklerinin değiştiği sonucuna ulaşılmıştır.

Anahtar kelimeler: Kırmızı karaağaç, ısıl işlem, renk, parlaklık, shore D sertlik, yüzey pürüzlülüğü

INVESTIGATION OF SOME SURFACE PROPERTIES AND SHORE D HARDNESS VALUE IN RED ELM (ULMUS RUBRA) HEAT-TREATED AT 200^{O}C

Abstract

Heat treatment application is an environmentally friendly application. Today, many heat treatment methods have been developed. Color, glossiness, surface roughness and hardness properties of wood material change with heat treatment application. Red elm (Ulmus rubra Muhl) wood is used for ties, fence posts, and agricultural implements. Although heat treatment has been applied to many tree species in the literature, it is seen that heat treatment has not been applied to this tree species. In this study, some surface properties and shore D hardness values were investigated in red elm (Ulmus rubra Muhl) wood that was heat treated at 200^{o}C for 3 h. For this purpose, color parameters (L*, b*, and a*), glossiness parallel (//) to

fibers at 20°, 60°, and 85°, surface roughness parameters (R_a, R_z, and R_q) and shore D hardness properties were determined on the materials of heat treated and untreated red elm wood. According to the results of the research, the total color difference value (ΔE*) was found to be 25.93, and it was determined that the results of all tests (lightness: L*, red color tone: a*, yellow color tone: b*, R_a, R_z, and R_q parameters, shore D hardness and glossiness) performed in the study decreased with the applied heat treatment. It was concluded that the properties of the wood changed with the heat treatment applied in the study at 200°C for 3 hours.

Keywords: Red elm, heat treatment, color, gloss, shore D hardness, surface roughness

1. Giriş

Ulmus rubra Muhl (syn. U. fulva Michx.; kırmızı karaağaç; 2n = 28), Kuzey Dakota'dan doğudan güney Quebec'e ve güneyden kuzey Florida'ya ve doğu Teksas'a kadar doğu Kuzey Amerika'ya özgü diploid bir karaağaç türüdür (Cooley ve Sambeek 1990). Bu ağaç yaprak döken bir türüdür (Braun 1950, Gleason ve Cronquist 1991). Ağaç, 1905 yılında Arnold Arboretum'dan J.G. Jack tarafından Kuzey Amerika'ya tanıtılan bir Kuzey Asya türüdür (Wyman 1951). Amerika Birleşik Devletleri Tarım Bakanlığı'ndan (USDA) Frank N. Meyer daha sonra 1908'de onu bir koruyucu kemer ağacı olarak tanıtmıştır (Wyman 1951, Engstrom ve Mathew 1942). Kurak koşullara adapte olduğundan ve şiddetli kışlara dayanabildiğinden, Great Plains'deki tarımsal araştırma istasyonları tarafından alanın her tarafına ekilmesi önerilmiştir (Dickens ve ark., 1928).

Karaağaç, Mollisols ve Alfisols takımlarında ortak olan topraklarda yetişmektedir. Nemli, zengin, alçak yamaçlarda, nehir kenarlarında, nehir teraslarında ve dip arazilerde en iyi şekilde yetişir, ancak genellikle çok daha kuru alanlarda, özellikle kireçtaşı kökenli olanlarda bulunur (Scholz 1958). Bu ağaç, Amerikan karaağacı ile aynı hastalıkların çoğuna sahiptir (Hepting 1971).

Çiçekli ve meyveli olan bu ağaç, hava ve konuma bağlı olarak, Şubat'tan Mayıs'a kadar, ilkbaharda yapraklardan önce görünen, göze çarpmayan, mükemmel çiçeklere sahiptir. Tohumlar nisandan hazirana kadar olgunlaşır ve olgunlaşır olgunlaşmaz rüzgârla dağılır. Büyük mahsuller, 15 yaşından itibaren her 2 ila 4 yılda bir taşınmaktadır (Brinkman 1974). Rüzgâr ve su, bu ağacın meyvesinin yayılmasında başlıca etkenlerdir. Sıkıştırılmış nutlet, tohumun dağılmasını kolaylaştıran sürekli bir zarlı kanatla çevrilidir. Çoğu, ana ağacın 1 veya 2 ağaç yüksekliğine düşerken, bu yarıçap, kuvvetli rüzgârlar veya havanın yukarı üflenmesiyle genişletilebilir. Hem rüzgâr hem de su, karaağaç tohumunu, fidanlık kullanımı için kolayca toplandığı eğimli kayaların tabanında vb. çöküntülerde konsantre eder (Toumey ve Korstian 1948).

Mineral toprak, kaygan karaağaç fidelerinin hızlı çimlenmesi ve ilk oluşumu için en iyi ortamdır, ancak ağaç aynı şekilde, toprağın orman çöpü veya çimen ve diğer otsu bitkilerle kaplı olduğu birçok yerde bulunur (Collingwood ve Brush 1947). Bu ağaç, Wisconsin'deki şiddetli buz fırtınalarının ardından taç kırılmasından da muzdariptir (Bruederle ve Stearns 1985). Bu ağacın tohumları, yerli karaağaçların çoğundan daha büyüktür. 77.200 ila 119.000/kg arasında değişir ve ortalama 90.400/kg civarındadır. Tohumların dağılması işlemi yerçekimi ve rüzgâr ile olmaktadır (Brinkman 1974). Bu ağaç tarihte gıda ve lif olarak kullanılmıştır. Kiowa kabilesi, iç kabuğu saklar ve kışın çay demlemek için kullanıldığı bildirilmiştir. Tatlandırıcı olarak da kullanılabilir. Potawatomi kabilesi törensel yakacak

odunu, ağaç kabuğunu kutular, sepetler, halatlar ve kordonlar yapmak için kullandıkları bildirilmiştir (Moerman 1998).

Bu ağaç geleneksel tıpta birçok kullanıma sahip olmuştur. Potawatomi kabilesi, haşlanmış iç kabuğunu iltihaplanma için dermatolojik bir yardımcı olarak ve Yerli Amerikalılar ise yine kabuğunu kramplar ve ishal için kullanmışlardır (Erichsen-Brown 1989). İç kabuğu göz ilacı ve boğaz ağrılarına yardım için kullanılmıştır (Moerman 1998). Açık renkli diri odunlu koyu kahverengi, yakın taneli, kaba, güçlü, ağır, sert, orta derecede dayanıklı, çit direkleri, bağlar ve tarım aletleri için kullanılmaktadır (Wilson 1928). Kırmızı karaağaç ahşabında; hacimsel daralma %13.80, radyal yönde daralma %4.90, teğet yönde daralma %8.90, sertlik 508 kg ve 390 kg (Llach Cordero 1971), eğilme direnci 102.393 MPa, elastikiyet modülü 13464.00 MPa (Chen ve Guo 2016) olarak bulunmuştur.

Ahşap malzeme, yüksek mukavemet-ağırlık oranına sahip yenilenebilir bir lignoselülozik yapı malzemesidir. Diğer yapı malzemeleriyle karşılaştırıldığında, ahşabın işlenmesi nispeten kolaydır ve işleme için enerji gereksinimleri düşüktür (Li ve ark., 2017).

Çevre dostu bir modifikasyon yöntemi olarak ısıl işlem, ahşap endüstrisinde yaygın olarak kullanılmaktadır (Fu ve ark., 2020). Ahşaba ısı uygulanması, dehidrasyon, termal oksidasyon, depolimerizasyon ve ahşap bileşenlerinin bozulması ile sonuçlanır (Kučerová ve ark., 2016). Isıl işlem ile ahşap malzemenin sahip olduğu kimyasal (Inari ve ark., 2006, Chen ve ark., 2012, Domingos ve ark., 2021a,b), fiziksel (Hidayat ve ark., 2015, Romagnoli ve ark., 2015), mekanik (Santos 2000, Wang ve ark., 2014, Liu ve ark., 2019), biyolojik (Mohareb ve ark., 2012, Li ve ark., 2017, Ayata ve ark., 2017), renk (Yixing ve ark., 1994, Yang ve ark., 2015, Kučerová ve ark., 2016, Fu ve ark., 2020, Esteves ve ark., 2020), parlaklık (Ayata ve ark., 2018a, Ayata ve Çavuş 2018) ve yüzey pürüzlülüğü (Ayata ve ark., 2018b, Karlinasari ve ark., 2018) gibi önemli özelliklerinin değiştiği bildirilmiştir.

Bu çalışmada, 200^{o}C'de 3 saat süre ile ısıl işlem uygulanmış kırmızı karaağaç (Ulmus rubra Muhl) odununda renk, parlaklık, yüzey pürüzlülüğü ve shore D sertlik değeri araştırılmıştır. Elde edilen bu sonuçların bu ağaç türüne ait bilgi dünyası için önemli bilgiler sunacağı düşülmektedir.

2. Materyal ve Metot

2.1. Materyal

Bu çalışmada, ağaç türü olarak kırmızı karaağaç (Ulmus rubra Muhl) odunu seçilmiştir. Alınan malzemelerin ardaksız, budaksız, böcek ve mantar tahribatına sahip olmayan örneklerden olmasına özen gösterilmiştir. Deney örneklerine ait test grupları için 100 × 10 × 2 cm boyutlarında alınmış ve ISO 554, (1976) standardına göre iklimlendirme işlemleri uygulanmıştır.

2.2. Metot

2.2.1. Isıl İşlem Uygulaması

Deney örnekleri üzerinde ısıl işlem uygulaması 200^{o}C'de 3 saat süre olacak şekilde yapılmıştır.

2.2.2. Testler

Isıl işlem görmüş ve görmemiş deney örnekleri üzerinde renk parametreleri (L*, b* ve a*) ASTM D2244-3 (2007) standardına göre, CS-10 colorimeter (CHN Spec, Çin) marka [Ölçüm koşulları: CIE 10° standart gözlemci; CIE D65 ışık kaynağı, aydınlatma sistemi: 8/d (8°/dağınık aydınlatma)] renk cihazında ($\Delta E^* = [(\Delta L^* = L^*_{\text{ısıl işlemli}} - L^*_{\text{kontrol}})^2 + \Delta a^* = a^*_{\text{ısıl işlemli}} - a^*_{\text{kontrol}})^2 + (\Delta b^* = b^*_{\text{ısıl işlemli}} - b^*_{\text{kontrol}})^2]^{1/2}$), 20^{o}, 60^{o} ve 85^{o}'de liflere paralel (//) parlaklık değerleri ISO 2813 (1994) standardına göre, ETB-0833 model (Vetus Electronic

Technology Co., Ltd., CN) gloss meter cihazında, yüzey pürüzlülüğü parametreleri (R_a, R_z ve R_q) (80 ve 100 numaralı zımparalar ile zımparalanmış yüzeyler üzerinde) JD 520 model (Beijing Jitai Tech Detection Device Co., Ltd., Çin) (ISO 16610-21, 2011) pürüzlülük test cihazında (liflere dik yönde, örnek uzunluğu 2.5 mm ve örnek uzunluk sayısı (cut - off) 5 olacak şekilde) ve shore D sertlik özellikleri (Stand: model Ld-J Loyka, China ve Durometer: Shenzhen Yibai Network Technology Co., Ltd., Guangdong, Çin) 5 kg'lık yük uygulamalı olacak şekilde ASTM D 2240 (2010)'a göre belirlenmiştir. Buna ek olarak, Tablo 1'de verilmiş olan Barański ve ark., (2017) ait olan renk değiştirme kriteri de belirlenmiştir.

Tablo 1. Renk değiştirme kriterleri (Barański ve ark., 2017)

ΔE* Değeri	**Gözlem Sonucu**
ΔE* < 0.2	Görünmez renk değişimi
2 > ΔE* > 0.2	Hafif renk değişimi
3 > ΔE* > 2	Yüksek filtrede görünür renk değişimi
6 > ΔE* > 3	Filtrenin ortalama kalitesiyle görülebilen bir renk değişimi
12 > ΔE* > 6	Yüksek renk değişimi
ΔE* > 12	Farklı renk

2.3. İstatistiksel analiz

Bu çalışmada, bir SPSS programı kullanılarak testlere ait minimum ve maksimum değerleri, standart sapmaları, homojenlik grupları, ortalamaları ve varyans analizleri belirlenmiştir.

3. Bulgular ve Tartışma

Renk parametrelerine ait belirlenmiş olan varyans analizi Tablo 2'de gösterilmektedir. Elde dilen bu sonuca göre, işlem türünün bütün renk parametreleri (L*, b* ve a*) için anlamlı olarak bulunduğu görülmektedir.

Tablo 2. Renk parametrelerine (L*, b* ve a*) ait belirlenmiş olan varyans analizi sonuçları

Test	**Varyans Kaynağı**	Serbestlik Derecesi	Kareler Toplamı	**Ortalama Kare**	**F Değeri**	**α≤0.05**
L*	**İşlem Türü**	1	2544.317	2544.317	8740.053	0.000*
	Hata	18	5.240	0.291		
	Toplam	20	48303.735			
a*	**İşlem Türü**	1	29.427	29.427	475.428	0.000*
	Hata	18	1.114	0.062		
	Toplam	20	1809.794			
b*	**İşlem Türü**	1	787.638	787.638	26217.216	0.000*
	Hata	18	0.541	0.030		
	Toplam	20	8971.214			
***: Anlamlı**						

Renk parametrelerine (L*, b* ve a*) ait belirlenmiş olan SPSS sonuçları Tablo 3'de gösterilmektedir. Belirlenmiş olan bu sonuçlara göre, L*, a* ve b* parametreleri için yapılan ölçümlerde ısıl işlemden sonra sırasıyla %38.17, %22.82 ve %47.36 oranlarında azaldıkları belirlenmiştir. Literatürde bazı araştırmacılar (Türk 2021, Ayata ve ark., 2018a; Gürleyen ve ark., 2017; Ayata ve ark., 2017) tarafından ahşap malzemeye uygulanan ısıl işlemden sonra L*, b* ve a* parametrelerinin değiştiği bildirilmiştir.

Tablo 3. Renk parametrelerine (L*, b* ve a*) ait belirlenmiş olan SPSS sonuçları

Test	İşlem		Ortalama	SS	HG	Değişim (%)	Minimum	Maksimum	COV
L*	Isıl işlemsiz	0	59.11	0.68	A*	↓38.17	57.95	60.12	1.15
	Isıl işlemli	0	36.55	0.34	B**		36.09	37.30	0.93
a*	Isıl işlemsiz	0	10.65	0.26	A*	↓22.82	10.14	10.94	2.44
	Isıl işlemli	0	8.22	0.24	B**		7.79	8.60	2.92
b*	Isıl işlemsiz	0	26.50	0.21	A*	↓47.36	26.04	26.73	0.79
	Isıl işlemli	0	13.95	0.12	B**		13.74	14.19	0.86

N: Ölçüm Sayısı, SS: Standart Sapma, HG: Homojenlik Grubu, COV: Varyasyon Katsayısı,
***: En yüksek değeri ifade etmektedir, **: En düşük değeri ifade etmektedir.**

Toplam renk farklılıklarına (ΔL*, Δa*, Δb* ve ΔE*) ait sonuçları Tablo 4'de gösterilmektedir. Bu sonuca göre toplam renk farkı (ΔE*) değeri 25.93 olarak bulunmuştur. Isıl işlem uygulamasından sonra ahşap malzemelere ait rengin değiştiği diğer çalışmalarda da bildirilmiştir (Ayata ve ark., 2017; 2018a; Ayata ve Çavuş 2018; Ayata 2020; Türk 2021). Ayrıca Barański ve ark., (2017)'e göre renk değiştirme kriteri "farklı renk (ΔE*>12)" olarak elde edilmiştir.

Tablo 4. Toplam renk farklılıklarına ait sonuçlar

200°C'de 3 saat süre ile ısıl işlem	ΔL*	Δa*	Δb*	ΔE*	Renk değiştirme kriteri (Barański ve ark., 2017)	
	-22.56	-2.43	-12.55	25.93	ΔE* > 12	Farklı renk

20°, 60° ve 85°'de liflere paralel (//) parlaklık değerlerine ait belirlenmiş olan varyans analizi Tablo 5'de gösterilmektedir. Elde edilen bu sonuca göre, işlem türünün bütün parlaklık derecelerinde anlamlı olarak elde edildiği görülmektedir.

Tablo 5. Parlaklık değerlerine ait belirlenmiş olan varyans analizi sonuçları

Test	Varyans Kaynağı	Serbestlik Derecesi	Kareler Toplamı	Ortalama Kare	F Değeri	α≤0.05
//20°	İşlem Türü	1	1.352	1.352	529.043	0.000*
	Hata	18	0.046	0.003		
	Toplam	20	8.840			
//60°	İşlem Türü	1	18.432	18.432	771.572	0.000*
	Hata	18	0.430	0.024		
	Toplam	20	246.000			
//85°	İşlem Türü	1	82.825	82.825	47.660	0.000*
	Hata	18	31.281	1.738		
	Toplam	20	2505.590			
*: Anlamlı						

20^o, 60^o ve 85^o'de liflere paralel (//) parlaklık değerlerine ait belirlenmiş olan SPSS sonuçları Tablo 6'da verilmiştir. Elde edilen bu sonuçlara göre, 20^o, 60^o ve 85^o'de liflere paralel (//) parlaklık değerlerine ait bütün dereceler için yapılan ölçümlerde ısıl işlemden sonra sırasıyla %59.77, %44.34 ve % 31.38 oranlarında azaldıkları belirlenmiştir. Isıl işlemden sonra parlaklık değerlerinin değiştiği literatürde bazı araştırmacılar (Ayata 2020; Ayata ve Çavuş 2018) tarafından bildirilmiştir.

Tablo 6. Parlaklık değerlerine ait belirlenmiş olan SPSS sonuçları

Test	İşlem	N	Ortalama	SS	HG	Değişim (%)	Minimum	Maksimum	COV
//20°	Isıl işlemsiz	0	0.87	.05	A*	↓59.77	0.80	0.90	5.75
	Isıl işlemli	0	0.35	.05	B**		0.30	0.40	14.29
//60°	Isıl işlemsiz	0	4.33	.20	A*	↓44.34	3.90	4.60	4.62
	Isıl işlemli	0	2.41	.09	B**		2.30	2.60	3.73
//85°	Isıl işlemsiz	0	12.97	.72	A*	↓31.38	10.70	15.50	13.26
	Isıl işlemli	0	8.90	.71	B**		7.50	9.80	7.98
N: Ölçüm Sayısı, SS: Standart Sapma, HG: Homojenlik Grubu, COV: Varyasyon Katsayısı, *: En yüksek değeri ifade etmektedir, **: En düşük değeri ifade etmektedir.									

Shore D sertlik değerlerine ait belirlenmiş olan varyans analizi sonucu Tablo 7'de gösterilmektedir. Elde dilen bu sonuca göre, işlem türünün anlamlı olarak elde edildiği görülmektedir.

Tablo 7. Shore D sertlik değerine ait belirlenmiş olan varyans analizi sonuçları

Test	Varyans Kaynağı	Serbestlik Derecesi	Kareler Toplamı	Ortalama Kare	F Değeri	α ≤0.05
Shore D	İşlem Türü	1	540.800	540.800	268.906	0.000*
	Hata	18	36.200	2.011		
	Toplam	20	55702.000			
*: Anlamlı						

Shore D sertlik değerlerine ait belirlenmiş olan SPSS sonuçları Tablo 8'de verilmiştir. Elde edilen bu sonuca göre ısıl işlemsizde sertlik değeri 57.70 olarak elde edilirken, ısıl işlem görmüşte 47.30 olarak bulunmuştur. Isıl işlem sonrası %18.02 oranında bir azalma ısıl işlem ile meydana gelmiştir. Isıl işlemden sonra shore D sertlik değerlerinin azaldığı Türk (2021), Esteves ve ark., (2021) ve Ayata (2021) tarafından yapılan çalışmalarda da bildirilmiştir.

Tablo 8. Shore D sertlik değerine ait belirlenmiş olan SPSS sonuçları

Test	İşlem	N	Ortalama	SS	HG	Değişim (%)	Minimum	Maksimum	COV
Shore D	Isıl işlemsiz	10	57.70	1.25	A*	↓18.02	55.00	59.00	2.17
	Isıl işlemli	10	47.30	1.57	B**		44.00	49.00	3.31
N: Ölçüm Sayısı, SS: Standart Sapma, HG: Homojenlik Grubu, COV: Varyasyon Katsayısı, *: En yüksek değeri ifade etmektedir, **: En düşük değeri ifade etmektedir.									

Bazı ağaç türlerinde belirlenmiş olan shore D sertlik değerlerinin kıyaslanması Tablo 9'da gösterilmektedir. Şanıvar ve Zorlu (1980) tarafından sertlik değerinin ağaç türünden ağaç türüne farklılıklar gösterdiği şeklinde bildirilmiştir.

Tablo 9. Bazı ağaç türlerinde belirlenmiş olan shore D sertlik değerlerinin kıyaslanması

Ağaç Türü	Shore D	Kaynak
Ceviz (Juglans regia)	27.80	Lionetto ve Frigione, (2009)
Ak kavak (Populus alba L.)	31.50	Akçay, (2020)
Limba/Fraké (Terminalia superba)	35.30	Esteves ve ark., (2021)
Sibirya çamı (Pinus sibirica)	37.20	Ayata, (2021)
Ayous (Triplochiton scleroxylon K. Schum.)	37.65	Ayata (2020)
Sarıçam (Pinus sylvestris L.)	39.20	Akçay, (2020)
Simul (Salmalia malabarica)	40.00	Devi ve Maji, (2012)
Ihlamur (Tilia grandifolia Ehrh.)	40.40	Akçay, (2020)
Sarıçam (Pinus sylvestris L.)	40.42	Karal, (2017)

Meşe (Quercus petraea L.)	42.33	Karal, (2017)
Kavak (Populus spp.) - diri odun	42.35	Li ve ark., (2018)
Kore çamı (Pinus koraiensis Sieb. Et Zucc.)	42.40	Luo ve ark., (2020)
Loblolly (Pinus taeda)	42.60	Mattos ve ark., (2015)
Kavak (Populus alba L.)	42.93	Leone ve ark., (2009)
Kavak (Populus spp.)	43.52	Dong ve ark., (2015)
İncir (Ficus hispida)	45.00	Hazarika ve Maji, (2013)
Amerikan titrek kavağı (Populus tomentosa Carr.)	46.35	Yan ve ark., (2015)
Kauçuk (Hevea brasiliensis)	46.57	Devi ve ark., (2003)
Kayın (Fagus orientalis L.)	47.50	Karal, (2017)
Sapsız meşe (Quercus petraea)	47.71	Leone ve ark., (2009)
Çam (Pinus sp.)	48.40	Dos Santos ve ark., (2016)
Sapelli (Entandrophragma cylindricum)	50.00	Karal, (2017)
Göknar (Abies cephalonica)	51.00	Sahin ve Mantanis, (2011)
Kavak (Populus beijingensis W. Y. Hsu)	51.80	Chu ve ark., (2016)
Acajou d`Afrique (Khaya anthotheca)	52.20	Esteves ve ark., (2021)
Huş (Betula pendula L.)	52.60	Ayata ve Bal, (2020a)
Doğu kayını (Fagus orientalis L.)	52.80	Akçay, (2020)
Koto (Pterygota macrocarpa K. Schum.)	53.20	Türk, (2021)
Ovenkol Guibourlia ehie)	53.21	Leone ve ark., (2009)
Şeftali (Prunus persica (L.) Batsch.)	54.80	Okan ve Ayata, (2020)
Fıstık çamı (Pinus pinea)	56.50	Leone ve ark., (2009)
Afrormosia (Pericopsis elata)	56.80	Esteves ve ark., (2021)
Kırmızı karaağaç (Ulmus rubra Muhl)	**57.70**	**Tespit**
Eyong (Eribroma oblonga)	58.00	Türk, (2021)
İncir (Ficus carica L.,)	58.60	Ayata ve Dilik, (2020)
Teak (Tectona grandis L.)	59.10	Esteves ve ark., (2021)
Duka (Tapiriria guianensis)	60.40	Esteves ve ark., (2021)
Kestane (Castanea sativa Mill.)	61.06	Karamanoğlu ve Kaymakçı, (2018)
Sapelli (Entandrophragma cylindricum)	61.80	Esteves ve ark., (2021)
Jequitiba (Cariniana legalis (Mart.) Kuntze)	62.20	Türk, (2021)
Wenge (Millettia laurenti)	63.90	Esteves ve ark., (2021)
Zebrano (Microberlinia brazzavillensis)	64.20	Esteves ve ark., (2021)
Doussié (Afzelia africana)	64.70	Esteves ve ark., (2021)
Kiraz (Prunus avium)	65.00	Sahin ve Mantanis, (2011)
Merbau (Intsia bijuga)	65.80	Esteves ve ark., (2021)
Mahogany (Suvitenia mahogani)	65.93	Leone ve ark., (2009)
Karaçam (Pinus nigra)	66.00	Sahin ve Mantanis, (2011)
Kestane (Castanea sativa)	66.00	Sahin ve Mantanis, (2011)
Sipo (Entandrophragma utile)	68.40	Esteves ve ark., (2021)
Tali (Erythrophleum suaveolens)	68.50	Esteves ve ark., (2021)
Monkey pod (Pithecellobium saman (Jacq.) Benth.)	71.70	Çamlıbel ve Ayata, (2020)
Ipê (Tabebuia serratifolia (Vahl) Nicholson)	73.80	Ayata ve Çamlıbel, (2021)

Rose (Dalbergia nigra)	76.80	Esteves ve ark., (2021)
Santos (Myroxylon balsamum)	77.20	Esteves ve ark., (2021)
Yalancı akasya (Robinia pseudoacacia L.)	79.35	Ayata ve Bal, (2020b)
Jatoba (Hymenaea cunrbaril L.)	83.70	Luo ve ark., (2020)

Tablo 10'da yüzey pürüzlülüğü parametrelerine (R_a, R_z ve R_q) ait belirlenmiş olan varyans analizi gösterilmektedir. Elde edilen bu sonuca göre, R_a parametresi için işlem türü (A) ve zımpara numarası (B) ve faktörlerin etkileşimi (AB) anlamlı olarak elde edilirken, R_z ve R_q parametreleri için işlem türü (A) ve zımpara numarası (B) anlamlı belirlenmiş olunup, faktörlerin etkileşimi (AB) anlamsız olarak bulunmuştur.

Tablo 10. Yüzey pürüzlülüğü parametrelerine (R_a, R_z ve R_q) ait belirlenmiş olan varyans analizi sonuçları

Test	**Varyans Kaynağı**	Serbestlik Derecesi	Kareler Toplamı	**Ortalama Kare**	**F Değeri**	**α≤0.05**
Ra	**İşlem Türü (A)**	1	13.864	13.864	472.441	0.000*
	Zımpara (B)	1	7.824	7.824	266.629	0.000*
	Etkileşim (AB)	1	0.681	0.681	23.205	0.000*
	Hata	36	1.056	0.029		
	Toplam	40	3042.141			
Rq	**İşlem Türü (A)**	1	20.817	20.817	475.263	0.000*
	Zımpara (B)	1	25.969	25.969	592.902	0.000*
	Etkileşim (AB)	1	0.145	0.145	3.304	0.077**
	Hata	36	1.577	0.044		
	Toplam	40	5052.587			
Rz	**İşlem Türü (A)**	1	109.303	109.303	106.965	0.000*
	Zımpara (B)	1	819.387	819.387	801.863	0.000*
	Etkileşim (AB)	1	2.577	2.577	2.521	0.121**
	Hata	36	36.787	1.022		
	Toplam	40	10555 9.378			
***: Anlamlı, **: Anlamsız**						

Tablo 11'de yüzey pürüzlülüğü parametrelerine (R_a, R_z ve R_q) ait belirlenmiş olan SPSS sonuçları verilmiştir. Bu sonuçlara göre, yüzey pürüzlülüğü parametreleri (R_a, R_z ve R_q) için yapılan ölçümlerde uygulanmış olan ısıl işlem ile azaldıkları belirlenmiştir. Ayrıca zımpara numarasının artması ile de pürüzlülük değerlerinin azaldığı da görülmüştür. Isıl

işlemden sonra yüzey pürüzlülüğü parametrelerinin (R_a, R_z ve R_q) azaldığı literatürde bazı araştırmacılar (Ayata ve ark., 2018b; Ayata 2021; Salca ve Hiziroglu 2014) tarafından bildirilmiştir. Pürüzlülük değerlerinin zımpara numarasının artması ile azaldığı diğer çalışmalarda da görülmüştür (Çamlıbel ve Ayata 2020; Türk ve Ayata 2021; Ayata ve Dilik 2020; Okan ve Ayata 2020). Yüzey pürüzlülüğü parametrelerine ait araştırma sonuçlarının literatür ile uyumluluk gösterdiği belirlenmiştir.

Tablo 11. Yüzey pürüzlülüğü parametrelerine (R_a, R_z ve R_q) ait belirlenmiş olan SPSS sonuçları

Test	İşlem	Zımpara		Ortalama	SS	HG	Değişim (%)	Minimum	Maksimum	COV
R_a	Isıl işlemsiz	80 Numara	0	9.85	.19	A*	↓11.68	9.49	9.98	.93
	Isıl işlemli		0	8.70	.14	B**		8.44	8.89	.61
	Isıl işlemsiz	100 Numara	0	8.41	.06	A*	↓7.37	8.28	8.51	.71
	Isıl işlemli		0	7.79	.24	B**		7.13	7.96	.08
R_q	Isıl işlemsiz	80 Numara	0	12.77	.37	A*	↓13.55	12.17	13.05	.90
	Isıl işlemli		0	11.04	.14	B**		10.82	11.26	.27
	Isıl işlemsiz	100 Numara	0	11.21	.10	A*	↓13.29	11.07	11.39	.89
	Isıl işlemli		0	9.72	.08	B**		9.58	9.84	.82
R_z	Isıl işlemsiz	80 Numara	0	57.57	.92	A*	↓16.61	55.14	58.43	.60
	Isıl işlemli		0	48.01	.44	B**		46.04	49.50	.00
	Isıl işlemsiz	100 Numara	0	53.75	.91	A*	↓15.89	52.46	54.82	.69
	Isıl işlemli		0	45.21	.57	B**		44.17	46.05	.26

N: Ölçüm Sayısı, SS: Standart Sapma, HG: Homojenlik Grubu, COV: Varyasyon Katsayısı,
***: En yüksek değeri ifade etmektedir, **: En düşük değeri ifade etmektedir.**

4. Sonuç ve Öneriler

Bu araştırmada, toplam renk farkı değeri (ΔE*) 25.93 olarak belirlenmiş olunup, ısıl işlem uygulaması ile ışıklılık (L*) değerinin, kırmızı renk (a*) tonu değerinin, sarı renk (b*) tonu değerinin, yüzey pürüzlülüğü parametrelerinin (R_a, R_z ve R_q), shore D sertlik değerinin ve 20°, 60° ve 85°'de liflere paralel (//) parlaklık değerlerinin azaldığı sonucuna ulaşılmıştır.

Bu ağaç türüne ait ısıl işlem görmüş ve görmemiş malzemeler üzerine çeşitli vernik türlerinin uygulanması ve üst yüzey testlerinin yapması önerilmektedir.

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BAZI SU ÖRNEKLERİNDE BULUNAN KLORÜR MİKTARLARININ TAYİNİ

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ÖZET

Klorür iyonu üniversal bir safsızlıktır. Bazı bileşiklerin su içerisinde çözünmesiyle klorür miktarı artmaktadır. Suyun temizlenmesi ve dezenfektasyon işleminde de kullanılmaktadır. Su çeşidine göre klorür miktarı da farklılık göstermektedir. Deniz suyundaki miktarı fazla iken, kaynak sularında miktarı düşüktür. Bu çalışmada klorür iyonuna duyarlı membran bir iyon seçici elektrot geliştirildi. Klorür derişimindeki 10 kat artışa karşı duyarlılığının, Nernst eşitliğine uygun olduğu tespit edildi. İyon seçici elektrodun duyarlılığına etki eden faktörler incelendi ve seçiciliğinin ve duyarlılığının yüksek olduğu şartlar belirlendi. Önce sentetik klorür örnekleri hazırlandı. Klorür elektrot ile bu örneklerdeki klorür tayinleri yapıldı. Ardından deniz suyu, atık su, çeşme suyu ve 3 farklı kaynak sularındaki klorür miktarları ölçüldü.

Anahtar Kelimeler: Klorür, Klorür seçici elektrot, Membran, Bazı sular.

DETERMINATION OF CHLORIDE AMOUNTS IN SOME WATER SAMPLES

ABSTRACT

The chloride ion is a universal impurity. The amount of chloride increases with the dissolution of some compounds in water. It is also used in water cleaning and disinfection. The amount of chloride also differs according to the type of water. While its amount is high in sea water, its amount is low in spring waters. In this study, a chloride ion sensitive membrane ion selective electrode was developed. It was found that its sensitivity to a 10-fold increase in chloride concentration was in accordance with the Nernst equation. The factors affecting the sensitivity of the ion selective electrode were examined and the conditions with high selectivity and sensitivity were determined. First, synthetic chloride samples were prepared. Chloride determinations in these samples were made with a chloride electrode. Then, the chloride amounts in sea water, wastewater, tap water and 3 different spring waters were measured.

Keywords: Chloride, Chloride selective electrode, Membrane, Some water.

GİRİŞ

Literatürde klorür tayini için kullanılan birkaç sıvı ve polimer membran bazlı iyon seçici elektrot (ISE) bulunmaktadır [1-6]. Bu elektrotlardaki aktif bileşenler, kuaterner amonyum tuzlarıydı. Salisilat gibi lipofilik anyonlara bu tür sensörlerin doğuştan gelen Hofmeister tipi tepkisi, yutulmuş Aspirinli hastalardan alınan kan örneklerinde klorür tayini için önemli pozitif hatalara yol açabilir [7]. Ek olarak, bromür ve eklenen heparinin pozitif etkileşimleri de gözlemlenebilir [8]. Araştırmacılar, gümüş teli sodyum hipoklorit çözeltisine daldırarak klorür seçici elektrotların (Ag/AgCl elektrotları) hızlı hazırlanması için bir yöntem geliştirdiler [9]. Farklı daldırma süreleriyle hazırlandılar. Nernst tepkisi, tepki süresi ve uzun süreli kararlılık gibi bazı özellikleri, simüle edilmiş beton gözenek çözeltilerinde (SCPS) test edilmiştir [10-11].

Prensipte klorür tayini, klinik teşhis [12-13] çevresel izleme [14-15] ve çeşitli endüstriyel uygulamalar [16-17] gibi birçok farklı alanda önemlidir. Genel olarak, Na^+, K^+ iyonlarıyla ilişkili klorür iyonları; Mg^{2+} deniz suyunda ve yerkabuğunun tortullarında büyük miktarlarda bulunur. Ayrıca NaCl, KCl ve CaCl2 gibi tuzlar halinde doğaya yaygın olarak dağılırlar [18]. Kaynak suyu örneklerinde klorür tayininin zorunlu olması nedeniyle yeni bir klorür seçici elektrot geliştirdik [19].

Bu çalışmanın amacı, bazı su örneklerinde klorür iyonunu miktarını ölçmek için aktif malzeme olarak iyon değiştirici kullanarak klorür için seçici bir elektrot hazırlamaktı. Bunun için sırasıyla iyon değiştirici aktif madde, inert matris ve plastikleştirici olarak kullanılan farklı bileşimlerde tridodesilmetilamonyumklorür (TDMACl), PVC ve dibütilftalat (DBF) kullanılarak katı membran elektrotlar hazırlanmıştır. Ayrıca optimum çalışma koşulları da detaylı olarak araştırılmış ve girişim çalışmaları yapılmıştır. Daha sonra hazırlanan bu elektrot ile bazı su örneklerindeki klorür iyonu belirlendi.

DENEYSEL ÇALIŞMALAR

Kimyasallar ve Cihazlar

Potansiyel, JENWAY 3030 İyon metre ile ölçüldü. Dış referans elektrotu olarak çift bağlantılı Ag/AgCl elektrotu 924036 kullanılırken, iç referans elektrotu olarak ev yapımı Ag/AgCl elektrotu hazırlandı; 0.1 M NaCl ve 0.1 M KI solüsyonuna daldırıldı. pH ölçümleri için pH elektrodu ile birleştirilmiş 924003 iyon analizörü kullanılmıştır. Tüm ölçümler bu amaçla hazırlanmış 30 mL'lik cam hücre ile yapıldı. Deneyler boyunca manyetik karıştırıcı kullanılmıştır.

Tüm reaktifler en azından analitik reaktif derecesindeydi (Merck). Tüm çözeltilerin hazırlanmasında üçlü saf su kullanıldı.

Elektrodun Hazırlanması

3 mL tetrahidrofuran (THF) içinde çözülmüş 100-250 mg PVC, 1 mL THF içinde çözülmüş 90 mg iyon değiştirici ve 0.2 mL DBF, 30 mL'lik 4.2 cm çapında bir beher içinde karıştırıldıktan sonra karışım manyetik karıştırıcı Çözücü daha sonra ortam atmosferinde yaklaşık 24 saat buharlaşmaya bırakıldı. Beherin tabanında film şeklinde oluşan zar, Teflon pens kullanılarak dikkatlice çıkarıldı. Daha sonra, film membran, THF içinde çözülmüş bir PVC yapıştırıcısı ile bir PVC borunun (1 cm çapında) düz ucuna yapıştırıldı. Bir gün sonra fazla membran kesildi ve tüp sırasıyla 0.1 M NaCl ve 0.1 M KI solüsyonu ile dolduruldu. Daha sonra iç referans elektrotu olarak ev yapımı bir Ag/AgCl elektrotu daldırıldı. Elektrotun şartlandırılması için yaklaşık 2 gün 10^{-4} M NaCl solüsyonunda kalmalıdır [19].

SONUÇLAR ve TARTIŞMA

Elektrot Bileşimi

Elektrodun tespit limiti, seçiciliği ve bakımının membran bileşimine ve kalınlığına bağlı olduğu bilinmektedir. Bu nedenle farklı membran kompozisyonlarında ve kalınlıklarında elektrotlar hazırlanmış ve her 10 konsantrasyon değişikliği için 10^{-6} ila 10^{-1} M klorür konsantrasyonu aralığında potansiyel tepkileri ölçülmüştür.

Aynı büyüklükteki beherlerde 0.4 g miktarlarında farklı bileşenlerde membran karışımları hazırlanarak elektrotlar elde edildi. Her bir elektrodun duyarlılığı ölçüldü ve tablo 1 de verildi.

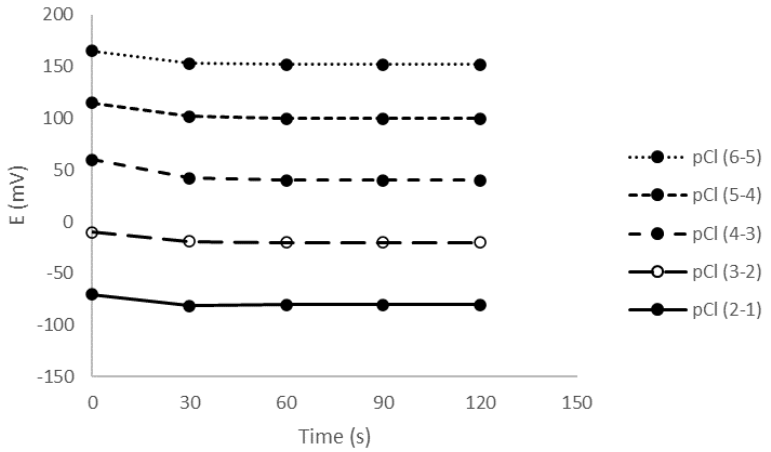
Tablo 1. Farklı bileşendeki elektrodun klorür derişimine duyarlılığı.

Elektrot Bileşimi	Eğim (mV)	Değişim (M)
10% TDMACl, 60% PVC, 20% DBF	21.8 ± 1.5	$1x10^{-1}$ - $1x10^{-5}$
20% TDMACl, 60% PVC, 20% DBF	32.5 ± 1.7	$1x10^{-1}$ - $1x10^{-5}$
30% TDMACl, 50% PVC, 20% DBF	58.2 ± 0.63	$1x10^{-1}$ - $1x10^{-5}$

Görüldüğü gibi, %30 TDMACl içeren elektrot en yüksek eğime (yaklaşık 58 mV) sahip olduğundan, bu elektrot tüm çalışma boyunca kullanılmıştır.

Cevap Verme Süresi

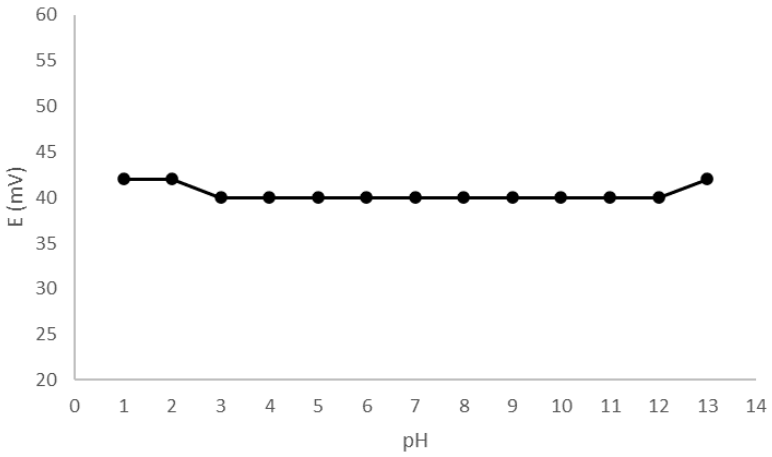
Cevap verme süresi için farklı klorür konsantrasyonlarında zamana dayalı potansiyel değerleri kaydedilmiştir. Elektrotun yanıt süresi 30 s olarak bulundu (Şekil1).



Şekil 1. Klorür derişim değişimlerinde elektrodun cevap süresi

pH Etkisi

Potansiyel okumalar üzerindeki pH etkisini incelemek için 10^{-3} M klorür çözeltisine, hem HCl hem de NaOH ilave edilerek belirli pH değerleri ayarlanmış ve potansiyel değerleri kaydedilmiştir. Potansiyel okumalar, 10^{-3} M klorür klorür konsantrasyonlarında pH 2-12 aralığında değişmeden kaldı (Şekil 2).



Şekil 2. 10^{-3} M klorür çözeltisinin potansiyel değerlerinin pH ile değişimi.

Girişim Etkisi

Bir elektrodun birden fazla anyon ve katyona duyarlılığını ölçmek için karışık çözelti metodu kullanıldı [20].

$K_{A,B}^{pot}$ x $a_B^{nA/nB}$= a_A{antilog[(E_1 - E_2)/S]} – a_A

Gerçek numunelerde bulunabilecek iyonların seçiciclik katsayıları hesaplandı ve tablo 2 de verildi.

Tablo 2. Bazı anyon ve katyonların seçicilik katsayıları.

Ions	$K_{A,B}^{pot}$
Cl^-	$2x10^{-3}$
NO_3^-	$6x10^{-4}$
SO_4^{-2}	$7x10^{-6}$
PO_4^{-3}	$3x10^{-4}$
K^+	$2x10^{-3}$
Na^+	$1x10^{-3}$
Ag^+	$1x10^{-5}$
Ca^{+2}	$2x10^{-6}$
Cu^{+2}	$3x10^{-6}$
Mg^{+2}	$3x10^{-6}$

Su Örneklerinde Klorür Miktarı Tayini

Elektrodun optimum şartları belirlendikten sonra Karadeniz suyu, Ankara çeşme suyu ve 3 farklı kaynak sularında bulunan klorür miktarı hem hazırladığımız elektrot ile hem de ticari Orion klorür elektrot ile ölçüldü ve sonuçların birbiriyle uyumlu olduğu tablo 3 de gözükmektedir.

Tablo 3. Farklı su örneklerindeki klorür miktarı sonuçları ve karşılaştırılması.

Su örnekleri	Cl-SE [Cl-]: mg/L	Orion (Cl-SE) [Cl-]: mg/L
Deniz suyu	1856 ± 15	1861 ± 14
Çeşme suyu	0.61 ± 0.02	0.59 ± 0.01
Doğal kaynak suyu (A)	0.34 ± 0.01	0.35 ± 0.01
Doğal kaynak suyu (B)	0.31 ± 0.01	0.33 ± 0.01
Doğal kaynak suyu (C)	0.28 ± 0.01	0.30 ± 0.01

SONUÇLAR

Bu çalışmada, bazı su örneklerinde klorür iyonunu miktarını ölçmek için aktif malzeme olarak iyon değiştirici kullanarak klorür için seçici bir elektrot hazırlandı. Bu elektrot klorür derişimine karşı 58 mV luk bir eğimle duyarlılık gösterdi ve Nersnt eşitliğine uygun olduğu tespit edildi. Elektrodun seçicilik ve duyarlılık şartları belirlendi. Bu elektrot ile bazı su örneklerinde bulunan klorür miktarları ölçüldü. Aynı örnekler Orion marka klorür seçici elektrot ile de ölçülüp sonuçların birbiriyle uyumlu olduğu belirlendi.

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KURU BAKLAGİLLERDE BULUNAN MOLİBDEN MİKTARININ İYON SEÇİCİ ELEKTROT İLE TAYİNİ

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ÖZET

Molibden, vücudumuzun enzimlerini ve diğer maddeleri parçalamada kullanılan bir elementtir. Vücutta kimyasal reaksiyonları başlatan, sülfit oksidaz, aldehit oksidaz, ksantin oksidaz ve mitokondrial amidoksim azaltıcı bileşen (mARC) enzimlerini active eder. Ayrıca sülfitleri parçalamada önemli rol oynar. Fazla alımında gut hastalığına sebep olur. Eser miktardaki bu minerali, besinlerden alırız. Suda az çözünen tuzlardan oluşan katı hal molibden seçici elektrot hazırlandı. Bu elektrodun duyarlılığına etki eden faktörler incelenerek optimum şartları belirlendi. Önce sentetik numunelerde değeri bilinen molibden miktarları, iyon seçici elektrot ile ölçülerek hata oranları tespit edildi. Ardından Türkiye`de çok tüketilen mercimek, fasulye ve pirinç örnekleri çözünürleştirildi. Örneklerdeki molibden miktarları %95 güven seviyesi ve 5 deneyin ortalaması olarak yaklaşık 0.2 ile 0.5 mg /100 g olarak ölçüldü.

Anahtar Kelimeler: Molibden, İyon seçici elektrot, Potansiyometri, Kuru baklagiller.

THE AMOUNT OF MOLYBDENE IN DRIED LEGUMES DETERMINATION WITH ION SELECTOR ELECTRODE

ABSTRACT

Molybdenum is an element used to break down our body's enzymes and other substances. It activates sulfide oxidase, aldehyde oxidase, xanthine oxidase and mitochondrial amidoxime reducing component (mARC) enzymes that initiate chemical reactions in the body. It also plays an important role in breaking down sulfites. Excessive intake causes gout. We get trace amounts of this mineral from food. A solid-state molybdenum selective electrode consisting of salts sparingly soluble in water was prepared. Optimum conditions were determined by examining the factors affecting the sensitivity of this electrode. First, the amount of known molybdenum in synthetic samples was measured with an ion-selective electrode and error rates were determined. Then, samples of lentils, beans and rice, which are widely consumed in Turkey, were solubilized. Molybdenum amounts in the samples were measured as approximately 0.2 to 0.5 mg/100 g, with 95% confidence level and the average of 5 experiments.

Keywords: Molybdenum, Ion selective electrode, Potentiometry, Dried legumes.

GİRİŞ

Molibden canlı hücrelerde eser miktarda bulunur. Bitkiler için vazgeçilmez bir elementtir. Ayrıca baklagillerdeki bakterilerin azot bağlama sürecinde katalizör görevi görür. Bitkilerin beslenmesinde eser miktarda kullanılmaktadır. Bu nedenle molibden tayini önemlidir.

Molibden tayinin de birçok yöntem kullanılmaktadır. Bunlardan öncelikle iyon seçici elektrotlar ile yapılan tayinler önemlidir. Eser miktardaki molibden tayini, iyodür elektrot kullanılarak hidrojen peroksit iyot reaksiyonundan yararlanılarak dolaylı olarak yapıldı [1-2]. Molibdenin direk tayinin de ise fosfomalibdat membran kullanılarak ölçüldü [3]. Ayrıca

sodyuma duyarlı katı kristal elektrot geliştirilerek de molibden tayinin de kullanıldı. Bu elektrodun duyarlılığının yüksek olduğu belirlendi [4]. Bir çalışmada ise polimerik memran elektrot kullanılarak molibden tayini iyodür üzerinden yapıldı [5]. Başka bir çalışmada ise molibden sülfür temelli bir iyon seçici elektrot ile molibden miktarları ölçüldü [6].

Molibden tayinin de diğer bir yöntem ise tekrarlanabilir özelliği iyi, duyarlılığı ve seçiciliği yüksek olan diferansiyel puls polarografi yöntemidir. İnek karaciğerinde yapılan ölçümlerde molibden miktarı 170-230 $\mu g g^{-1}$ olarak ölçüldü [7]. Aynı yöntem ile ıspanakta bulunan moibden miktarı ise katalitik hidrojen pikinden yararlanarak yaklaşık 43 $\mu g g^{-1}$ olarak hesaplandı [7].

Diğer kullanılan tayin yöntemleri ise spektroskopik yöntemlerdir. Çevre, su ve biyolojik örneklerdeki molibden miktarları, atomik absorpsiyon spektroskopisi (AAS) ve ICP-OES yöntemleri kullanılarak ölçüldü [8]. Ayrıca süt, sebze ve meyvelerdeki molibden miktarı da alev atomik absorpsiyon spektroskopisi ile (FAAS) [9] bitkilerdeki molibden ise AAS yöntemi ile ölçüldü [10-11].

Bu çalışmanın amacı, molibden iyonu için seçici, hazırlanması kolay, kullanımı kolay ve uzun ömürlü bir elektrot hazırlamaktı. Diğer yöntemlerde, molibden tayini maliyetlidir ve ön konsantrasyon gerektirir. Bu elektrotun en önemli avantajı diğer iyonlara duyarlı olmamasıdır. Mevcut çalışma, yukarıda verilen geleceği karşılayan yeni bir katı hal molibden iyonu seçici elektrotun hazırlanmasını ve uygulanmasını açıklamaktadır. Kuru baklagillerdeki molibden iyonu yeni elektrot ile analiz edildi.

DENEYSEL ÇALIŞMALAR

Kimyasallar ve Cihazlar

Potansiyel, JENWAY 3030 İyon metre ile ölçüldü. Dış referans elektrotu olarak çift bağlantılı Ag/AgCl elektrotu 924036 kullanılırken, iç referans elektrotu olarak ev yapımı Ag/AgCl elektrotu hazırlandı; 0.1 M NaCl ve 0.1 M KI solüsyonuna daldırıldı. pH ölçümleri için pH elektrodu ile birleştirilmiş 924003 iyon analizörü kullanılmıştır. Tüm ölçümler bu amaçla hazırlanmış 30 mL'lik cam hücre ile yapıldı. Deneyler boyunca manyetik karıştırıcı kullanılmıştır.

Tüm reaktifler en azından analitik reaktif derecesindeydi (Merck). Tüm çözeltilerin hazırlanmasında üçlü saf su kullanıldı.

Elektrodun hazırlanması

MoS_2, Ag_2S ve Cu_2S katı tuzlar kurutuldu ve ardından değişen bileşimlerde karıştırıldı. Tuz veya tuz karışımından belirli bir miktar (10-15 mg) alınmış ve hidrolik kullanılarak önce 5000 kgcm−2 basınçta 5 dk daha sonra 8000 kgcm−2 basınçta 10 dk tutularak pelet yapılmıştır. IR enstrümanına basın. 7 mm çapında ve 0.1-0.3 mm kalınlığındaki peletler epoksi reçinesi (0.7 g epoksi ve 0.9 g sertleştirici) ile kapatılmıştır.

İyi bir sızdırmazlık elde etmek için borunun kenarındaki epoksi reçinesi (0.7 g epoksi 0.9 g sertleştirici) yaklaşık 10 dakika beklemek zorunda kaldı ve ardından pelet kapatıldı. Pelet kapatıldıktan bir gün sonra, düz uçlu gümüş bir tel bağlanır. Bu amaçla cam tüpün içi 0,5 g grafit tozu, epoksi reçine ve sertleştirici karışımı ile yaklaşık 1 cm'ye kadar doldurulduu. Hazırlanan elektrot reçinenin kuruması için yaklaşık 2 gün beklemek zorunda kaldı. Elektrotun yüzeyi yıkanır ve ardından yumuşak bir kağıtla parlatılır. Bu elektrotlar kullanılmadıkları zaman havada ve karanlık bir yerde beklemelidir. Bu elektrotların ömrü, günde 4-5 kez kullanıldıklarında en az 2 yıl olabilir.

SONUÇLAR VE TARTIŞMA

Elektrot Bileşimi

Elektrodun tayin sınırı, seçiciliği ve duyarlılığı elektrot bileşimine bağlı olduğu bilinmektedir. Bu nedenle dört farklı bileşende elektrotlar hazırlanmış ve her 10 konsantrasyon değişikliği için 10^{-6} ila 10^{-1} M molibden konsantrasyonu aralığında potansiyel tepkileri ölçülmüştür. Aynı büyüklükteki beherlerde 0.3 g miktarlarında farklı bileşenlerde

membran karışımları hazırlanarak elektrotlar elde edildi. Her bir elektrodun duyarlılığı ölçüldü ve tablo 1 de verildi.

Tablo 1. Dört farklı bileşendeki molibden elektrodun molibden derişimine karşı duyarlılığı.

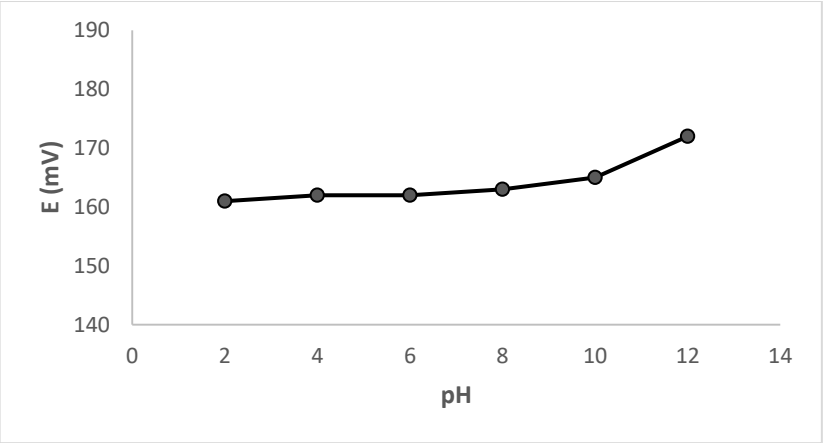
	E (mV)			
[Mo (VI)]	**30%**	**20%**	**10%**	**5%**
$1x10^{-6}$	-65	46	0	200
$1x10^{-5}$	-60	70	14	210
$1x10^{-4}$	-54	114	41	223
$1x10^{-3}$	-40	160	65	248
$1x10^{-2}$	-25	204	90	265
$1x10^{-1}$	-10	248	116	290
Slope ($1x10^{-6}$ - $1x10^{-1}$)	11 ± 1	**40 ± 2**	29 ± 2	18 ± 1
Slope ($1x10^{-5}$ - $1x10^{-1}$)	14 ± 1	**45 ± 2**	26 ± 2	20 ± 1

Cevap Süresi

Elektrotun cevap süresi konsantrasyon değişikliğine bağlıdır. Her eklemeden sonra potansiyeldeki değişimin sabit olduğu süre tepki süresi olarak alınır. Molibden konsantrasyonu 1×10^{-5}'ten 1×10^{-4}'e değiştirildiğinde, 1×10^{-4}'ten 1×10^{-3}'e, 1×10^{-3}'ten 1×10^{-2}'ye ve 1×10^{-2}'den 1×10^{-1} M'ye kadar, elektrotun cevap süresi yaklaşık 15-20 s olarak ölçüldü. Bu sürenin kısa olması bir avantaj oldu. Bu nedenle bu elektrot rutin analizler için kolaylıkla kullanılabilir. Tüm bu ölçümler sabit sıcaklıkta yapılmış ve çalışma boyunca eğimi en yüksek elektrot kullanılmıştır.

pH Etkisi

10^{-3} M molibden varlığında pH'ın potansiyel okumalar üzerindeki etkisi araştırıldı. Bu amaçla 20 ml 0.1 M NaNO3 solüsyonlarına 0.02 ml 1 M HCl eklendi ve her eklemeden sonraki potansiyeller ölçüldü. NaOH ilaveleri için de aynı prosedür uygulandı. Ölçümler sırasında eğimi en yüksek (%20 MoS_2) elektrot kullanıldı. pH ile potansiyeldeki değişim pH 1'den 10'a her bir pH birimi değişikliği için sadece 2-3 mV idi. Şekil 1'te görüldüğü gibi, elektrot pH 1 ve 10 güvenlik arasında kullanılabilir.



Şekil 1. %20 MoS_2 bileşimindeki elektrodun pH ile potansiyel değerinin değişimi.

Girişim Etkisi

Elektrot molibden dışında herhangi bir iyona karşı duyarlı olup olmadığını belirlemek için karışık çözelti yöntemi kullanıldı [12]. Seçicilik katsayı ($K_{A,B}^{pot}$) değerleri aşağıdaki denklem kullanılarak hesaplanmıştır ve tablo 2 de verilmiştir.

$K_{A,B}^{pot}$ x $aB^{nA/nB}$= aA{antilog[(E1 - E2)/S]} – aA (1)

Burada, S = 2.303RT/nAF (molibden elektrotunun eğimi), aA birincil iyonun aktivitesi (burada borat), aB girişim yapan iyonun aktivitesi, E1 sadece A mevcut olduğunda ölçülen potansiyel, E2 potansiyeli Girişim yapan iyon varlığında birincil iyona yanıt veren seçicilik katsayısı ($K_{A,B}^{pot}$) ve nA (molibdenin yükü), nB (girişim yapan iyonun yükü) yükleridir.

Tablo2. Molibden elektrodun bazı iyonlara karşı seçiciclik katsayıları($K_{A,B}^{pot}$) .

B (anions)[b]	$k_{A,B}^{pot}$	B (cations)[b]	$k_{A,B}^{pot}$
Cl^-	$2x10^{-4}$	Na^+	$1x10^{-4}$
Br^-	$1x10^{-4}$	K^+	$2x10^{-4}$
NO_3^-	$1x10^{-4}$	Ag^+	$2x10^{-4}$
SO_4^{2-}	$2x10^{-5}$	Cu^{2+}	$3x10^{-5}$
$H_2PO_4^-$	$1x10^{-5}$	Ca^{2+}	$3x10^{-5}$

Kuru baklagillerdeki molibden miktarlarının tayini

Marketten alınan kuru fasulye, nohut ve mercimek örnekleri yaş yakma yöntemi ile çözünürleştirildi ve 10`ar ml`lik stok örnem çözeltileri hazırlandı. Bu örneklerdeki molibden miktarları hem molibden seçici elektrot ile hem de diferansiyel puls polarografi yöntemi ile ölçüldü. Sonuçlar % 95 güven seviyesi ve 4 ölçümün ortalaması olarak tablo 3 de verildi.

Tablo 3. Kurufasulye, nohut ve mercimek örneklerindeki molibden miktarlarının tayini ve farklı yöntem ile karşılaştırılması.

Örnek	Mo-SE ile [Mo]: $\mu g g^{-1}$	Diferansiyel puls polarografisi ile [Mo]: $\mu g g^{-1}$
Kurufasulye	0.18 ± 0.02	0.17 ± 0.02
Nohut	0.13 ± 0.02	0.14 ± 0.02
Mercimek	0.11 ± 0.02	0.10 ± 0.02

SONUÇLAR

Bu çalışmada MoS_2, Ag_2S ve Cu_2S'nin katı tuzları kullanılarak yeni bir molibden iyon seçici elektrot hazırlanmıştır. Elektrotun hazırlanması basittir, tekrarlanabilirlik, hassasiyet ve kullanım ömrü açısından çok iyi performans gösterir. Doğrusal kısmın eğimi (1×10^{-1}–1×10^{-5} M) molibden iyonuna karşı 45±2 mV dur. Bu elektrot, birçok anyon ve katyona duyarlı olmadığı ve pH 1 ie 10 arasında çalışılabileceği belirlendi. Kuru baklagillerdeki eser molibden miktarları farklı yöntem ile karşılaştırılmalı yapıldı ve sonuçların birbiriyle uyumlu olduğu tespit edildi.

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INSECTICIDAL ACTIVITY OF METHANOL AND CHLOROFORM EXTRACTS FROM HYPERICUM HETEROPHYLLUM, AN ENDEMIC TO TURKEY, AGAINST TRIBOLIUM CONFUSUM

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ABSTRACT

Synthetic chemical insecticides, which are used extensively in agricultural control, cause significant damages to nature and human health. For this reason, recently, the search for natural products against pests has become very popular. Hypericum is an important genus in the family Hypericaceae (Clusiaceae), which includes about 500 species. This genus has been grown in temperate regions and used for the treatment of many diseases in both traditional and modern medicine. In this study, the methanol (polar) and chloroform (non-polar) extracts from flower, leaf and stem of Hypericum heterophyllum, an endemic to Turkey was investigated insecticidal activities against adults of Tribolium confusum (Tenebrionidae), important stored grain insect. The pest was incubated with the food under 10% concentration of Hypericum extracts and the mortality was recorded after 24, 48 and 72 h of exposure. The mortality of this pest varied from 0.0 to 21.2 % for all exposure intervals, and was found to increase with the increasing exposure time in all extracts. After 72 h of exposure, the chloroform extract of H. heterophyllum stem (21.2 %) displayed the highest toxic effect on T. confusum. The chloroform extracts (10.8 %) showed higher toxicity than methanol extracts (3.4 %). The extracts of leaf part in both solvents had the least toxic effect (0.3 % for methanol and 8.3 % for chloroform. There are very few studies on insecticidal activities against pests of H. heterophyllum. But, the methanol and chlorofom extracts of flower, leaf and stem of H. heterophyllum was first time used against T. confusum in current study. The chloroform extract of H. heterophyllum stem had a high toxic effect on T. confusum, and we realized that it can be used as an insecticide. We think that this study data will shed light on insecticides that will be produced from H. heterophyllyum against these insects for future studies.

Keyword: Hypericum, stored grain insect, solvent, plant parts, toxic effect

INTRODUCTION

The Hypericum genus has about 500 species divided into 36 taxonomic sections using morphological characters (Robson, 2003; Zhou et al., 2020) and adapted to different climatic and ecological conditions (Sarrou et al., 2018). The genus including a large number of medicinal and aromatic species contain a wide variety of the extremely significant chemical compounds such as phenolic acid, flavonoids, phloroglucinols, napthodianthrones, xanthones and essential oils (Napoli et al., 2018). Some Hypericum species have an active usage in traditional and modern medicine due to very important biological activities such as antioxidant, antidepressant, antitumor, antibacterial, antimicrobial, anti-inflammatory effects and others (Zorzetto et al., 2015).

Synthetic chemical pesticides and insecticides have been actively used to effectively control of stored grain insects for many years (Kostyukovsky and Shaaya, 2013). However, scientists have begun to search for new and natural products to combat against stored product insects due to some reasons such as pose potential risks of synthetic chemicals for mammals, chemical resistance against insect populations, change of ecological balance, increase of chemical costs (Rouhani et al., 2019; Lampiri et al., 2020). Low-cost organic sources that are less harmful to the environment and human health are very valuable. Many researches have been recently on insecticidal affects of different plants having various biological activities have been done conducted (Guru-Pirasanna-Pandi et al., 2018; Lampiri et al., 2020). Since plants are natural products, they are safer agricultural products, and cause less pollution (Sodaeizadeh et al., 2010).

Tribolium confusum (Tenebrionidae) in the Coleoptera (Insecta) is the leading pest that cause significant damage to many products during the storage period of products. This insect feeds on spills of grains, flour and flour products, bran, semolina, spices, dried fruits, vegetables and legumes (Ajayi et al., 2019). Especially, these insects damage cereal grains both qualitatively and quantitatively, which cause to be unsuitable for seed, food or forage.

Hypericum extracts have been shown to exhibit potent toxic effect on insects, particularly against coleopteran insects (Tozlu et al., 2011; Dastagir et al., 2016; Puthur et al., 2019) and, for this reason, it was hypothesized that extracts of these Hypericum species could potentially exhibit insecdicidal activity against adults of the stored grain insect, Tribolium confusum. H. heterphyllum, an endemic species to Turkey, were investigated first time toxic effects on these insects, had very little literature about this issue. In an earlier study, dichloromethane extract of H. heterophyllum displayed higher inhibiton zone against Paenibacillus larvae than that of other many Hypericum species (Hernandez-Lopez et al., 2015). Yaman and Şimşek (2021) notified that acetone extracts of H. heterphyllum against Tribolium confusum exhibited the lower toxic effect for some stored product insects than other Hypericum extracts. Also, the methanol and chloroform extracts from H. heterophyllum were first time used against this insect in current study. The goal of this study was to evaluate the effect of methanol and chloroform extracts from flower, leaf and stem of H. heterophyllum on T. confusum, important stored product insect.

MATERIAL AND METODS

Plant Material

H. heterophyllum Vent., an endemic species to Turkey were collected aerial parts including more than 30 individuals at 100% flowering period from its natural habitats (Yozgat, Bozok University Campus, 1332 m). Collection of plants was done between 11:00 and 13:00. The flowers, leafs and stem parts of the plants were separated, and dried under shade at 20 ± 2 ºC for analysis.

Preparation of Samples for Analysis

The aerial parts (flower, leaf and stem) of H. heterophyllum were used for the extraction. The aerial parts were dried under shade and mechanically ground with a blender. 4 g (three replicate) of each grounded plant materials were extracted individually in 40 mL of 100% methanol and chloroform at 40 °C for 24 h. Each solvent was used separately. The resulting solutions were filtered through whatman paper and the solvents was removed on a rotary evaporator at temperature bellow 40°C. The extracts were dissolved with acetone. Finally, the concentration of the extracts was adjusted to 10%, and all samples were stored at 4 ºC until used (Yaman and Şimşek, 2021).

Test Insects

In order to feed the insect species used in the study, 1-liter jars were filled with 1/3 food. Adult individuals were taken into these jars and left to feed. These stock cultures were incubated at 27±2 ºC in dark conditions. Within 45 days, a new generation of adults emerged, and randomly selected adult individuals were used in the study (Abay et al., 2012).

Contact Toxicity

The 10% concentration of Hypericum extracts were used for contact effect according to method used by Gökçe et al. (2010). About 1 µl of the extracts was applied topically to each insect by micro-aplicator. For control, insects were topically treated with 1 µl of acetone solvent. The experiment was set up in complete randomized block design with six replications of ten insects pre replicate in a petri dish containing food. Insect mortality was recorded after 24, 48 and 72 h of exposure. The mortality rates were calculated as %.

Data Analysis

No mortality was observed in the control applications of all species. The same vials were examined for mortality at the different exposure intervals (24, 48, and 72 hours), so mortality data were analyzed by using one-way analysis of variance (ANOVA) with plant parts as the main effects. Percent mortality data were expressed as mean values. It was used Levene's test to check homogenity of variances before ANOVA tests. Also, data given in percentages were subjected to arcsine ($\sqrt{X}$) transformation before statistical analysis. Differences between the means were compared by Duncan's multiple range tests using SPSS 20.0 Statistical software at 0.05 level.

RESULT AND DISCUSSION

The methanol and chloroform extracts from different plant parts of Hypericum heterophyllum caused higher mortality against adult of Tribolium confusum and given in Table 1, Figure 1 and Figure 2.

Table 1. Contact toxicity of various solvent extracts from flower, leaf and stem of Hypericum heterophyllum against Tribolium confusum adults

Exposure / Solvents	Plant parts	24 saat	48 saat	72 saat	Average
Control		0	0	0	
Methanol	Flower	0	7.1	10.0	3.4
	Leaf	0	0.3	0.3	
	Stem	0	3.4 b	9.7	
Chlorofom	Flower	4.1 b	14.6	16.0 b	10.8
	Leaf	2.6	3.4 b	8.3	
	Stem	12.6	14.2	21.2	

Means followed by the different letters in each exposure are significantly different (Duncan test at 0.05).

As shown in Table 1, the methanol extracts (3.4%) exhibited less toxic effects on T. confusum than the chloroform extracts (10.8%). After 72 h of exposure, the chloroform extract of the stem part was exhibited the highest mortality with 21.2%, followed by the chloroform extract of the flower (16.0%) and there was no statistically significance. The effect of the exposure time of the extracts on this insect was investigated and it was determined that the mortality rates of the extracts of both solvents increased at a regular rate as the exposure time increased (Figure 1).

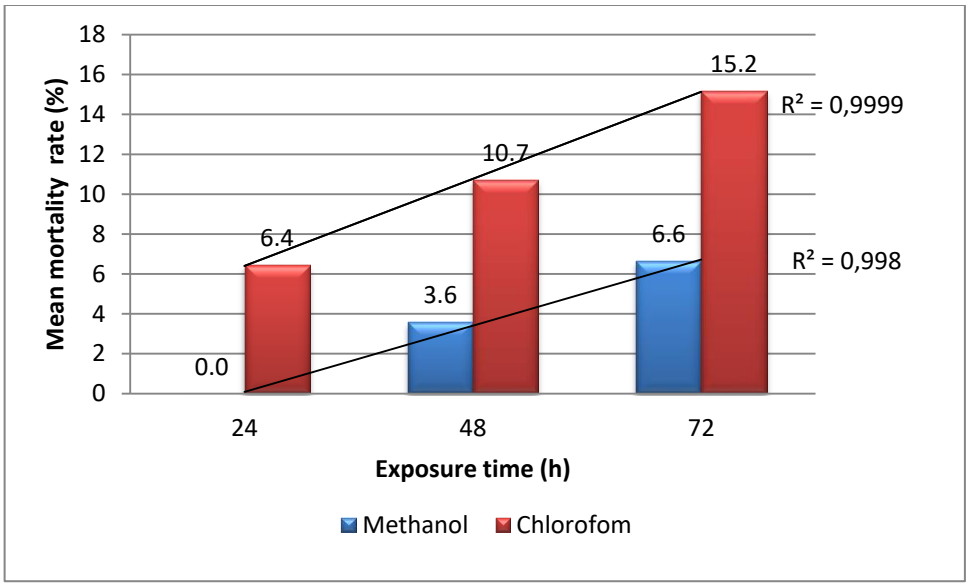


Figure 1. Effect of different exposure times on contact toxicity of Hypericum heterophyllum extracts against Tribolium confusum adults

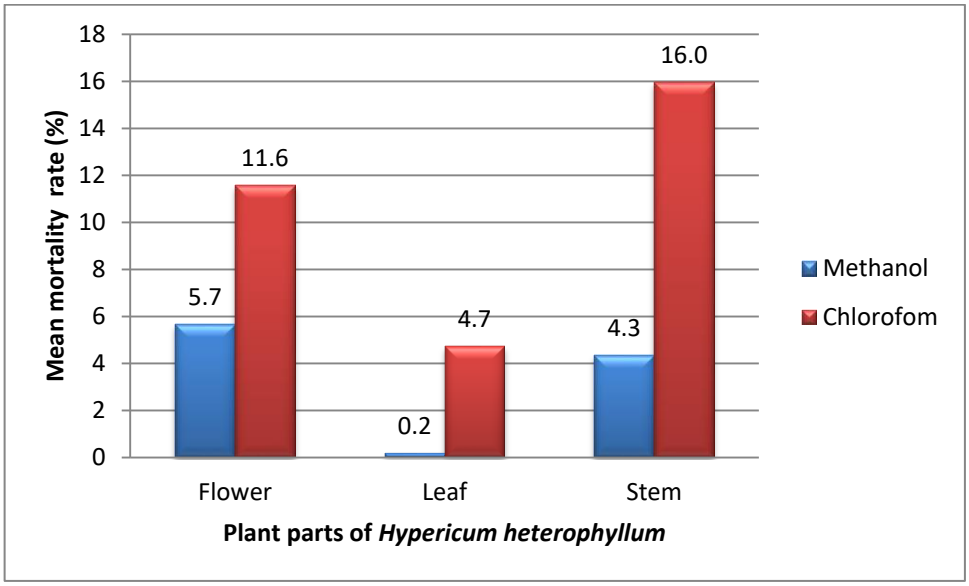


Figure 2. Contact toxicity of flower, leaf and stem parts of Hypericum heterophyllum against Tribolium confusum adults

The findings clearly indicated that the efficacy of H. heterophyllum extracts varies among the plant parts tested, and it is highly related with the variety of solvents (Figure 2). While the flower part (5.7%) was effective in methanol solvent, the stem part (16.0%) was effective in chloroform solvent. However, both solvent extracts of the leaf part had the lowest mortality against this insect. But, Yaman and Şimşek (2021) reported that acetone extract from leaf part of Hypericum heterophyllum showed a higher mortality effect than other parts. Many researchers reported the toxic effects of various solvent extracts from Hypericum species against several insects or their larvaes in previous studies. For example, Dastagir et al. (2016) notified that none of leaf, flower and fruit extracts with methanol of H. perforatum showed effect on mortality of some pests. da Silva et al. (2013) recorded that hexane extract

from flowering aerial parts of H. carinatum was highly toxic on larvaes of Aedes aegypti. Erdoğan and Yıldırım (2016) found that ethanolic extract of H. calycinum (12%) caused approximately 60% mortality against nymph and adult of Myzus persicae Sulzer under both leaf dipping and spraying methods. According to the results of Binias et al. (2016), aqueous extract of H. perforatum inhibited the feeding activity on larvae of Leptinotarsa decemlineata. Puthur et al. (2019) reported that of 2000 mg/L concentration of H. japonicum methanol extract caused 85% mortality on S. oryzae after 24 h exposure.

Our results indicated that the methanol and chloroform extracts derived from flower, leaf and stem of H. heterophyllum has high toxic effect for the control of T. confusum, but this effect varies according to the plant part and solvent. Especially, the results showed that the chloroform extract of stem part can be useful in controlling adult populations of this insect. The main reason for this difference on insecticidal activity in plant parts and solvents is based on its chemical content. Further research is needed to shed light to these different parts of the H. heterophyllum, including phytochemical components of this effective Hypericum extract, and to evaluate the basis of their use in realistic scenarios in stored-product protection.

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SOCIAL DYNAMICS OF ARTISTIC REPRESENTATION

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Abstract

In primitive societies, it is seen that people imitate and imitate nature with the desire to dominate nature. Art has also been a tool in imitating nature. The relationship between art and representation begins with imitating nature. While the representational value of art in oral culture gained a place in memory through descriptions, representation began to be provided with words and images with the transition to written culture. The artistic expression shaped in the scholastic structure of the Middle Ages gains a symbolic representation understanding with iconographic narratives; The similarity of the represented and the represented loses its importance. Representation is provided by symbolic meaning, not by similarity in appearance, imitation and imitation. Scientific developments and discoveries in the Renaissance provide a mimetic-based imitation of art. In this period, science and art interacted and supported each other more than ever before. The interaction of science and art has contributed to the representational quality of art in the sense of perfectly resembling the reality it emulates. The use of perspective science for the application of spatial depth in the art of painting is for the spatial expression of mechanical representation in art. The application of scientific developments in artistic practices is important in terms of visualizing reality. The socio-cultural values of our age, thanks to the advancing science, technological tools and materials, mass media have provided the formation of visual culture. Art and representation in visual culture are realized through images, symbols and signs. Art becomes a part of cultural production and the artist assumes the role of agent of cultural phenomena. Art representations in visual culture, such as pictures, photographs, videos, ready-made objects, symbols, etc. in such forms. The representational nature of art has started to function through signs. Now, the similarity, sameness or mimetic relationship between the signifier and the signified in the representative nature of art has left its place to the sign, to the science of interpretation.

Keywords: Art, Artistic Representation, Oral Culture, Written Culture, Contemporary Art.

SANATSAL TEMSİLİN TOPLUMSAL DİNAMİKLERİ

Özet

Primitif toplumlarda insanların doğaya egemen olma arzusu ile onu taklit ettiği ve ona öykündüğü görülmektedir. Sanat ta doğaya öykünmede bir araç olmuştur. Sanatın temsil ile olan ilişkisi de doğaya öykünme onu taklit etme ile başlar. Sözlü kültürde sanatın temsili değeri betimlemeler aracılığıyla bellekte yer edinirken, yazılı kültüre geçiş ile birlikte temsil sözcükler ve görüntülerle sağlanmaya başlamıştır. Ortaçağın skolastik yapısı içerisinde şekillenen sanatsal ifadenin ikonografik anlatılarla sembolik bir temsili anlayış kazanır; temsil edilenle temsil edenin benzerliği önemini yitirir. Temsil görünüşteki benzerlik, taklit ve

öykünmeyle değil sembolik anlamla sağlanır. Rönesans'ta bilimsel gelişmeler, yapılan keşifler sanatın mimetik temelli taklidi bir temsil anlayışının oluşmasını sağlar. Bu dönemde bilim ve sanat daha önce hiç olmadığı kadar etkileşim içerisinde olmuş ve bir birini desteklemiştir. Bilim ve sanatın etkileşim içerisinde olması, sanatın öykündüğü gerçekliğe kusursuz şekilde benzeyerek yerini alma anlamında temsili niteliğine katkılar yapmıştır. Perspektif biliminin resim sanatında mekânsal derinliği sağlayan uygulanması için kullanılması, sanatta mekanik temsilin uzamsal ifadesi içindir. Bilimsel gelişmelerin sanatsal pratiklerde uygulanması gerçekliğin görselleştirilmesi bakımından önemlidir. Çağımızın sosyo-kültürel değerleri ilerleyen bilimin sayesinde teknolojik araç-gereçler, kitle iletişim araçları görsel kültürün oluşmasını sağlamıştır. Görsel kültürde sanat ve temsil imgeler, semboller ve göstergeler üzerinden gerçekleşmektedir. Sanat kültürel üretimin bir parçası haline gelir ve sanatçı kültürel olguların eyleyeni görevini üstlenir. Görsel kültürde sanat temsillerini resim, fotoğraf, video, hazır nesne, sembol vb. gibi formlarda oluşturmaktadır. Sanatın temsil niteliği göstergeler üzerinden işlemeye başlamıştır. Artık sanatın temsili niteliğinde gösteren ile gösterilen arasındaki benzerlik, aynılık ve ya mimetik ilişki yerini göstergeye, yorum bilime bırakmıştır.

Anahtar Kelimeler: Sanat, Sanatsal Temsil, Sözlü Kültür, Yazılı Kültür, Çağdaş Sanat.

SOCIAL DYNAMICS TRANSFORMING REPRESENTATION IN ART

Art is one of the most basic cultural phenomena that shape socio-cultural life. In oral culture, art existed before writing. Art provided communication between people in oral culture. The painting represents the symbolic language and the existence with the similarity it establishes. In the transition from speech to writing, the picture begins to take the place of things as a symbolic typeface, to represent them. Religion, science, technology and mass media have determined the course of art and representation in social life. Visual and descriptive expressions have taken place in the memory in oral culture. The replacement of the representational function of memory by writing after oral culture has added a different dimension to pictorial representation. Pictorial, descriptive expressions in oral culture were left to encodings with symbolic characters; this situation has changed the quality of representation.

1-Art, Oral Culture, Written Culture and Representation

People communicate in various ways. Speech and writing are the two most basic structures for people to communicate. Art is one of the ways people communicate. We call the culture in which the word is used in communication, the oral culture, and the culture in which the writing is used, the written culture. Art has revealed different representational qualities in these two different cultures.

It is known that art is an effective communication tool before speech and writing, among the communication methods that people have developed in many different ways throughout history. Pictures made on cave walls and rock paintings are examples for these. Word and writing are used for communication by a certain community or society. According to Ong, "word and writing are the best and most basic method developed for societies to communicate. However, basically, it is the language that dominates the communication and the individual voices that make the language heard" (Ong; 1995:20). The language of art is more visual. Art's unique visual language conveys people's thoughts.

Humans need sounds to convey their thoughts verbally, and codes that represent sound to make this message in written form. Art, on the other hand, needs basic plastic elements such as unique form, color, light and shade while creating its own communication language. The message of art, on the other hand, has been attached to basic elements such as form and color for centuries etc. has added.

In oral culture, which provides communication with speaking and listening, speech, ear and memory have great duties. The spoken word must be heard by the ear and the memory must be recorded. A good memory is the area where the spoken word is stored, a representation event is recorded and if necessary, it will be put into words. Written culture consists of writing that encodes sound, and seeing and reading become important in this culture. The codes (symbol/letter) representing the sound sequences are lined up side by side to form the text. Writing visually gives shape and form to sound. The meaning intended to be conveyed is actually the same. Here, writing has reduced the burden of memory, memory.

Oral culture is a culture based on speaking and listening, in which the word is used in communication. This culture gives importance to memorizing and coding facts and events into memory. For memorization it needs heroes, epics, poetic rhythms; events, facts and things are represented in memory by rhythm of utterance and by heroes. Griswold says that in oral cultures, memorization of the wise people, extraordinary heroes and permanent repetitions will be ensured as the memory of the past, and proverbs and poetic rhythms and codes are needed for the continuity of the information in the memory. The history of societies will take place in memory as a representative event and situation and will be transferred to generations. In oral culture, the continuation of the past memory of human history depends on epic narratives, heroes and artistic rhythms. Art undertakes to memorize, retain and transfer the past to human memory by coding it with rhythm (Griswold; 2008:145).

In the oral culture period, people communicated by making pictures. These pictures represented the object, which it resembles more. Paintings, sometimes used together in a code, evoked meanings other than the object they represent, and they also represented quite different phenomena. For example, objects depicted in Egyptian hieroglyphs are codes that represent a situation outside of itself.

The pictures that people have made on different surfaces for thousands of years have a great importance in the formation of writing. According to Ong, before writing, pictures, symbols or meaningful signs played an important role in the emergence of writing. Picture and text are tools that support memory. However, a picture or text can represent an object, a thing. Often the objects in the picture may not make any sense on their own; However, it can be made sense with the help of a code, rule or code. It is the representation of a discourse, word, utterance expressed by writing and painting. Writing has a kind of pictogram and historical depth extending to signs and even objects representing any sign. According to Ong, the Sumerian cuneiform was developed to record business transactions. The cuneiform script of the Sumerians is derived from the notch of putting earth tokens in sealed boxes and throwing the number of coins out of the box. Writing BC. cuneiform writing in the Sumerians around 3500 BC; Egyptian hieroglyph in 3000 BC; Indian script between 3000-2400 BC; China in 1500 BC; Minoan or Mycenaean script in 1200 BC; It appears independently of each other in various parts of the world, such as Maya in 50 AD and Aztec script in 1400 AD (Ong; 1995:103-105).

Art is a communication tool that exists in written culture as it is in oral culture. From word to word, art has imitated and imitated nature while creating its own language. Therefore, this approach of art is to represent nature. This representation language of art depends on the perfection of the level of success in imitating nature. In fact, the sound that makes up the word is shaped as a reflection of nature. Writing also represented nature and meaning with codes that give sound and speech their visual form.

2-Religion Influences On Artistic Representation

One of the main dynamics affecting the representational expression in art has been religion. The relationship of art with religion and belief begins in the prehistoric period. Religion has influenced art in every period, determined its point of view on reality and

directed the way of production of art. Therefore, or directly, this effect is also reflected in the representational quality of art.

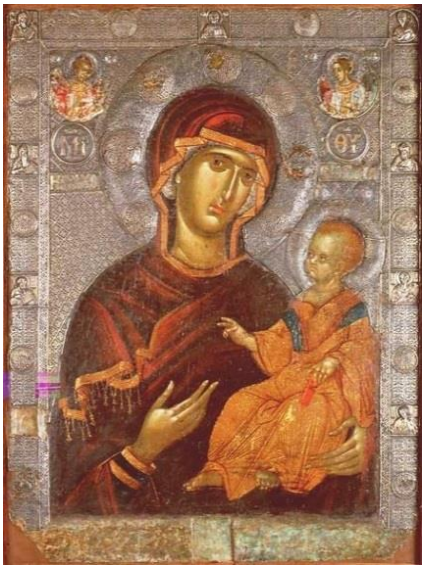
The Venus of Villondorf (25,000 BC) from the prehistoric period, shaped with a symbolic expression, has survived to the present day as an indicator of the belief styles of primitive people. Sculptures with symbolic meanings, such as Venus of Villondorf, often represent fertility, fertility and reproduction.



Picture-1. Venus of Vilondorf. (https://tr.wikipedia.org/)

From time to time, religion has imposed limitations on the reflection of imitation similarity depending on the mimetic approach of art. These limitations have caused the art to turn to symbolic expression and its representational quality to turn into a symbolic representation language. Later, the limitations on realism in art were removed and the similarity of the relationship between the signifier and the signified was ensured.

Monotheistic belief system made it compulsory for artists to produce works in the service of religious institutions. In most societies such as Egypt, artists were taught how to make visual representations and what their colors would be, and production was made under strict control (Çakır; 2014:124). The depiction in Christianity takes place on visual icons. According to Ferrari (2014: 66-71), Jesus Christ the visual depictions representing Jesus will be composed and where they will be located in the church are determined by the depiction program carried out by the church. In the understanding of the representative icon determined by the church, Saint Jesus on the cross or St. It continues as a representative narrative in the lap of Virgin Mary takes its final form in the X. century.



Picture-2. Byzantine icon; 14th Century.(https://www.wikiwand.com)

Belief systems formed in different civilizations and cultural environments have affected art and the representation quality of art. Considering the relationship between art and religion, it is seen that there was an intense interaction in the Middle Ages. The artist is passive because he is dependent on the medieval religious administration, and the way of art is directed by religious leaders. It is a fact that the determination of medieval art and its representational quality stems from the dynamics of an attitude related to faith. According to Erzen, the phenomenon that determines art and its representational value is related to how the beliefs underlying religions perceive people's view of the world, seeing-appearing, reality-illusion (Erzen; 2012: 26). Again, according to Erzen, the incarnation of the soul in the Christian faith is an important teaching and the beings in the world are a sign of incarnation. In Christianity, people are made to believe in these images in which the soul comes into existence. In this respect, painting and sculpture are important in terms of being a means of representation (Erzen; 2012: 63).

The religion of Islam, on the other hand, looks at the relationship of art between reality and its image from a different angle. Erzen says that according to Islam, "man cannot know the essence of existence and God". According to Erzen, since there are thousands of images and states of him, no comment can be made on them. Islamic thought presents the reality and its reflection in art with an aesthetic quality with the endless repetitions of reality-dream games. It is aimed to create an ambiguity between the art-image-real and dream-illusion determined by Islamic thought (Erzen; 2012: 26-28). This way, the representation of art is created. Expressing reality before it is definitely revealed is one of the basic approaches of Islamic culture. Expressing and questioning representation in this way is one of the most important features of his art. In addition, according to Islamic thought, the belief that the truth exists not only with the visible but also with the invisible, or that it can be different from the visible, has led to the formation of an understanding other than realistic expression in art. This shows that the representative expression moves away from similarity.

3- Representation from the perspective of art, science, technology

Science, Technology and art interact in terms of application processes. In this interaction, science can be viewed as knowledge, technology as the discipline of practices that instrumentalize knowledge by controlling it with scientific data, and art as a phenomenon that synthesizes knowledge and technique in its own language in the process of creation. Science, technology and art support each other for many purposes.

In the Renaissance, where art and science are mentioned together, the knowledge of perspective provides artists with a great opening in reflecting reality. The application of knowledge with depth technique in painting is very important in the representation of earthly space. In terms of creating a perspective optical image, the geometric-based approach in the description of nature in terms of the relationship of art with science provides a reliable source of information about reality in terms of depth and pictorial expression.

Scientific discoveries such as Euclid's geometry and Newton's laws of physics and optics had an impact on artists until modernism. The color contrast theory of physics laws developed by Chevreul and Helmholtz in the 19th century had important effects on impressionist artists. According to Dikmen, at the beginning of the 20th century, Einstein's theory of special relativity had a great influence especially on Pablo Picasso, one of the leading artists of Cubism. Among the examples of the interaction between art and scientific developments, we can include the mathematics of the French mathematician Maurice Princet. Princet plays an important role in the birth of cubism, even Princet is seen as the mathematician of cubism (Dikmen, 2012: 140-142).



Picture-3. Raffaello Sanzio, School of Athens; 1509-1511. (https://tr.wikipedia.org/)

As can be seen, pictorial approaches and techniques that appear as representations of reality change in each era. It draws attention from the rock paintings that today's art interacts with technology in various ways. During the Renaissance, each artist developed his own unique painting technique. However, Camera Obscura is very important, which enables the development of all image production technologies even today. Camera Obscura's mediation of projecting any image of nature onto a surface has brought new dimensions to the painting technique. In the 19th century, with photography, an advanced derivative of the invention of the camera, Camera Obscura, the first visual representations produced with a technological tool appear. An instrumentalization of technique has changed the flow of representation in art.

Altunay (2013: 26-27) states that the most important dynamic on the basis of the use of technology by art is the industrial revolution. The industrial revolution has enabled the development of technology, and this has shaped the forms of artistic production. Futurist art was the most affected by these developments at that time. According to Futurists, who argue that the traditional in society should be displaced and the past should be ignored and values belonging to machine, technology and power should be replaced, things such as movement, speed, machine power are the basic concepts that make up the new life style. An

understanding in which machine aesthetics and speed are represented in art has been shaped. Dada's understanding of art shows an industrial product as a work of art, showing that science and art are in a linear relationship. This view shows the urinal, which is an industrial product, a "ready made object" in the field of art. Marcel Duchamp, a Dada artist, overturns the representational understanding of traditional painting; allows the ready-made object to take its place in the representation itself. Pop Art moves away from traditional approaches as a way of production and technique. Pop art transforms traditional material into a popular form of representation by associating it with the technological image.



Picture-4. Marcel Duchamp, Fountain; 1917. (https://en.wikipedia.org)

Bauhaus, which was created with the slogan of "A New Unity" in the relationship of art and technology, turned to industrial production. Bauhaus tried to produce a new model in industrial products. Today, there are many art and design schools that act with Bauhaus principles (Antmen, 2013: 107).

It creates a revolutionary effect in the display technologies of photography. It is important first to gain mobility in the film and then to the development of moving images in electronic imaging technologies. The development of the technologies of photography, film and video are interrelated. While photography and film are based on almost the same technological basis, video is different in terms of image production method and technique. Even if the electronic image is technically optical, the surface on which it reflects/image is produced is not on a card with light, the image is produced on the glass/screen by electronic processes. In this respect, video is different from photography and film. Altunay says that the electronic image was discovered in the late 1930s, and in the 1950s it was an image production technology that entered social life as commercial television broadcasts. On the other hand, with the development of video recording technology in the 1960s, electronic image production devices enabled the formation of a personal recording system in society. Technology-based image production technologies have taken the tradition of mechanical and optical painting techniques that emerged with photography one step further (Altunay, 2013: 80-83). Image production technologies such as photography, film, television and video, which have been developed integrated with each other, have shaped the social structure in terms of displaying and conveying the message.

Technological devices such as photography, film and video create representations that do not differ in terms of similarity between object and image. Reproduced representational expression provided by means is produced on a card, film, or screen. According to Altunay, all the screens that surround us are actually representation surfaces. Because screens are actually extensions of painting techniques, reproduction tools, just like in photography and film (2013: 5-15). Artistic representation has been transformed by developing science and technology, and the visual language of representation has gained a different quality.

CONCLUSİON

When we look at the social dynamics that have decisive importance in the representation of art, the lifestyles of oral and written culture have been effective. Beliefs and religion/s in the social structure, the production and presentation of art have a great importance in shaping the quality of representation. However, scientific progress and related technological developments have brought different expansions to the ways of producing, presenting and re-presenting images of art, and this has provided restructuring on the sameness and differences in terms of perception and reflection of reality in representational expression.

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THE ROLE OF ONLINE LEARNING IN THE NEW EDUCATIONAL REALITY CAUSED BY THE PANDEMIC

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Abstract

In the era of digital technologies in the 21st century, the Internet and e-learning play an important role in the process of human development; therefore, people are obliged to follow the pace of technology development and not fall outside its framework. The world in which we live constantly changes. As all spheres of life evolve, human changes and, consequently, their needs change, the unity of these changes human's capabilities and needs. The nature of the job and the demand for employees also change as the activities and professions that a person owns become less in demand over time or generally useless for the market. Accordingly, the professions that were considered the most demanded and prestigious in the past have been replaced by other professions today, or the market has set completely different requirements and standards for them. A person who wants to meet the standards and requirements set for the job that he or she was the desired staff for the job is forced to be flexible and innovative, constantly looking for new challenges both at work and in the study areas. The e-learning method has come under particular scrutiny in the wake of the Covid-19 pandemic. Distance learning has made the learning process much more accessible in the real world.

The main goal of the paper is to determine how distance learning has affected the new pandemic-induced reality. The main tasks were formulated for this purpose: What do students know about distance learning? How does online learning affect their academic achievement? What are the pros and cons of online learning? Which subject do they master best in this way of teaching? Focus groups were used for the study. The study was conducted in several public schools in Georgia and included 40 students. After analyzing the data, it was found that students have information about online teaching, see many positive aspects, as well as highlight the negative aspects. They often use various online platforms for both classroom and extracurricular activities. Students are most actively using the online language learning program and note that their academic performance in this regard has increased dramatically during the pandemic period.

Keywords: Online learning, Pandemic, Student , Education.

Introduction

Given that the Internet occupies a large place in our lives today, modern education has become unimaginable without computers and the Internet. Teachers, pupils, students, and other stakeholders are actively using computer and Internet capabilities in a variety of fields, including most often education.

With the help of internet technologies, it is possible to study online without leaving home or work, from virtually any place where you have access to a computer and the Internet. This makes it possible for a modern specialist to acquire knowledge without special business trips, vacations and travel, so as not to interrupt his or her core business. In addition, the study is possible at any time of the day or night and on weekends.

The distance learning method makes the learning process much easier and more accessible. If you want to get education, but due to time and space you can not get the knowledge, it is enough to search the Internet for interesting programs or courses, register on the site and pay the tuition fee and start studying. Consequently, there is an organizationally simple process for both learners and educational institutions.

E-learning makes the learning process more creative and individual. Experience shows that with the help of e-learning users are characterized by more mobility, independence, and a sense of responsibility. That is why after receiving such education it becomes quite in demand for the labor market.

Main Part

Among the many priorities, e-learning is one of the main goals of the learner to develop the ability to work independently, which in turn develops permeable competencies such as media and digital literacy, semiotic competence and learning. It is important to talk about the main goals of e-learning.

Objectives of e-learning:

• Increase access to learning opportunities and promote a flexible learning environment;

• Develop employees with skills and competencies that meet the needs of the 21st century. In particular, to increase the quality of digital (computer) literacy of employees, which is important for their profession, career;

• Deinstitutionalize the educational process / make it possible for a person to plan and manage the self-directed educational process;

• Offer people equal opportunities to get an education. In particular, to provide courses/education to employees in the region that are unavailable;

• Promote better learning by using interactive and multimedia content;

• Create psychological and intellectual comfort for people. In particular, people differ in their learning styles and speed. E-learning, in this regard, is tailored to their individual needs.

In addition to the fact that the e-learning form, as mentioned above, promotes the development of many skills and competencies, it is particularly effective in saving time in the learning process. With the help of e-learning, the student is given the opportunity to study at several universities at the same time. Furthermore, online learning is relatively cheaper than on-site learning, and the graduate is given exactly the same diploma as he or she or she would receive on the spot.

E-learning refers to online learning and includes all components of the learning process: goals, content, methods, tools, etc. There are three types of e-learning: 1) Attended teaching- when the teaching process takes place within the contact hours of the teacher and students, and the teaching material is delivered through an electronic course; 2) Distance learning means conducting the learning process without the physical presence of the professor/teacher. The training course is conducted remotely, from the beginning to the end, in electronic format; 3) Hybrid (attendance/distance) - the main part of the training is conducted remotely, while a small part is carried out in the form of attendance training".

Forms of e-learning

Attendance - As mentioned above, attendance instruction refers to the teaching process that takes place within the contact hours of the teacher and students, while the transfer of teaching materials is done through an electronic course.

Distance Learning - The beginning of distance learning dates back to 1728 when the Boston Gazette first published an announcement that teachers were looking for people to send material once a week. This method was actively introduced in the 19th century after the refinement of the postal system. From then until the end of the twentieth century, this system developed and improved more and more, although it only gained a foothold after the widespread use of computers and the Internet. With the advent of the Internet and the development of computer technology, "online learning" has emerged as a new form of distance learning. Which allows any person today to take a training course in any country in the world. What seemed unimaginable years ago is now a reality, getting education without leaving the country at world-renowned universities.

Distance learning refers to the learning process when the student and the lecturer are separated from each other, both in time and space. It is a form of teaching designed specifically for the student or group of students who are not physically present in a traditional auditorium or classroom, although communication between the student and the teacher is active.

Distance education is recognized in many developed countries of the world, it can be said that the form of distance learning is recognized as a serious alternative to higher education and is a comfortable and convenient means of learning for those who want to master various specialties. The number of students at leading universities in Europe and America does not far exceed the number of virtual students. This trend is characterized by growing and ascending dynamics for other universities as well. It is noteworthy that distance learning creates good conditions for education for students with disabilities as well as people in penitentiary institutions. The use of new teaching technologies is considered a top state priority in many countries around the world. In this regard, the advanced experience of foreign countries should be taken into account, which is necessary for the reform of the current education system in Georgia.

Mixed, the same hybrid form of teaching combines traditional classroom or face-to-face teaching with asynchronous (online discussion forums, letters, blogs) and synchronous (instant chats, video conferencing, webinars).

The hybrid e-learning form is also characterized by the fact that the teacher can record a video lesson with attached tests and send it to the student who did not attend the lesson. The student is introduced to new material, independently analyzes and does test assignments.
Mixed learning has several key advantages, such as flexibility in space and time tailored to the needs of the individual student, as well as the ability to balance the transfer of knowledge and skills.
The mixed learning approach requires a detailed discussion of the advantages of technological e-learning tools and their compatibility with pedagogical strategies and learning objectives.

Methodology

This study was conducted using a focus group method that best suited the specifics of the study. A Focus group is a type of group interview, the course of which obeys certain rules and is characterized by specific goals. Also, the methodologies used in the focus group process, the requirements for the selection of respondents, and the forms of communication between the researcher and the respondents are different.
The focus group allows us not only to study in depth this or that difficult issue but also to create a clear idea about the diversity of opinions in the community around this issue. Focus group discussions reveal the respondents' attitudes towards the social problem, their psychological attitudes, and emotional assessments, which are often not even realized by the respondent.
One of the great advantages of a focus group is that it allows us to keep an eye on the thought process and try to determine why people think the way they think. This happens during an exchange of views between group members. No less important is the fact that conducting a focus group often helps to take a fresh look at this or that issue, highlighting its important aspects that may not have been revealed during the formal interview. Therefore, according to David Morgan, one of the most important virtues of focus groups is the ability of this method to discover new topics and come up with new hypotheses.
Also, the economic side can be considered a positive side. Focus groups are less expensive than other types of research. As a result of the focus group, the researcher only draws conclusions based on the verbal information of the respondents, which, of course, somewhat reduces the reliability of the results because this information does not always correspond to reality. Which is considered to be the negative side of the focus group.
The sample included 40 students from different public and private schools in Georgia. In order to collect data, five focus groups were conducted with a total duration of 7 hours. The research questionnaire included 20 open-ended questions. We observed the process and wrote the words and sentences used by the participants on the audio tape. We have pointed out some interesting and useful points and specific details for our research.

Knowledge of distance education

All respondents share one opinion about online education. For them, Internet education is associated with the resources available in the Internet space, through which it is possible to get education, both for school assignments and extracurricular activities.

Pros of online education

Respondents think online education has many positive aspects. Will it be practicality or affordability. The main advantages of online education for students were accessibility, practicality, and a wide choice of materials. One of the main advantages of online teaching is considered to be the student-tailored curriculum, being free to choose the field you are interested in.

Disadvantages of online education

Despite the positives, students also see negatives in online education. One part agrees with the opinion that such education or replacing an individual and direct connection with the lecturer is very good, while the other opposes it. Respondents talk about sites where tuition is expensive and consider this to be the main problem. The second major problem was health issues. Some participants believe that long-term use of the equipment is detrimental to their health.

Online education platforms

Research participants are quite actively involved in the process of getting online education. Accordingly, several major sites most frequently visited by respondents were identified. As survey participants believe, youtube.com is a very good way to get online education. Respondents agree that any site can be used as a source of education, even foreign movie sites can become a foreign language learning tool if used properly.

Basic subjects

When asked which subject will be studied most often from online platforms, the majority of respondents singled out foreign languages. For the main reasons, almost everyone justified accessible, reliable information, free tutorials, and easy access to certifications. It should be noted that most students learn Russian, Japanese, and English through online teaching. Many of them name obtaining a certificate as a positive side of online learning. Online training courses are the best way to get free and cheap education with certificates and certificates.

Conclusion

In conclusion, we can say that after analyzing the data, it was found that online education for respondents is mainly associated with the resources available in the Internet space, through which it is possible to get education. Research participants are quite actively involved in the process of getting online education. In the process. Foreign languages (Russian, English, Japanese) were the most frequently studied subjects. Respondents think that online education has many advantages: practicality, accessibility, flexibility over time. Nevertheless, the disadvantages were also revealed, which means that online education does not allow for face-to-face interactions with lecturers. Most of the respondents turn to online education when there is a problem of lack of time or when the subject is not taught in Georgian. Our research is valuable because it deals with the involvement of students in online education, which allows them to additionally search for different materials and master the subjects they want, especially in a pandemic.

Recommendations

It is important that during the pandemic period, teacher training and retraining courses must be used to enable them to adapt to the digital world. In addition, it is especially important to set up and develop online learning platforms so that distance will not be a problem for getting a quality education, children living in regions and mountainous areas should be able to get the same quality of education as students in big cities.

The main goal is for Georgian pupils and students to be able to compete with their counterparts from leading countries, and in the modern world, this process is possible only with the inclusion of more technology in the education process.

Recommendations for parents: First of all, it is important to note that any change requires a certain adaptation period. Thus, when choosing any format of distance learning, we should not expect great success in the first days, therefore be charming and less critical of the people involved in such a learning focus on the positive, and record each positive result; However, at the same time, we will need to analyze each problem and think about how to fix those problems.

Parents of students should take into consideration the fact that online learning seriously increases the role of the parent in the teaching-learning process. Much depends on the parents on how safe the learning environment will be created for the child, not only physically but also socially.

Naturally, parents are interested in how appropriate it is for them to attend online lessons. In this case, the age of the child must be taken into account first. If the student is youngest, parental involvement is needed, but when it comes to the younger, the parent doesn't need to be present. The parent should consider how many hours the child spends with the computer. Attending and participating in 3-4 online lessons during the day is quite enough for the child to stop communicating with the computer for the rest of the day. However, if he engages in computer games during the "non-teaching" period, it can cause serious damage to his health. The parent should make sure that the teenager replaces computer games with other, more useful activities. Keep in mind that under the right guidance, distance learning can bring many positives. It will help the child to develop the ability to act in a changing environment, as well as self-discipline, responsibility, and managing their behavior.

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ARTIFICIAL INTELLIGENCE IN MATHEMATICS EDUCATION: AN EMPIRICAL STUDY OF USING CHATBOT IN TEACHING AND LEARNING MATHEMATICS AT VIETNAMESE HIGH SCHOOLS

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Abstract

In recent years, Artificial Intelligence (AI) has strongly impacted every area of life. Especially in education, many research trends on AI were born and brought many benefits such as Machine Learning, Deep Learning, Chatbot, etc. This paper presents an empirical study of using Chatbot systems on the Facebook Messenger platform for teaching and learning Mathematics. The research also discusses the initial results and challenges of using Chatbot in Mathematics Education.

Keywords: Artificial Intelligence, Chatbot, Mathematics Education.

INTRODUCTION

Recently, with the continuous development of the world, typically the 4.0 revolution has been affecting various fields, including Education (Aberšek and Flogie, 2017), especially in teaching Mathematics, there has been much research on the application of digital technology, for example: Using Geogebra to teach a Math topic (Loc and Phuong, 2015); make use of mobile applications in Mathematics Education (Larkin and Calder, 2016); designing Dual-use lessons to teach both online and offline (Tuan et al., 2020); etc. And especially, the trend of approaching Artificial Intelligence in Mathematical Education has become more and more common (Mali and Huaxi, 2019).

Artificial intelligence, also known as artificial intelligence (Artificial Intelligence - AI), according to McCarthy (1998), said that AI is the science and engineering that executes intelligent computer programs to understand human intelligence. In addition, AI can program algorithms on behavioral data using analysis and synthesis techniques (Nilsson, 2014). Therefore, AI has been developed and contributed to improving people's lives in many aspects (Pannu, 2015).

Although AI has been improved a lot, its application in Education is still a big obstacle (Kay, 2012). Thus, these challenges need to remove gradually; many research directions have been developed, such as Machine Learning (Perrotta and Selwyn, 2020), Deep Learning (Szeto et al., 2020), etc, especially chatbot, an interactive system automatically between users and computers on social networking platforms (Winkler and Soellner, 2018).

Chatbot, or the term Chatterbot, was introduced by Michael Mauldin (creator of the first Verbot, Julia) in 1994 to describe chat programs (Mondal et al., 2018). Users can ask questions and requests to the system, and the chatbot will rely on keywords and then process information to give appropriate automatic answers (Hiremath et al., 2018). Chatbot brings many benefits, such as: saving human costs (Lee et al., 2020); increase user satisfaction (Winkler and Soellner, 2018); gives precisely the information users are looking for (Vegesna et al., 2018), etc. Mathews (2006) shows that Facebook is a popular online social network in

Education. Many researchers are building chatbots to serve many fields, including Education, because of their usefulness (Holotescu, 2016), and learners now can see chatbot as one (or more) employee, virtual assistant.

This study proposes to design a chatbot dialog box on the Facebook Messenger platform for learning Maths. The effectiveness of chatbots has been evaluated; a study on teaching and learning Mathematics in high schools was conducted based on the chatbot building tool - Chatfuel.

LITERATURE REVIEW

Chatbot in Education around the World

Chatbot for learners is a new thing in supporting teaching and learning (Clarizia et al., 2018). However, the application of chatbots in Education is still limited (Winkler and Söllner, 2018); chatbots in Education still promise to impact student learning and satisfaction positively. Molnár and Szüts (2018) reported that some students, when chatting with chatbots, think that the information they find is more reliable than searching the Internet.

Research about the application of chatbots in Education is typical in the world such as chatbot Line application was studied at Indonesian Computer University to learn math. Experiments show that chatbot applied to a test class has achieved quite good results (Febriani and Agustia, 2019). MOOCBuddy - a chatbot consultation system for Facebook Messenger, based on media profiles and user interests to help learners find the best learning resources, MOOCBuddy considered the big trend of 2016 (Iftene and Vanderdonckt, 2016); Goel et al. (2015) designed Jill - the educational assistant chatbot, applied at Georgia Tech. Ashok Goel's online courses with over 400 students each semester will be many questions to answer over 10,000 questions. Teachers and students cannot meet face-to-face every day, and it will not be possible to answer all questions, so that chatbot Jill was born as a teaching assistant to solve the above situation. In the study of Heller et al. (2005), researchers gathered feedback from psychology students using a chatbot called Freudbot to create conditions for students to interact and thus improved the problem of answering questions; Chatbot about Sexual Health Information HIV/AIDS – SHIHbot research by Brixey et al. (2017) to answer the above questions. The chatbot's response data source is aggregated from professional medical resources and public health to support users with the most accurate information.

Chatfuel Tool

Chatfuel was born in 2015 as a free tool to build chatbots, prevalent on the Facebook Messenger platform (Janarthanam, 2017). To create an account with Chatfuel, then access http://chatfuel.com. According to Ahmed and Hussein (2020), chatfuel provides templates and pre-builts for creating chatbots. The design and implementation include the following essential steps:

+ In **Automate**, conversations designed with **Block**, specifically, when accessing the chatbot for the first time, there will be two default **Blocks**, **Welcome Message** and **Default answer** are demonstrated in Figure 1:

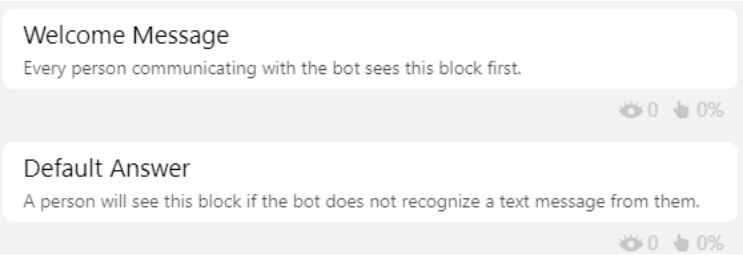


Figure 1. Two default blocks when designing conversations

+ Next, to create a new **Block**, select +ADD SEQUENCE OR GROUP to create a group of **Block** and naming, sorting, and grouping. After that, **the Link** button was chosen for creating a path (URL) to access that Block directly.

+ Continue to set the time in the preset Typing section: from 0.1 to 20 seconds. This animation gives the user time to read the message from the bot before the following message is sent.

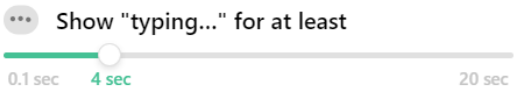


Figure 2. Set up a time for chatbot to respond

+ The next step is to enter data for the chatbot on the Facebook Messenger platform that cannot enter math formulas with Mathtype, so they have converted the PDF file of the questions to JPEG image and cut the image into each sentence.

+ Add additional functions for chatbots, in the section **Set up AI** is a critical feature that helps the chatbot to choose intelligent answers with keywords in the user's questions that been set up for the chatbot before, such as greeting, self-introduction, guiding users to update information, surveying users' opinions.

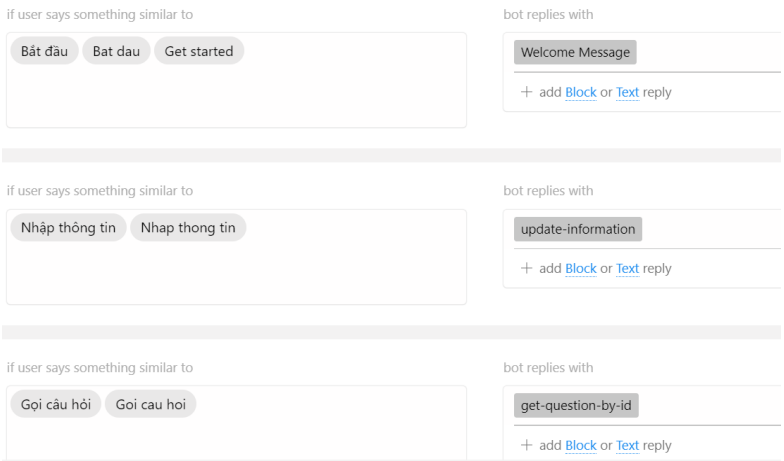


Figure 3. Set up AI

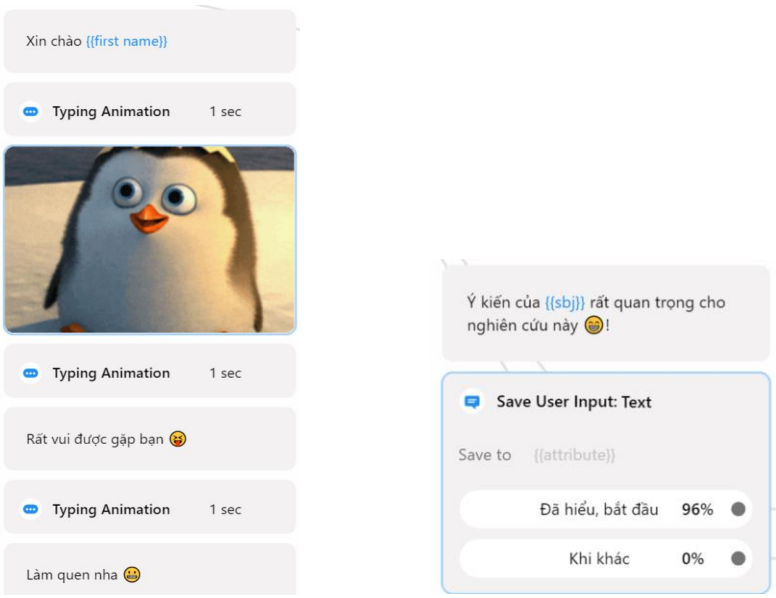


Figure 4. Set up the intro, user information

RESEARCH METHODS

The study is conducted according to the following process:

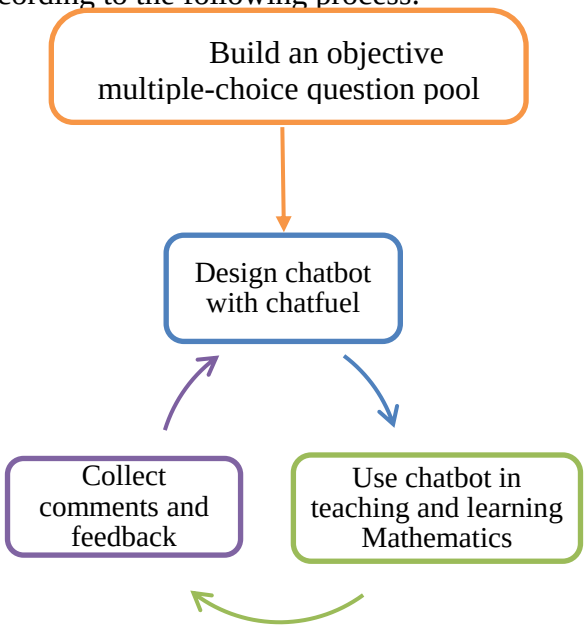


Figure 5. The Procedure of Designing Chatbot in Teaching and Learning Mathematics

+ At the "**Build an objective multiple-choice question pool**" step, the research has selected the chapter trigonometric functions and trigonometric equations for the grade 11 high school math program to proceed as the input data source for the chatbot, which is most students consider challenging to solve (Rohimah and Prabawanto, 2020), and the distribution time is not enough for students to practice and consolidate. IATA (Item and Test Analysis) software is provided free of charge by Fernando Cartwright to analyze multiple-choice data to improve the quality of questions; simultaneously, it also helps teachers assess students' fundamental abilities (Shiel and Cartwright, 2015). Next, conduct experiments with 35 multiple-choice questions on trigonometric functions and trigonometric equations and evaluate through IATA according to De Ayala (2013). The number of survey samples is at least three times higher than the number of questions studied with 35 questions; the number of

samples to be surveyed is at least 105 students in grade 11 at high schools in Can Tho city. Then, the question pool was aggregated with 135 questions as input data to design the chatbot.

+ Next, in "**Design chatbot with chatfuel**", with functions of Chatfuel, a study following Janarthanam (2017) steps to create a chatbot on the Facebook Messenger platform, including AI settings. Students will start a conversation with the chatbot like two friends by greetings: first and last name, school, the topic of choice, then students will choose the type of exercise they want to practice or consolidate knowledge, multiple-choice questions from the designed question pool, students will choose 1 of 4 options, the chatbot will answer that the student's answer is right or wrong.

+ In the step **"Use chatbot in teaching and learning Mathematics"**, the research has sent a link to access the chatbot for students to experience learning mathematics. There are four sections of math in trigonometric functions and trigonometric equations with levels from easy to difficult for students to do. In the chapter review, students can use it to answer questions or can practice more at home to improve their math ability based on the study of Palasundram et al. (2019).

+ The final step is **"Collect comments and feedback"**. This method is implemented based on evaluating educational products by survey and experiment (Mertens, 2014). The results and analysis are presented in RESULTS.

RESULTS

An Objective Multiple-Choice Question Pool

Table 1. Summary of 135 objective multiple-choice questions of the question pool

Section	Level of Remembering	Level of Understanding	Level of Applying	Level of Analysing	Total
Trigonometric Function	10	14	9	5	38
Basic Trigonometric Equations	10	9	7	3	29
Common Trigonometric Equations	8	14	10	6	38
Apply trigonometric functions and trigonometric equations in practice	6	9	6	9	30
Total	**34**	**46**	**32**	**23**	**135**

User Interface after Designing Chatbot

This study designs chatbot with objective multiple-choice questions learning Trigonometric Function and Basic Trigonometric Equations chapter by access link: https://www.facebook.com/ctume.kant/

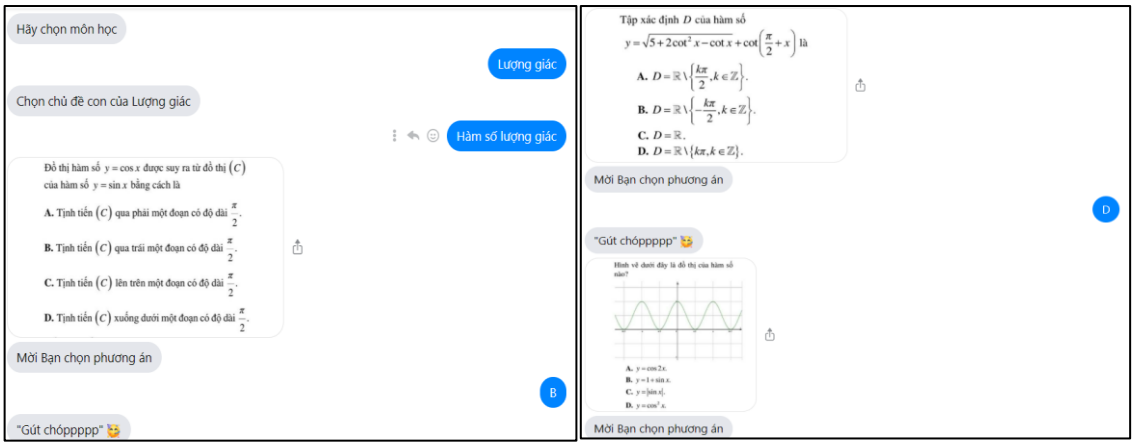


Figure 6. An interactive message between the user and the chatbot

Students' Feedback Survey

a) A priori analysis

In this study, a student survey was designed to assess student experience and collect feedback, including the following questions:

Table 2. Questionnaire about the chatbot applicability

Questions	Content
Q1: Compared with traditional teaching, learning Math with the chatbot via mobile phone on the Facebook Messenger platform has the following benefits:	1A. Accessibility
	1B. Supporting study at anytime
	1C. Supporting study anywhere with an Internet connection
	1D. Increasing interest in learning
	1E. Quick response
	1F. Ubiquity
Q2: Content of Knowledge	2A. Content covers the necessary knowledge
	2B. Content of knowledge is suitable for students
	2C. Content of knowledge is easy to understand
Q3: The organization of Content	3A. The organization of content is typing through text messages
	3B. The organization of content is interesting
	3C. The organization of content is interactive

Q4: In your opinion, what are the advantages of using the chatbot to learn Math?

Q5: In your opinion, what are the disadvantages of using the chatbot to learn Math?

Q6: What suggestions do you have for improving the chatbot?

Q7: On a scale of 1 to 10, how would you rate about the chatbot works?

Question 1 is used to evaluate the advantages of using the chatbot to learn Math. Some of the benefits mentioned above are extracted from the study by Criollo-C et al. (2018) on the advantages and disadvantages of M-learning in education, and other benefits have added more. Questions 2 and 3 include the content and organization of the chatbot extracted from Vanichvasin's (2021) research, from which this study wants to evaluate the range of knowledge and how to organize and arrange chatbot's content has. All four questions are designed on a 5-step Likert scale to evaluate the quantitative results of the answers. The questions were coded to score as follows: Strongly disagree = 1; Disagree = 2; Neither agree nor disagree = 3; Agree = 4; Strongly agree = 5.

Questions 4, 5, and 6 are open-ended questions to evaluate the advantages and disadvantages of chatbot. In addition, it is intended to record suggestions for improving the chatbot checkout form from users. Question 7 examines the rating for how the chatbot works on a 10-point scale.

b) A posteriori analysis

The study has collected 75 handouts and collected 75 votes (100%) from 4 high schools in Can Tho city. Student feedback on reliability Cronbach's Alpha of Q1, Q2 and Q3 questions were analyzed by using the SPSS version 24 and presented in Table 3:

Table 3. Analysis of student opinion survey data based on Cronbach's Alpha of Q1, Q2, and Q3 questions

Questions	Cronbach's Alpha	N of Items	Code Number	Corrected Item-Total Correlation
Q1	0.802	6	Q1A	0.589
			Q1B	0.629
			Q1C	0.681
			Q1D	0.504
			Q1E	0.606
			Q1F	0.377
Q2	0.601	3	Q2A	0.493
			Q2B	0.330
			Q2C	0.411
Q3	0.627	3	Q3A	0.417
			Q3B	0.417
			Q3C	0.477

As in Table 3, the correlation coefficients of the observed variables are entirely appropriate (both greater than 0.3). Besides, the coefficient of Cronbach's Alpha of the Q1 question is 0.802 ≥ 0.8, which shows that scale is perfect. The coefficient of Q2 and Q3 questions are 0.601 and 0.672, respectively, are more significant than 0.6, show that they meet the requirements for reliability, proving the questions are consistent with the opinion survey.

Question 1 is presented with the following details:

Table 4. Q1 question's quantity statistics

Questions		**1A**	**1B**	**1C**	**1D**	**1E**	**1F**
Strongly disagree	Frequency		0	0	0		
	Percentage (%)						
Disagree	Frequency		0	0	0		
	Percentage (%)						
Neither agree nor disagree	Frequency	4	5	2	6		
	Percentage (%)	.3	.7	.7	.3	0.7	.3
Agree	Frequency	7	37	38	39	7	0
	Percentage (%)	9.3	9.3	0.7	2.0	9.3	3.5
Strongly agree	Frequency	4	36	32	32	0	8
	Percentage (%)	5.3	8.0	2.7	2.7	0.0	7.3
Total of Agree and Strongly agree	**Frequency**	**71**	**73**	**70**	**71**	**7**	**8**
	Percentage (%)	**94.6**	**97.3**	**93.4**	**94.7**	**9.3**	**0.8**

Based on Table 4, it is showed that the total percentage of students choosing Agree and Strongly Agree the advantages of chatbot is more significant than 85% when learning Math compared to traditional teaching. For Q1B related to learning Math at any time with the highest rate of 97.3%. The benefit of Q1E is that the quick response is also achieved 89.3%, which is also a significant advantage when students use the chatbot, with programming the chatbot to respond after students enter the answer as quickly as possible to learn. Students do not lose time waiting for the next question.

Question 2 and 3 are presented with the following table:

Table 5. Q2 and Q3 questions' quantity statistics

Code Number	**Quantity**	**Mean**	**Median**
Q2A	75	4.36	4
Q2B	75	4.21	4
Q2C	75	4.33	4
Q3A	75	4.32	4
Q3B	75	4.29	4
Q3C	75	4.25	4

The mean value of question from Q2A to Q3C are all greater than 4, showing that most students agree with the survey content proving that the chatbot provides the necessary and appropriate knowledge for students understandably and clearly. In addition, the content arrangement of the chatbot is pre-programmed when the user is writing a message, it was built to catch students' attractivenes and increase interaction. Therefore, they are more interested in learning Math with chatbot. The median value of the sentences is 4, higher than the theoretical mean value of 3, showing that the opinion trend is skewed to the positive side.

Analytical results for Q4 to Q6 are presented with the following details:

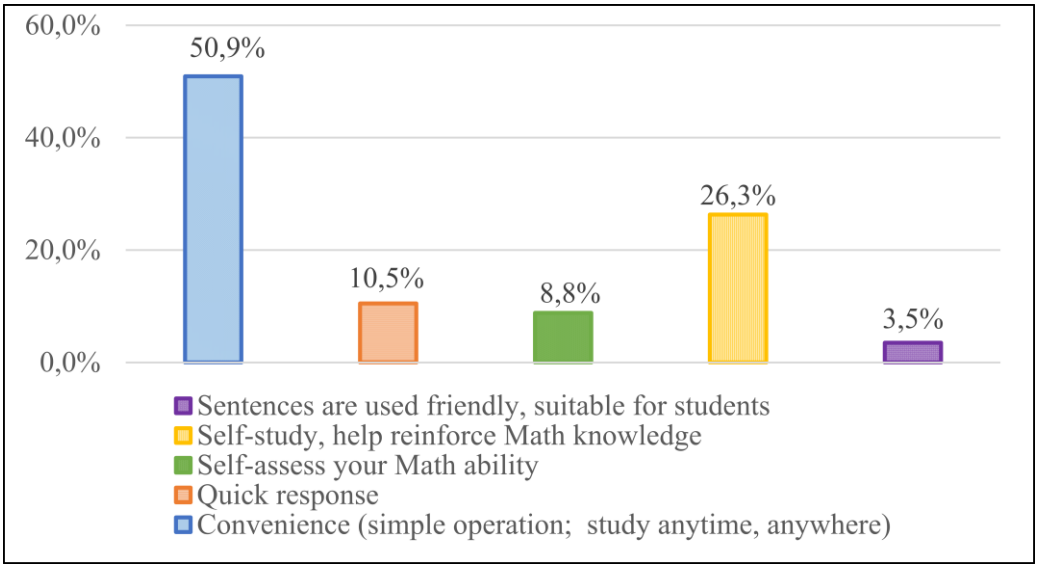


Figure 7. Advantages of using chatbot in learning Math

Up to 50.9% of the survey respondents said that the advantage of using a chatbot in teaching Mathematics is convenience, which includes ideas such as simple operation; can learn anywhere, anytime, this is also the most prominent and characteristic advantage of chatbot. The advantage of offering students consolidate their knowledge of Mathematics accounted for 26.3%, showing that chatbots provide objective multiple-choice questions that can both support students perform self-assessment, self-study and reinforce themselves. Besides, students will receive a quick response, so they have been increasing interest in learning Math.

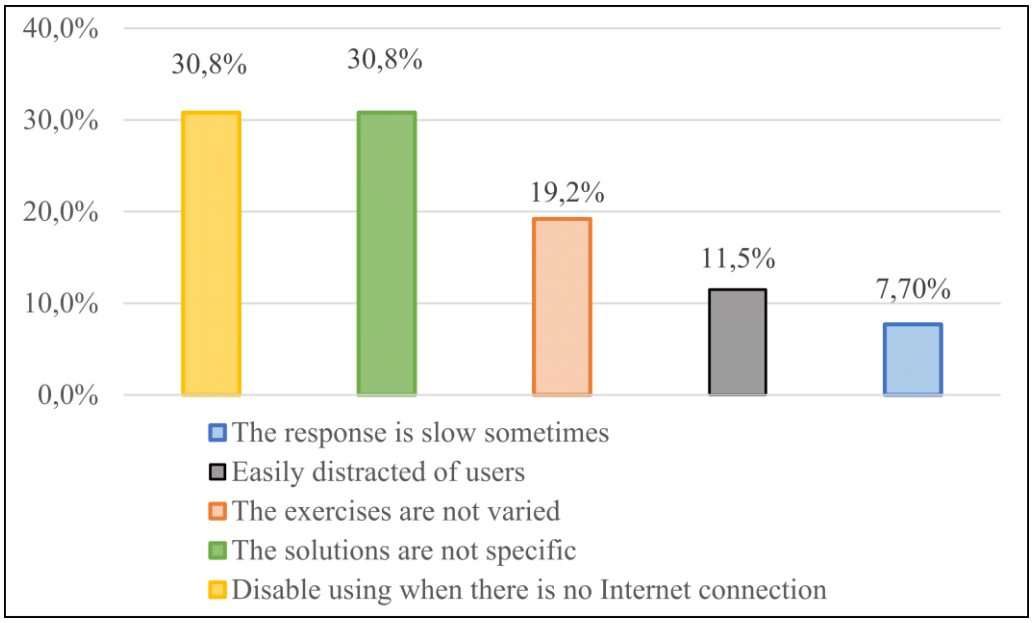


Figure 8. Disadvantages of using chatbot in learning Math

The percentage of students choosing options about the disadvantages of chatbots in teaching Math is lower than 50%, showing that chatbot does not have too many limitations for students. However, the main disadvantages are given as “cannot be used in places where there is no Internet" and "no specific solution" accounting for 30.8%, making it difficult for students to ask questions in places where the Internet is not available, and they find hard to understand how wrong they are partial. There is also 11.5% that chatbot has not yet attracted users. These are issues of concern for us to fix later for chatbots.

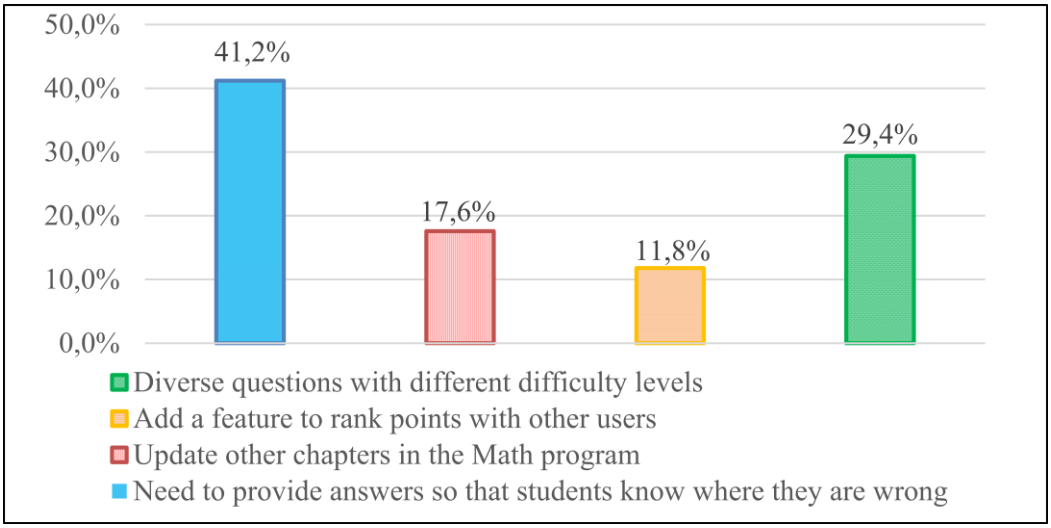


Figure 9. Things need to be improved for chatbot

With the percentage of survey votes accounting for 41.2%, it is necessary to provide solutions for students that they can know where are wrong with the highest rate. Other requirements include updating other chapters in the Math program and a variety of questions so that students can do new questions with a variety of exercises. An improvement that is quite actively contributed is adding a feature to rank chatbot users against each other. Thereby, students will know where they are compared to their peers, helping them strive more and be more active in learning Math.

Question 7 asks about the rating scale of how it works when students experience it on a scale of 10.

Table 6. Student chatbot evaluation statistics

Score (x_i)										**0**
Frequency (n_i)								5	3	5

The average score is calculated as follows:

$$\overline{X} = \frac{\sum_{1}^{10} x_i.n_i}{N} \approx 8.03$$

The results received with an average score of 8.03/10 show that some students appreciate the application. Overall, the scores were spread from 5 to 10 points, with a maximum of 33 students choosing 8 points, and none of the responses rated the score low. It will substantially positively impact the research team to continue developing and expanding the chatbot as a virtual assistant and tutor system for students.

The question is whether the rating of chatbots with gender is dependent or independent of each other? The study was conducted to test the independence of two variables between Gender and Score.

Table 7. Statistics of chatbot rating scale by gender

| Gender | | | | | | | | | |

The result of the p-value is 0.372 > 5%, which should accept H_0 reject H_1 at 5% significance level and derive Gender and Score independently of each other. It shows that there is no dependence between males and females with chatbot evaluation scores, and it is not possible to conclude that male or female students will prefer chatbot with AI-integrated ways of working or even Information Technology, the operation of male students is more accessible than that of female students.

CONCLUSION

Research results show that teaching Math using chatbots on the Facebook Messenger platform benefits students to learn Math effectively in the current educational context. In addition, Chatbot can be used for many purposes such as self-reinforcing Math knowledge, self-study, and self-assessment of their Math learning ability.

Chatbot applies not only to Maths but also to other subjects such as Physics (Aguilar-Mejía and Tejeda, 2020), Chemistry (Mahroof et al., 2020), … In addition, chatbots also have many outstanding features about form, message response speed, can be used at any time or place with an Internet connection. In the future, the chatbot will be perfected by research-oriented features such as adding a rating function to help students increase interest and motivation when learning math; optimize the processing of design steps; diversify the conversational style of chatbots.

In addition, the trend of incorporating technology into Mathematics education will become more and more popular, especially after the global crisis because of the Covid-19 pandemic. Readers can refer to some articles about teaching and learning Mathematics with digital tools such as mobile apps (Tuan et al., 2020a), text mining techniques (Bui et al., 2020), augmented reality (Estapa and Nadolny, 2015), 3D scan software (Hieu et al., 2020), etc.

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EXAMINATION OF THE INTERNET ADDICTION LEVEL OF UNIVERSITY STUDENTS

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Abstract

This study was carried out to determine and compare the internet addiction levels of university students studying at the Faculty of Sports Sciences (FSS) and the Department of Computer Technologies (DCT) during the COVID period. 300 (age; 21.92±2.94 years) undergraduate students studying at FSS and 300 (21.35±1.20 years) undergraduate students studying at DCT participated in the study. In the study, the “Internet Addiction Scale” developed by Young (1998) and adapted into Turkish by Bayraktar (2001), was used to determine the internet addiction levels of undergraduate students. The highest score that can be obtained from the scale is 100 and the lowest score is 0. A high score is evaluated as a high internet addiction (showing symptoms) of the individual. Data analysis was done with SPSS 21 package program. Independent t test was used for statistical analysis.

It was observed that the internet addiction levels of all undergraduate students participating in the study were in the "limited symptomatic" level. It was determined that the internet addiction scores of students studying at DCT were higher than those of FSS students, but the scores did not differ statistically significantly according to the department they studied ($p>0.05$). Internet addiction scores of male students were statistically higher than female students ($p<0.05$). It was determined that the internet addiction scores of those who had their own computer and those who did not have their own computer were similar ($p>0.05$).

As a result; Internet addiction levels of undergraduate students studying at university are at a level that shows a limited number of symptoms. Studying at FSS and DCT does not differentiate this situation. Males show more symptoms than females.

Keywords: Internet, addiction, student

INTRODUCTION

Addiction can be defined as the inability to stop using or control a substance or behavior (Günüç, 2009). Within the scope of technological addictions, addictions such as media addiction, television addiction, mobile phone addiction, computer and internet addiction can be handled (Taylan and Işık, 2015)

Internet addiction is defined as the inability to prevent excessive internet use, the loss of importance of the time spent without the Internet, the state of extreme irritability and aggression when deprived, and the gradual deterioration of the individual's family, friends and school life due to the time spent on the Internet (Uysal, 2013).

Internet addiction is mental problems that has become widespread in our country as well as in the world and that psychiatrists related to addiction are starting to encounter frequently. It is suggested that games played over the internet and enjoyable moments spent in front of

the computer are addictive by using neurobiological mechanisms similar to the same psychoactive substances (Öztürk et al., 2007; Aslan, 2011).

In this study, the internet addiction status of the students of the Department of Sports Sciences and Computer Technologies was examined.

METHOD

Our study included 300 undergraduate students (age; 21.92±2.94 years) studying at the Faculty of Sports Sciences (FSS) and 300 undergraduate students (age; 21.35±1.20 years) studying at the Computer Technologies Department (DCT). 600 undergraduate students participated. "Personal Information Form" and "Internet Addiction Scale" were used as data collection tools. Participants filled the scale and personal information form online.

Internet Addiction Scale: The "Internet Addiction Scale", developed by Young (1998) and adapted into Turkish by Bayraktar (2001), was used. For each question in this 6-point Likert-type scale, participants are given a score of 0 (Never), 1 (Rarely), 2 (Occasionally), 3 (Mostly), 4 (Very often), 5 (Continuously). By summing up the scores obtained as a result of the survey, users who score 50 points or less are classified as "No Symptom", users between 50-79 points as "Limited Symptoms", and those who score 80 and above are classified as "Pathological Internet Users" (Bayraktar, 2001).

Statistical Analysis: Whether the data showed normal distribution or not was examined with the Kolmogorov-Smirnov test. Since it was determined that the data showed normal distribution, the difference between the two groups was analyzed by t test in Independent groups.

RESULTS

Table 1: Internet Addiction Scores of Participants

		N	**Internet Addiction score**		p
			Mean	Std. Deviation	
Faculty	Department of Computer Technologies	300	57.41	23.25	0,083
	Sports Science Faculty	300	51.34	25.78	
Gender	Female	285	48.35	22.64	0,045*
	Male	315	59.75	28.34	
Do you have your own computer?	Yes	352	54.97	24.12	0,557
	No	248	52.56	26.49	

Internet addiction scores of students studying in DCT and FSS are given and compared in the table. It was observed that the Internet addiction scores of the students studying in both departments were at a level showing a "limited number of symptoms". There was no statistically significant difference between the Internet addiction scores of the students of both departments ($p>0.05$).

The table shows whether the total score of students' internet addiction differs according to the gender variable. As a result of the examination, it was seen that there was a significant difference between the internet addiction scores of the students. Internet addiction mean scores of male students ($\bar{X} = 59.75$) were statistically significantly higher than female students ($\bar{X} = 48.35$) ($p<0.05$). It is observed that male students have more internet addiction than female students.

Internet addiction scores of those who have their own computers and those who do not, were compared and it was found that there was no statistically significant difference ($p>0.05$).

DISCUSSION

In our study, the Internet addiction levels of students studying at DCT and FSS were examined. There was no statistically significant difference between the Internet addiction scores of the students of both departments. It was observed that the Internet addiction scores of the students studying in both departments were at a level showing a "limited symptomatic" level. When this finding of our study is compared with the literature, it is seen that the internet usage scores of the students in our study are much higher. The reason for this situation may be the implementation of our scale during the COVID period. The reason of this situation can be education is processed online during the COVID period. People who cannot go out comfortably are locked in their homes and they cannot find much to do, so their use of telephone and computer has increased.

In our study, it was examined whether the students' internet addiction scores differed according to the gender variable. As a result of the examination, it was seen that there was a significant difference between the internet addiction scores of the students. It is observed that male students' internet addiction is higher than female students. The reason for this may be that women do more housework (cooking, cleaning, etc.) than men. As men get bored at home, they may have increased their phone and computer use. When the literature is examined, it is seen that it supports our study.

Within the scope of a research, analyzes were made in order to determine students' internet usage and thoughts. As a result of the analyzes, the internet usage status of the physical education and sports department students was examined. In the study, firstly, the relationship between gender status and existing variables was investigated, and as a result of the analyzes made, it was determined that the Internet was used more effectively by male students (Argan, 2006).

Günç (2009) analyzed the internet addiction status by gender and found that the addiction levels of men were higher than women. In another study, it is seen that male students have a higher average of internet addiction than female students (Gökçearslan and Günbatar, 2012).

Internet addiction scores of those who have their own computer and those who do not have been compared and it has been found that there is no statistically significant difference. The reason for this is that phones can now be used as a kind of computer. In fact, the phone is more practical for students who want to attend the class.

As a result; Internet addiction levels of undergraduate students studying at university are at "limited symptomatic" level. Studying at FSS and DCT does not differentiate this situation. Males show more symptoms than females.

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ANALYSIS OF THE STRESS FACTORS OF BASKETBALL REFEREES

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Abstract

This study was conducted to determine the stress sources faced by basketball referees during their refereeing process and to examine the differences between them according to various variables. A "personal information form" and a "stress sources scale" developed by Çakmak (2011) were applied to 178 male basketball referees between the ages of 18-39 (age; 26.06 ± 4.42 years). Scale; It consists of 3 sub-dimensions: individual, environmental and organizational stress. In statistical processes; Student's t test was used for two group comparisons and One Way ANOVA test was used for triple group comparisons.

It was observed that the opinions of the participants on the organizational stress factors were the highest. It was determined that the factor with the least average is the environmental stress factor. Individual referees had higher individual stress factors than married basketball referees. There was no significant difference between the views of single referees and married referees on environmental and organizational stress sources ($p<0.05$). No statistically significant difference was found between the opinions of basketball referees with high school and university education on individual stress, environmental stress and organizational stress factors ($p>0.05$). As a result of the analysis made; The opinions of basketball referees with 1-2 years of professional seniority on individual stress factors were found to be higher than the referees with 3-5 years and 6-10 years of professional seniority.

As a result of our study; it has been observed that marital status and duration of arbitration affect the stress level.

Keywords: Basketball, referee, stress

INTRODUCTION

Stress can also be defined as an inconspicuous physiological and psychological reaction to events that are perceived and addressed as a danger sign or a warning for the individual's well-being and peace (Ertekin, 1993).

In a state of stress, where the organism is threatened, a series of events occur in humans at both physical and psychological levels. The bodily stress response is characterized by being a constant response that occurs regardless of the type of stressors. The organism is threatened and thus causes an alarm response to disrupt the balance and maintain vitality. It has to adapt to the new situation in order to restore the deteriorated balance (Baltaş, 2000).

Sabuncuoğlu and Tüze (2003); named the factors that cause stress as stressors. They studied stressors by grouping them as individual factors, physical environmental conditions, and organizational factors.

People's individual sources of stress can be their temperament, temperament, character, and abilities that often reveal their personality; that is, the source of stress may be the individual's own personality. It is not the events that affect people, but the meanings they give to events. People see as they think or see as they want to see. There are different types of the same image, as well as the point of view. Accordingly, the individual's personal characteristics are themselves potential sources of stress (Çakmak, 2011 and Tutar, 2004). Physical environmental conditions closely affect the study environment of the employee's physiology and psychology (Çakmak, 2011). Organizations are social units that are created consciously and function within an order in order to fulfill a specific purpose (Genç 2005). Organizational stress, which is also called study stress or occupational stress, can be defined as the activation of individual energy against any expectation related to the organization or study (Aydın, 1993).

This study was carried out in order to determine the stress sources faced by basketball referees during their refereeing process.

METHOD

178 male basketball referees between the ages of 18-39 (age; 26.06 ± 4.42 years) voluntarily participated in our study.

Data Collection: The data collection tool consists of 2 parts. First part; It is the part that includes personal and professional information of basketball referees. In the second part, there is a scale developed by Çakmak (2011) to determine the individual, environmental and organizational stress sources of the referees. Answers to each item in the scale are shown with a five-point rating scale. The options of the scale and their scores are from 1 to 5 as "Strongly Disagree" (1 Points), "Disagree" (2 Points), "Undecided" (3 Points), Agree "(4 Points)," Strongly Agree "(5 Points). A scale form was prepared based on the Likert method with five options towards to. For the range in the five-point rating scale (5-1 = 4), according to the calculated range coefficient (4/5 = 0.80), the option ranges, "Absolutely Disagree" (1.00-1.79), "Disagree" (1.80-2.59), "Unsure" (2.60-3.39), "I agree" (3.40-4.19), "Strongly Agree" (4.20-5.00).

The scale forms were handed over by the researcher and the basketball referees were filled.

Data Analysis: Whether the data showed normal distribution or not was examined with the Kolmogorov Smirnov test and it was determined that the data showed a normal distribution. For this reason, Student's t test was used in the comparisons of two groups and the One Way ANOVA test was used in the comparison of three groups.

RESULTS

Table 1. The Measured Scores of Basketball Referees on Individual, Environmental and Organizational Stress Factors

Organizational Stress Factors	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Individual	178	2.22	4.56	3.23	.51
Environmental		1.31	4.50	2.68	.75
Organizational		1.81	4.75	3.46	.61

It was observed that the opinions of the participants on the organizational stress factors were the highest. It was determined that the factor with the least average is the environmental stress factor.

Table 2. Opinions of basketball referees on individual, environmental and organizational stress sources by marital status

Organizational Stress Factors	**Marital Status**	**N**	**Mean**	**Standard Deviation**	**p**
Individual	married	70	3.01	.42	**0,028***
	single	108	3.30	.52	
Environmental	married	70	2.63	.74	0,733
	single	108	2.70	.75	
Organizational	married	70	3.42	.69	0,770
	single	108	3.47	.591	

*p<0,05

As a result of the analysis made; the views of single and married basketball referees on individual stress, environmental stress and organizational stress sources are given in Table 3. Individual referees had higher individual stress factors than married basketball referees. There

was no significant difference between the views of single referees and married referees on environmental and organizational stress sources (p <0.05).

Table 3. Analysis of basketball referees' opinions on stress sources according to the educational level variable

Organizational Stress Factors	**Education Status**	**N**	**Mean**	**Standard Deviation**	**p**
Individual	high school	74	3.31	.59	0,350
	university	104	3.19	.47	
Environmental	high school	74	2.70	.92	0,868
	university	104	2.67	.67	
Organizational	high school	74	3.53	.71	0,472
	university	104	3.42	.57	

As a result of the analysis made; No statistically significant difference was found between the opinions of basketball referees with high school and university education on individual stress, environmental stress and organizational stress factors (p> 0.05).

Table 4. Opinions of basketball referees on individual, environmental and organizational stress sources according to the variable of refereeing year

Organizational Stress Factors	**Year of refereeing**	**N**	**Mean**	**Standard Deviation**	**p**
Individual	1-2 years (a)	57	3.51	.52	**0,004** a>b,c
	3-5 years (b)	65	3.05	.48	
	6-10 years (c)	56	3.20	.44	
Environmental	1-2 years (a)	57	2.89	.87	0,264
	3-5 years (b)	65	2.60	.71	
	6-10 years (c)	56	2.57	.65	
Organizational	1-2 years (a)	57	3.60	.62	0,199
	3-5 years (b)	65	3.48	.63	
	6-10 years (c)	56	3.28	.55	

*p<0,01

As a result of the analysis made; the opinions of basketball referees with 1-2 years of professional seniority on individual stress factors were found to be higher than the referees with 3-5 years and 6-10 years of professional seniority.

DISCUSSION

The stress factors of the basketball referees participating in the study were examined. It was observed that their views on organizational stress factors were the highest. It was determined that the factor with the least average is the environmental stress factor.

In our study, stress factors were examined according to marital status. Individual referees had higher individual stress factors than married basketball referees. No significant difference was found between the views of single referees and married referees on

environmental and organizational stress sources. In a study, it was found that the stress levels of soccer referees were affected by the marital status variable.

No statistically significant difference was found between the opinions of basketball referees with high school and university education on individual stress, environmental stress and organizational stress factors.

As a result of the analysis made; the opinions of basketball referees with 1-2 years of professional seniority on individual stress factors were found to be higher than the referees with 3-5 years and 6-10 years of professional seniority. However, no significant difference was found between basketball referees' views on environmental and organizational stress sources according to their seniority in the profession. A significant difference was found only between their views on individual stress sources according to their seniority in the profession. This result shows that those new to refereeing (1-2 years) are more stressful. However, in the study conducted by Ekmekçi (2008) on basketball referees, no statistically significant difference was found in stress sources sub-dimensions according to the year of refereeing.

As a result of our study; it has been observed that marital status and the duration of the arbitration affect the stress level.

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ANALYSIS OF BRANCH AND PERSONNEL BASED PRODUCTIVITY INDICATORS IN THE TURKISH BANKING SECTOR

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ABSTRACT

Branch and personnel based productivity in the banking sector are calculated by using the main items as assets, loans, deposits and profits created by branches and personnel of the banks, which are the network used by banks while carrying out their activities. Calculating the productivity of the banking sector is an critical indicator for comparing the performances of banks. Branch and personnel based productivity indicators in the banking sector are calculated by dividing total assets, loans, deposits, and profits by the total number of branches and personnel of the banks. These productivity indicators allow comparing the performance of the banking groups on functional and ownership bases.

The aim of this study is to examine the analysis of branch and personnel based productivity indicators of the Turkish banking sector between 2006 and 2020 using the ratio analysis method. In this framework, the banks operating in the Turkish banking sector are grouped under functional base (deposit banks - participation banks - development and investment banks) and ownership base (state banks - domestic banks - foreign banks); and then asset, loan, deposit and profit per branch and personnel of these banking groups in this period are calculated and compared based on these banking groups.

As a result of the analysis, according to branch based productivity indicators in the 2006-2020 period; state banks increased their asset per branch the most by 9.1 times; state banks increased their loan per branch the most by 17.8 times; foreign banks increased their deposit per branch the most by 8.4 times and domestic banks increased their profit per branch the most by 3.4 times.

According to personnel based productivity indicators in the 2006-2020 period; participation banks increased their asset per personnel the most by 12.4 times; state bank increased their loan per personnel the most by 20.3 times; participation banks increased their deposit per personnel the most by 11.2 times and domestic banks increased their profit per personnel the most by 3.8 times.

Keywords: banking sector, productivity, branch and personnel-based productivity indicators.

1. INTRODUCTION

Banks carry out all their activities through their branches and personnel, which is called the network of the banks. Banks provide all banking services, especially collecting deposits and extending loans, through this network. Banks, which have a higher number of branches and personnel widespread in all regions of the country, naturally collect more deposits and extend more loans than the other banks. However, this does not mean that the

banks that have a high number of branches and personnel are better performed than the banks that have a small network in the country in comparison to the productivity of the banks.

Measuring the performance of banks is an important issue in the banking sector. Common ratios are needed to measure the performance of banks and to compare them with each other. The size of the balance sheet items and total profits of the banks may differ according to the bank structures. For this reason, the comparison of banks with each other based on these balance sheet items does not yield accurate results. Common ratios should be calculated and be used to compare banks with each other.

Within this framework, branch and personnel based productivity indicators are one of the ratios to be used to measure and compare bank performance. Branch and personnel based productivity indicators can be calculated by dividing the total assets, total loans, total deposits, and total profits of the banks by the number of branches and personnel of the banks. Branch and personnel based productivity indicators allow banks to compare with each other, both based on banks and bank groups.

The aim of this study is to examine the analysis of branch and personnel based productivity indicators of the Turkish banking sector between 2006 and 2020 using the ratio analysis method. Banking sector data provided by the supervisory authority of the Turkish banking sector, namely the Banking Regulation and Supervision Agency of Turkey on its website is used in the study (BDDK, 2021). In this framework, the banks operating in the Turkish banking sector are grouped under functional base (deposit banks - participation banks - development and investment banks) and ownership base (state banks - domestic banks - foreign banks); and then asset, loan, deposit and profit per branch and personnel of these banking groups in this period are calculated and compared based on these banking groups.

The study is organized as follows. After the introduction, the studies that examined the performance of the banks based on branch and personnel in the Turkish banking sector are summarized under the literature review in Section 2. A general overview and main indicators of the Turkish banking sector are presented in Section 3. The branch and personnel based productivity indicators of the banking group in the sector and the comparison of them with each other is made in Section 4. In the conclusion section, the main findings and a general evaluation are provided.

2. LITERATURE REVIEW

The studies attempted to measure the performance of the Turkish banking sector by using the balance sheet items and branch and personnel of the sector are summarized in this section.

Ün (2010) studied the relationship between the extent of the number of bank branches and personnel and the basic indicators of economic stability with random effects panel data models of the ten private equity commercial banks of Turkey. Çilan and Can (2014) analyzed the performance of the bank branches in the Turkish banking sector with various ratios by aiming to study the relationship between branch performance variables and variables affecting the branch performance by employing canonical correlation analysis.

Arslan and Bora (2016) aimed to compare domestic and foreign banks in the Turkish banking sector using the ratio analysis method by various ratios and found that when inflation and correspondingly government bonds and treasury bills' interest rates are high, bank groups have achieved high interest-earning profits, in periods when inflation and government bonds' and treasury bills' interest rates are low, they have tried to increase non-interest revenues.

Yümlü and Hazar (2018) researched the performance measurement methods of branches, which is the determinant of performance and profitability of banks and the performance of six private and public Turkish banks branches are analyzed comparatively. Atukalp (2018) examined branch and employee performance of the Turkish banks according to the ownership structure concerning the asset, credit, deposit, and net profit of deposit banks and to determine whether there is a significant difference between them by using Kruskal Wallis Test and Mann-Whitney U Test.

3. OVERVIEW OF TURKISH BANKING SECTOR

The overview of the Turkish banking sector, including the number of banks, total assets, loans, deposits, and profits of the banking groups on functional and ownership base, are given in Table 1 as of December 2020. There are three types of banking groups on a functional base in the Turkish banking sector. Deposits banks are conventional banks that collect deposits from the customers. Participation banks are the banks operating profit-loss sharing according to the Islamic rules. Development and investments banks do not have the right to accept deposits and are established for special purposes and provide investment banking services.

Table 1: Overview of Turkish Banking Sector, December 2020.

December 2020 Million TL	**# of Banks ***	**Total Assets**	**Share (%)**	**Total Loans**	**Share (%)**	**Total Deposits**	**Share (%)**	**Total Profits**	**Share (%)**
Banking Sector	52	6.106.442	100	3.576.375	100	3.455.314	100	58.503	100
Functional Base									
Deposit Banks	32	5.281.462	86.5	3.091.047	86.4	3.133.909	90.7	48.688	83.2
Participation Banks	6	437.146	7.2	222.349	6.2	321.405	9.3	3.717	6.4
Invest&Dev. Banks	14	387.834	6.4	262.979	7.4	-	-	6.098	10.4
Ownership Base									
State Banks	10	2.765.963	45.3	1.697.286	47.5	1.496.414	43.3	21.479	36.7
Domestic Banks	14	1.810.777	29.7	1.020.999	28.5	1.018.293	29.5	21.390	36.6
Foreign Banks	28	1.529.701	25.1	858.089	24.0	940.608	27.2	15.634	26.7

Source: BRSA Banking Sector Data, Own Calculations.

* Adabank and Birleşik Fon Bankası under the management of Saving Deposit Insurance Fund are not included.

As of December 2020, 52 banks are operating in the Turkish banking sector. Of these 52 banks, on functional base; 32 banks are deposit banks with a share of 86.5%, 6 banks are participation banks with a share of 7.2%, and 14 banks are development and investment banks with a share of 6.4% in total assets of the banking sector. On ownership base; there are 10 state banks with a share of 45.3%, 14 domestic banks with a share of 29.7%, and 28 banks

with a share of 25.1% in total assets of the banking sector. The distribution of total loans, deposits, and profits by banking groups has also similar shares as in the total assets of the sector. Deposit banks have the highest shares in this items in the banking sector, as having a share of 86.4% in total loans, 90.7% in total deposits, and 83.2% in total profits.

Table 2: Main Indicators of Turkish Banking Sector, 2006-2020

December, Year Million TL	**Assets**			**Loans**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	499.731	6.106.442	1.122	218.987	3.576.375	1.533
Functional Base						
Deposit Banks	470.635	5.281.462	1.022	202.467	3.091.047	1.427
Participation Banks	13.752	437.146	3.079	9.323	222.349	2.285
Invest.&Dev. Banks	15.345	387.834	2.427	7.197	262.979	3.554
Ownership Base						
State Banks	155.523	2.765.963	1.678	51.021	1.697.286	3.227
Domestic Banks	278.593	1.810.777	550	131.392	1.020.999	677
Foreign Banks	65.615	1.529.701	2.231	36.573	858.089	2.246
	Deposits			**Profits**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	307.647	3.455.314	1.023	11.364	58.503	415
Functional Base						
Deposit Banks	296.495	3.133.909	957	10.243	48.688	375
Participation Banks	11.152	321.405	2.782	391	3.717	850
Invest.&Dev. Banks	-	-	-	730	6.098	735
Ownership Base						
State Banks	10	1.49	1.272	4.	21.4	350

	9.051	6.414		768	79	
Domestic Banks	163.536	1.018.293	523	5.034	21.390	325
Foreign Banks	35.060	940.608	2.583	1.562	15.634	901
	Branches			**Personnel**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	7.256	11.113	53	150.462	202.442	35
Functional Base						
Deposit Banks	6.860	9.802	43	138.102	180.500	31
Participation Banks	355	1.250	252	7.107	16.811	137
Invest.&Dev. Banks	41	61	49	5.253	5.131	- 2
Ownership Base						
State Banks	2.246	3.978	77	43.984	68.763	56
Domestic Banks	3.791	3.632	- 4	77.920	68.383	- 12
Foreign Banks	1.219	3.503	187	28.558	65.296	129

Source: BRSA Banking Sector Data, Own Calculations.

The development of the main indicators of the banking sector, namely total assets, loans, deposits, profits, branches, and personnel by the amount and percentage change between 2006 and 2020 are presented in Table 2.

The total assets of the banking sector increased 1.112% between 2006 and 2020. During this period, on functional base, participation banks increased their assets 3.079% the most and; on ownership base, foreign banks increased their assets 2.231% the most in the banking sector. The total loans of the banking sector increased 1.533% between 2006 and 2020. During this period, on functional base, development and investment banks increased their loans 3.554% the most and; on ownership base, state banks increased their loans 3.227% the most in the banking sector. The total deposits of the banking sector increased 1.023% between 2006 and 2020. During this period, on functional base, participation banks increased their deposits 2.782% the most and; on ownership base, foreign banks increased their deposits 2.583% the most in the banking sector. The total profits of the banking sector increased 415% between 2006 and 2020. During this period, on functional base, participation banks increased their profits 850% the most and; on ownership base, foreign banks increased their profits 901% the most in the banking sector.

When the development of the number of branches and personnel of the Turkish banking sector is examined, it is seen that the increase in the number of branches and personnel of the sector between 2006 and 2020 is not as high as the increase in the balance sheet items of the

sector in the same period. The total number of branches increased by only 53%, and the total number of personnel increased by only 35% in the Turkish banking sector between 2006 and 2020. This shows that Turkish banks realized a high growth rate in balance sheet items and had high profits without increasing the number of their branches and personnel. The investments in the digitalization of the banking services and the development of mobile banking in the Turkish banking sector in this period allowed banks to achieve high growth rates in the balance sheet items and high level of profits without sharply increasing the number of their branch and personnel.

4. BRANCH AND PERSONNEL BASED PRODUCTIVITY INDICATORS

Branch and personnel based productivity indicators are one of the ratios to be used to measure and compare bank performance. Branch and personnel based productivity indicators can be calculated by dividing the total assets, total loans, total deposits, and total profits of the banks by the number of branches and personnel of the banks. Branch and personnel based productivity indicators allow banks to compare with each other, both based on banks and banking groups.

Branch and personnel based productivity indicators of the Turkish banking sector on functional and ownership base of the banking groups between 2006 and 2020 are analyzed in this section.

When analyzing branch and personnel based productivity indicators, development and investment banking group will be excluded from the analysis. Development and investment banks do not have the right to accept deposits from the customers. Consequently, this banking group does not open many branches and has personnel in the banking sector as the other deposits and participation banks that have to open branches to collect deposits from customers all over the country. In other words, development and investment banks produce more balance sheet items with a lower number of branches and personnel when compared to the deposits and participation banks. Due to the low number of branches and personnel of the development and investment banks in the sector, the productivity indicators of these banks are calculated higher than the other banking groups and create discrepancies from the average of the other banking groups. Consequently, branch and personnel based productivity indicators of the development and investment banking group will be presented in the tables, but these indicators will not be analyzed in the study.

4.1. Branch Based Productivity Indicators

The development of the branch based productivity indicators of the Turkish banking sector on functional and ownership base of banking groups between 2006 and 2020 are presented in Table 3.

Table 3: Branch Based Productivity Indicators of Turkish Banking Sector, 2006-2020

December, Year Million TL	**Asset per Branch**			**Loan per Branch**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	68,9	549,5	698	30,2	321,8	966
Functional Base						

Deposit Banks	68,6	538,8	685	29,5	315,3	968
Participation Banks	38,7	349,7	803	26,3	177,9	577
Invest. & Dev. Banks	374,3	6.357,9	1.599	175,5	4.311,1	2.356
Ownership Base						
State Banks	69,2	695,3	904	22,7	426,7	1.778
Domestic Banks	73,5	498,6	578	34,7	281,1	711
Foreign Banks	53,8	436,7	711	30,0	245,0	716
	Deposit per Branch			**Profit Per Branch**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	42,4	310,9	633	1.556	5.264	236
Functional Base						
Deposit Banks	43,2	319,7	640	1.493	4.967	233
Participation Banks	31,4	257,1	719	1.101	2.973	170
Invest. & Dev. Banks	-	-	-	17.813	99.970	461
Ownership Base						
State Banks	48,6	376,2	675	2.123	5.399	154
Domestic Banks	43,1	280,4	550	1.328	5.889	343
Foreign Banks	28,8	268,5	834	1.281	4.463	248

Source: BRSA Banking Sector Data, Own Calculations.

The asset per branch of the banking sector increased 698% between 2006 and 2020. During this period, on functional base, participation banks increased their asset per branch 803% the most and; on ownership base, state banks increased their asset per branch 904% the most in the banking sector. The loan per branch of the banking sector increased 966% between 2006 and 2020. During this period, on functional base, deposit banks increased their loan per branch 968% the most and; on ownership base, state banks increased their loan per branch 1.778% the most in the banking sector.

The deposit per branch of the banking sector increased 633% between 2006 and 2020. During this period, on functional base, participation banks increased their deposit per branch 719% the most and; on ownership base, foreign banks increased their deposit per branch

834% the most in the banking sector. The profit per branch of the banking sector increased 236% between 2006 and 2020. During this period, on functional base, deposit banks increased their profit per branch 233% the most and; on ownership base, domestic banks increased their profit per branch 343% the most in the banking sector.

4.2. Personnel Based Productivity Indicators

The development of the personnel based productivity indicators of the Turkish banking sector on functional and ownership base of banking groups between 2006 and 2020 are presented in Table 4.

Table 4: Personnel Based Productivity Indicators of Turkish Banking Sector, 2006-2020

December, Year Million TL	**Asset per Personnel**			**Loan per Personnel**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	3,3	30,2	808	1,5	17,7	1.114
Functional Base						
Deposit Banks	3,4	29,3	759	1,5	17,1	1.068
Participation Banks	1,9	26,0	1.244	1,3	13,2	908
Invest. & Dev. Banks	2,9	75,6	2.488	1,4	51,3	3.641
Ownership Base						
State Banks	3,5	40,2	1.038	1,2	24,7	2.028
Domestic Banks	3,6	26,5	641	1,7	14,9	785
Foreign Banks	2,3	23,4	920	1,3	13,1	926
	Deposit per Personnel			**Profit Per Personnel**		
	2006	**2020**	**Change (%) 2006-2020**	**2006**	**2020**	**Change (%) 2006-2020**
Banking Sector	2,0	17,1	735	75,5	289,0	283
Functional Base						
Deposit Banks	2,1	17,4	709	74,2	269,7	264
Participation Banks	1,6	19,1	1.118	55,0	221,1	302

Invest. & Dev. Banks	-	-	-	139,0	1.888,5	755
Ownership Base						
State Banks	2,5	21,8	778	108,4	312,4	188
Domestic Banks	2,1	14,9	610	64,6	312,8	384
Foreign Banks	1,2	14,4	1.073	54,7	239,4	338

Source: BRSA Banking Sector Data, Own Calculations.

The asset per personnel of the banking sector increased 808% between 2006 and 2020. During this period, on functional base, participation banks increased their asset per personnel 1.244% the most and; on ownership base, state banks increased their asset per personnel 1.038% the most in the banking sector. The loan per personnel of the banking sector increased 1.114% between 2006 and 2020. During this period, on functional base, deposit banks increased their loan per personnel 1.068% the most and; on ownership base, state banks increased their loan per personnel 2.028% the most in the banking sector.

The deposit per personnel of the banking sector increased 735% between 2006 and 2020. During this period, on functional base, participation banks increased their deposit per personnel 1.118% the most and; on ownership base, foreign banks increased their deposit per personnel 1.073% the most in the banking sector. The profit per personnel of the whole banking sector increased 283% between 2006 and 2020. During this period, on functional base, participation banks increased their profit per personnel 302% the most and; on ownership base, domestic banks increased their profit per personnel 384% the most in the banking sector.

4.3. Comparison of the Change of Branch and Personnel Based Productivity Indicators

The comparison of the change of branch and personnel based productivity indicators of the Turkish banking sector on functional and ownership base of banking groups between 2006 and 2020 are presented in Table 5.

Table 5: Comparison of Change of Branch and Personel Based Productivity Indicators

Change (%) 2006-2020	**Asset per Branch**	**Loan per Branch**	**Deposit per Branch**	**Profit Per Branch**
Banking Sector	698	966	633	236
Functional Base				
Deposit Banks	685	968	640	233
Participation Banks	803	577	719	170
Invest. & Dev. Banks	1.599	2.356	-	461

Ownership Base				
State Banks	904	1.778	675	154
Domestic Banks	578	711	550	343
Foreign Banks	711	716	834	248
	Asset per Personnel	**Loan per Personnel**	**Deposit per Personnel**	**Profit Per Personnel**
Banking Sector	808	1.114	735	283
Functional Base				
Deposit Banks	759	1.068	709	264
Participation Banks	1.244	908	1.118	302
Invest. & Dev. Banks	2.488	3.641	-	755
Ownership Base				
State Banks	1.038	2.028	778	188
Domestic Banks	641	785	610	384
Foreign Banks	920	926	1.073	338

Source: BRSA Banking Sector Data, Own Calculations.

As a result of the analysis, according to branch based productivity indicators in the 2006-2020 period, on functional base; participation banks increased their asset per branch the most by 8.1 times and, on ownership base; state banks increased their asset per branch the most by 9.1 times. On functional base; deposit banks increased their loan per branch the most by 9.7 times and, on ownership base; state banks increased their loan per branch the most by 17.8 times. On functional base; participation banks increased their deposit per branch the most by 7.2 times and, on ownership base; foreign banks increased their deposit per branch the most by 8.4 times. On functional base; deposit banks increased their profit per branch the most by 2.4 times and, on ownership base; domestic banks increased their profit per branch the most by 3.4 times.

According to personnel based productivity indicators in the 2006-2020 period, on functional base; participation banks increased their asset per personnel the most by 12.4 times and, on ownership base; state banks increased their asset per personnel the most by 10.4 times. On functional base; deposit banks increased their loan per personnel the most by 10.7 times and, on ownership base; state banks increased their loan per personnel the most by 20.3 times. On functional base; participation banks increased their deposit per personnel the most by 11.2 times and, on ownership base; foreign banks increased their deposit per personnel the most by 10.8 times. On functional base; participation banks increased their profit per

personnel the most by 3.1 times and, on ownership base; domestic banks increased their profit per personnel the most by 3.8 times.

5. CONCLUSION

Branch and personnel based productivity indicators are one of the ratios to be used to measure and compare bank performance. Branch and personnel based productivity indicators can be calculated by dividing the total assets, total loans, total deposits, and total profits of the banks by the number of branches and personnel of the banks.

In this study, the analysis of branch and personnel based productivity indicators of the Turkish banking sector between 2006 and 2020 is examined by using ratio analysis. Banking sector data provided by the supervisory authority of the Turkish banking sector, namely Banking Regulation and Supervision Agency of Turkey on its website is used in the study. The banks operating in the Turkish banking sector are grouped under functional base and ownership base; and then asset, loan, deposit, and profit per branch and personnel of these banking groups in this period were calculated and compared based on these banking groups.

As a result of the analysis, according to branch based productivity indicators in the 2006-2020 period; state banks increased their asset per branch the most by 9.1 times; state banks increased their loan per branch the most by 17.8 times; foreign banks increased their deposit per branch the most by 8.4 times and domestic banks increased their profit per branch the most by 3.4 times.

According to personnel based productivity indicators in the 2006-2020 period; participation banks increased their asset per personnel the most by 12.4 times; state banks increased their loan per personnel the most by 20.3 times; participation banks increased their deposit per personnel the most by 11.2 times and domestic banks increased their profit per personnel the most by 3.8 times.

The change in the branch and personnel based productivity indicators of the Turkish banking sector in the period from 2006 to 2020 show that banking groups realized high growth rates during this period with a very low increase in their number of branches and personnel. This development also proves that banks operating in the Turkish banking sector are concentrated on the financial intermediation roles by financing the economy through extending loans to the real sector and households after the reforms made in the banking sector after the 2000 and 2001 crises in the Turkish economy.

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GELENEKSEL/TAMAMLAYICI TIP GİRİŞİMLERİNE VE STRATEJİLERİNE YÖNELİK GENEL BİR ARAŞTIRMA

A GENERAL RESEARCH ON TRADITIONAL/COMPLEMENTARY MEDICINE INITIATIVES AND STRATEGIES

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ÖZET

Dünya'da farklı toplumlarda geleneksel ve tamamlayıcı tıbbın (GETAT) kullanımı önemli ölçüde artış göstermektedir. Dünya Sağlık Örgütü (WHO), dünyanın farklı bölgelerinde geleneksel raporların canlanmasına yönelik raporları sunmuştur. Dünya Sağlık Örgütü (WHO), geleneksel ve tamamlayıcı tıp uygulamalarının, güvenli, saygılı ve etkili bir biçimde verilmesine yönelik stratejiler geliştirilmesi gerekliliğini vurgulayan, 2014-2023 "GELENEKSEL TIP STRATEJİLERİ" raporu içerisinde ülkelerin geleneksel ve tamamlayıcı tıp uygulamalarına yönelik politikalara yer vermiştir. Homeopati, yoga, osteopati, kupa tedavisi, sülük tedavisi, hacamat gibi uygulamalar çeşitli ülkelerin kullandığı geleneksel ve tamamlayıcı tıbba örnek teşkil etmektedir. Ülkelerin geleneksel ve tamamlayıcı tıp uygulamalarına yönelik eğitim stratejileri, sertifikalandırmaları ve sigorta kapsamlarını araştırarak çeşitli önerilerde bulunulmaktadır. "TAMAMLAYICI TIP" ve "GELENEKSEL TIP'' terimleri, ülkelerde geleneksel tıp adı altında birbirinin yerine kullanılmaktadır. T&CM, o ülkenin geleneklerinde kullanılmasa da çoğunlukla bir ülkenin kullandığı geleneksel tıbbı ifade etmektedir. T&CM uygulamaları, eski Çin ve Ayurvedik tıp uygulamalarından ilham almıştır. Bitkisel tedavi yöntemleri eski zamanlarda şifacılar ve şamanlar tarafından kullanılmıştır ve eski tıbbın bir parçası olduğu görülmektedir. ABD hükümeti tarafından 1993 yılında kurulan "ALTERNATİF TIP OFİSİ'' nin sorumlulukları artırılmış ve ofisteki bilgi eksikliğini gidermek amacıyla "ULUSAL TAMAMLAYICI VE ALTERNATİF TIP MERKEZİ'' olarak yeniden açılmıştır. Bu birimin kurulma amacı, T&CM uygulamalarının güvenilirliğini ve etkinliğini incelemek, aynı zamanda bilimsel olarak onaylanmış uygulamaların geleneksel tedavileri desteklemesini sağlamaktır. Sonuç olarak T&CM uygulamaları, sadece Türkiye'de değil, gelişmiş ve gelişmekte olan ülkelerde de mevcut sağlık politikalarına meydan okumaktadır. Bu dünya çapında bir sorun olduğu için, olumsuz sonuçların ortaya çıkabileceği düşünülmektedir. T&CM uygulamaları, temel tıp çerçevesi içerisinde kanıtlara dayalı sağlık politikaları oluşturmak için ülkelerle çalışmanın faydalı

olacağını göstermektedir. Bu uygulamaların yapılması halinde hizmetler daha etkin kullanılacaktır. Bu derleme çalışma, Türkiye ve seçilmiş bazı ülkelerin geleneksel ve tamamlayıcı tıp uygulamaları hakkında bilgi vermek ve bu uygulamalara yönelik izlenen politikaları incelemeyi amaçlamaktadır.

Anahtar Kelimeler: Geleneksel Tıp, Tamamlayıcı Tıp, Tıp Stratejileri, Sağlık Politikaları

ABSTRACT

The use of traditional and complementary medicine (GETAT) is increasing significantly in different societies around the world. The World Health Organization (WHO) has presented reports on the revival of traditional reports in different parts of the world. The World Health Organization (WHO) included policies for traditional and complementary medicine practices of countries in its 2014-2023 "TRADITIONAL MEDICINE STRATEGIES" report, which emphasizes the need to develop strategies for the safe, respectful and effective delivery of traditional and complementary medicine practices. Practices such as homeopathy, yoga, osteopathy, cupping therapy, leech therapy, and cupping are examples of traditional and complementary medicine used by various countries. Various suggestions are made by researching the education strategies, certifications and insurance coverages of countries for traditional and complementary medicine practices. The terms "COMPLEMENTARY MEDICINE" and "TRADITIONAL MEDICINE" are used interchangeably in countries under the name of traditional medicine. Although T&CM is not used in the traditions of that country, it mostly refers to the traditional medicine used by a country. T&CM practices are inspired by ancient Chinese and Ayurvedic medicine practices. Herbal remedies were used by healers and shamans in ancient times and appear to be part of ancient medicine. The responsibilities of the "ALTERNATIVE MEDICINE OFFICE", established by the US government in 1993, were increased and it was reopened as the "NATIONAL COMPLEMENTARY AND ALTERNATIVE MEDICINE CENTER" in order to fill the lack of information in the office. The purpose of the establishment of this unit is to examine the safety and effectiveness of T&CM applications, as well as to ensure that scientifically approved applications support traditional treatments. As a result, practices for T&CM challenge current health policies not only in Turkey, but also in developed and developing countries. Since this is a worldwide problem, it is thought that negative consequences may arise. T&CM practices show that it will be beneficial to work with countries to create evidence-based health policies within the framework of basic medicine. If these applications are made, the services will be used more effectively. This review aims to provide information about traditional and complementary medicine practices in Turkey and some selected countries and to examine the policies followed for these practices.

Key words: Traditional Medicine, Complementary Medicine, Medicine Strategies, Health Policies

1.GİRİŞ

Dünyada geleneksel tıp, sağlık hizmeti sunumunun temel dayanağı olan veya bir tamamlayıcısı topluluk olarak ifade edilir. T&CM, yerli sağlık geleneklerini tanımlamak da kullanmak ve dünya çalışmalarında daha faza yer verildiği belirtilmektedir. Tıp araştırmaları

sanayileşmiş ve gelişmekte olan ülkelerde geleneksel ve tamamlayıcı tıp uygulamaları %80 oranlarında artış görülmektedir.(Bodoker ve Kronenberg,2002). T&CM genellikle sağlık hizmetlerinin bir parçası olup hafife alınmaktadır. Hemen hemen her yerde uygulanmakta ve bu hizmetlere yoğun bir talep vardır. Bu hizmetlerin kalitesi, güvenliği ve etkinliği zaman içinde ülke uygulamalarıyla kanıtlanmıştır. WHO ülkelere uygun entegrasyon, düzenleme ve gözetim gibi hizmetleri küresel strateji düzeyinde geliştirmeyi amaçlamaktadır. (WHO,2013). Geleneksel Tıp Stratejisinde (WHO,2013) WHO, T&CM uygulamaları ve uygulayıcıları ülkelerine kendi ülkelerinde düzenleme yapılmasına yönelik adımlar atmasını tavsiye etmektedir.

Bu derleme çalışma da T&CM'yi incelemek, ülkelerin geleneksel uygulama politikalarını ve çalışmalarda tamamlayıcı tıp tedavilerinin bilgileri taranarak bu uygulamalara yönelik örneklere erişilebilmesi amaçlanmaktadır.

2. GELENEKSEL VE TAMAMLAYICI İLAÇ

"Tamamlayıcı tıp" ve "geleneksel tıp" terimleri, aşağıdaki ülkelerde birbirinin yerine kullanılmaktadır. T&CM uygulamaları ülkeler tarafından "geleneksel tıp" ifadesi kullanılmamaktadır (WHO,2001). T&CM uygulamaları eski Çinlilerden ilham alınmıştır. Bitkisel tedavi ve Ayurvedik tıp uygulamaları eski çağlarda şifacılar ve şamanlar tarafından kullanılan yöntemler zamanla eski tıbbın bir parçası gibi görünmektedir. Geleneksel ve tamamlayıcı tıp uygulamaları 19. yüzyılda osteopati ve homeopati gibi uygulamalar sayesinde geliştirilmiştir (Ceyhan ve Yiğit Tasa,2016). ABD hükümeti tarafından 1993 yılında kurulan "Alternatif Tıp Ofisi" artırılarak ofis "Milli Merkez" olarak yeniden açılmıştır. T&CM uygulamaları artan bilgi eksikliğini gidermek için tamamlayıcı ve alternatif tıp uygulamaları ve bu birim için güvenilirlik, uygulamaların etkinliği ve geleneksel tedaviler bilimsel olarak tasdik edilmiştir (Muslu Karayağız ve Öztürk,2008).

3. GELENEKSEL VE TAMAMLAYICI TIP GİRİŞİMLERİ

Geleneksel ve tamamlayıcı tıp küresel sağlık ihtiyaçlarının karşılanmasında önemli rol oynamaktadır (Ravishankar ve Shukla,2007). Geleneksel tıp, sağlık ihtiyaçlarını ve geleneksel farmasötik sistemlerin toplamı şeklinde ifade edilmektedir. Teorilerden oluşan bilgi, beceri ve uygulamalar, farklı kültürlere özgü inançlar ve deneyimler sağlığı önlemek, teşhis etmek, iyileştirmek ve tedavi etmek için kullanılmaktadır. Geleneksel Malay tıbbı, Çin tıbbı, Hint tıbbı, homeopati ve tamamlayıcı tedaviler gibi uygulamaları içermektedir (Othman ve Farooqui,2015). Diğer şu yöntemler Ayurveda, akupunktur, fitoterapi, kupa tedavisi, osteopati, homeopati, larva uygulaması, müzik terapisi, refleksoloji ve apiterapi T&CM'e örnek verilmektedir (Müslümanoğlu ve Tayfun,2019). T&CM örneklerinden biri olan botanik ilaçlar Çin'de geleneksel tıpta kullanılmakta olup Hindistan da ise terapötik uygulamalarda yer almaktadır. Geleneksel Çin tıbbı ve Avuryeda en eski tıbbi sistemlerden ikisi olarak kabul edilir. Şifalı bitkiler tıbbi malzeme olarak kullanılmaktadır (Jaiswal ve ark., 2016). Çin menşei olan akupunktur tedavisi kas-iskelet ağrısı gibi durumlar için etkili olduğu belgelenmiştir.19. yüzyılda ABD'nin Midwest bölgesinde kas-iskelet sisteminin etkinliği üzerinde duran osteopati hastalığı bulunmuştur (Brosnan,2016). T&CM'nin bir başka yöntemi de kupa terapisidir ve vücuttaki kan dolaşımını hızlandırmak için gövde vakumlanarak veya

kesilerek uygulanmaktadır. (Batur Çağlayan ve ark., 2018). Homeopati, ortaya çıkarabilecek hafif dozlarda maddeler vererek sağlıklı bir insanda hastalığın belirtilerini ve bir hastalığın tedavisini ifade etmektedir (Batur Çağlayan ve ark., 2018). 2014-2023 yılları arasındaki Gelenesel Tıp Stratejileri WHO tarafından ülkeleri teşvik, iyileştirmek ve modern sağlık uygulamalarını yaygınlaştırmak amaçlanmaktadır (WHO,2013).

Sağlık Bakanlığı, Türk yasalarına dayanarak T&CM yöntemlerinin sağlık sistemiyle entegrasyonunu kanıta dayalı bir şekilde sağlamak amacıyla hazırlanan stratejik bir plan uygulanmaktadır. "Geleneksel ve Tamamlayıcı Tıp Uygulamaları" ve T&CM merkezleri yasal dayanağı olup yaklaşık 20 üniversitede geliştirme ve eğitim hizmetleri ile araştırma vermeye başlanmıştır. Ayrıca yaklaşık 500 T&CM ünitesi açılmış ve 14 uygulamalar sertifikalandırılmıştır olup ortalama 5000 sertifika verilmiştir (www.getatkongre.org,erişim tarihi:29.12.2019).

3.1. Türkiye'deki T&CM Girişimleri ve Politikaları

Sağlık Bakanlığı tarafından 2012 yılında Geleneksel ve Tamamlayıcı Tıp uygulamaları için bir bölüm kurulmuştur. Sağlık Bakanlığı, T&CM uygulamalarının ana düzenleyicisidir. Genel Müdürlük Sağlık Hizmetleri için yetkilendirme, denetleme ve belgelendirmeden sorumludur. Türk Tıp ve Sağlık Bakanlığına Bağlı Tıbbi Cihaz Kurumu tıbbi cihaz ve ürünlerin hepsinin belgelendirilmesinden ve denetlenmesinden sorumludur (WHO,2019).

Bakanlığın Teşkilat ve Görevleri Hakkında Sağlık ve İştirakleri Kanunu Resmi Gazete de 2 Kasım 2011 tarihli gazete de yayınlanmıştır. Bu kanunun 8. maddenin (ğ) bendinde T&CM uygulamalarının "geleneksel, tamamlayıcı ve alternatif düzenlemelere ilişkin düzenlemelerin yapılması, ilaç uygulamaları ve yetkisiz faaliyetlerin durdurulması ve terfiler" iş tanımını ifade eden ilgili yasal düzenlemelerin hazırlaması ve denetlemesi Sağlık Hizmetleri Genel Müdürlüğü bünyesinde yer almaktadır (Karahancı ve ark.,2015).

Sağlık Bakanlığı tarafından Geleneksel, Tamamlayıcı ve Alternatif Tıp Uygulamaları Yönetmelik Taslağı 28 Şubat 2014 yılında hazırlandı. İlgili kurumlar tarafından, Geleneksel ve Tamamlayıcı Tıp Uygulamaları 27 Ekim 2014 yılında yürürlüğe girmiştir. Geleneksel ve Tamamlayıcı Tıp uygulamaları ile ilgili düzenleme eleştirilsede kupa tedavisi, kurtçuk ve sülük tedavisi gibi uygulamalar dahil edilmiştir (Karahancı ve ark.,2015).

WHO,2014-2023 yılları arasında Türkiye Sağlık Bakanlığının modern tıp ve tıp strateji ile ilgili entegrasyonuna dikkat çekmiştir. Entegrasyon yönetmeliklerle bilimin yardımını, güvenliği ve etkinliği sağlayan uygulamaları amaçlamaktadır. (https://www.haberturk.com/geleneksel-vetamalayici-tip-uygulamalarinda-klinik-rastırmalar-yonetmeligi-yururlukte-2397688, erişim tarihi: 29.12.2019). Bu amaçla, "Klinik Araştırmalar Yönetmeliği Geleneksel ve Tamamlayıcı Tıp Uygulamaları" Sağlık Bakanlığı tarafından 09

Mart 2019 tarihinde resmi gazetede yayınlanmıştır (https://www.resmigazete.gov.tr/eskiler/2019/03/20190309-2.htm, erişim tarihi: 29.12.2019). Bu yönetmelik aynı zamanda denetimi de sağlamaktadır ve T&CM'nin klinik araştırmaları ve yerlerini kapsayan uygulamaların yanı sıra uygulamayı yapacak kişileri de ele almaktadır. Araştırma, Tamamlayıcı Tıp (T&CM Enstitüsü) ve Türk Geleneksel Kültür Enstitüsü'nün temel amacı modern tıbbın kanıta dayalı bir şekilde ve kapsamında TÜSEB (Türkiye Sağlık Enstitüleri Müdürlüğü) ile entegreli olarak tıp hizmetleri sunulmakta olup geleneksel ve tamamlayıcı olmasını sağlamaktadır. Bu amaçla, T&CM Enstitüsü tarafından yürütülen ve disiplinler arası araştırma ve geliştirmeyi destekler faaliyetlerin birçoğu paydaşların desteğiyle gerçekleştirilmiştir. Bilimin ışığında tıp, Anadolu'nun gelişmesine hizmet etmek ve katkıda bulunmayı amaçlamaktadır (https://www.tuseb.gov.tr/, erişim tarihi:29.12.2019). T&CM uygulaması kamu ve özel sektördeki merkezlerin kendi kaynakları ile kurulmuştur. Birçok araştırma T&CM uygulamalarını içeren özel sektör ve kamu sektörü hibeleri ve fonları alanları tarafından finanse edilmektedir (WHO,2019).

Türkiye nüfusunun geleneksel ve tamamlayıcı tıp uygulamaları yüzdeleri mevcut değildir. Sağlık Bakanlığı tarafından yeni yasal çerçeve kapsamında 2014 yılında ilgili mevzuatın kabul edilmesinden bu yana T&CM uygulamaları düzenlenmemiştir. Bu yasal çerçeve 14 uygulamayı kapsamaktadır: akupunktur, apiterapi, hipnoz, sülük tedavisi, fitoterapi, osteopati, kupa tedavisi, refleksoloji, kurtçuk terapi, ozon tedavisi, kayropraktik, müzik terapisi, homeopati ve proloterapi (WHO,2019).

3.2. Dünyadaki T&CM Girişimleri ve Politikaları

Japonya ve Çin de kullanılan geleneksel ve tamamlayıcı tıbba öncülük etmektedir. Küba T&CM uygulamalarını sosyalist sağlık sistemi içinde kullanırken, Amerika Birleşik Devletleri bunları liberal sağlık sistemi için örnek teşkil etmektedir (Karahancı ve ark.,2015). T&CM teorisi Çin'de geleneksel tıp uygulamalarında farklı bölgelerde tıbbi bitkiler ve bunların işlenmiş ürünlerini yaygın olarak klinik uygulamalar rehberliğinde kullanılarak değerli deneyimler biriktirmiştir. Çin, 2015 yılında 644 şifalı bitki türlerini Farmakopesi'de kayıt altına alınmıştır. Mevcut istatistiksel verilere göre, 44 kişinin kullandığı azınlık etnik grupların yer aldığı 5500'den fazla otlar, hayvansal ürünler dahil tıbbi maddeler ve mineralli bazı ilaçlar ve ilaçların yaklaşık %90'ı bitki kökenlidir (Jaiswal,Liang ve Zhao,2016). Geleneksel ve modern tıp uygulamalarını ele alan 2500 hastane yaklaşık %95'i geleneksel ilaçlarla ilgili hizmet sunmaktadır. Çin'de modern tıp uygulamaları ve geleneksel tıp uygulamaları sigorta kapsamındadır (Karahancı ve ark.,2015).

Japonya'da geleneksel ilaçlar iki gruba ayrılmaktadır: kampo tıbbı ve geleneksel tıp. Geleneksel tıp uygulamaları yaygın olarak Japonya'da kullanılan akupunktur, judo tedavisi ve geleneksel Japon masajı ve koterdir. (WHO,2001).

Japonya'da T&CM uygulamları 1948 tarihli Pratisyen Hekimler Yasası ile ilgili düzenlemelerde allopatik ve Kampo ilacı da dahil olmak üzere doktorların geleneksel olarak uygulayabilecekleri tıbbi prosedürlerde kısıtlamalar bulunmuştur. 1960 tarihli ve 146 sayılı Eczacılar Kanununa göre doktorların kendi uygulamalarında kullanabilecekleri allopatik ve geleneksel ilaçlarla ilgili hizmetler sunmak için bir kişinin eczacı olarak kalifiye olması

gerekir. Japonya'da geleneksel ve allopatik ilaçlar arasında Eczacılık İşleri Yasası ayrım yapmamaktadır. Her iki tipin hazırlanması aynı yönetmeliğe tabidir (World,2001). Japonya'da doktorların %84'ü günlük uygulamalar da Kampo ilacı kullanmaktadır. Nisan 2000 itibariyle Ulusal Sağlık Sigorta ödeme listesinde reçetede kullanılan formüllerin 192'si bitkisel içerikli Kampo formüllerini ve 147'si reçeteli Kampo ilacını içermektedir (WHO,2013).

Küba geleneksel tıp ve uygulayıcıları için biyombaşarılı bir entegre sistemi kullanmaktadır.. Küba, T&CM ilaçları ve hizmetleri öğretim ve klinik uygulamaları çerçevesinde güçlü bir düzenleme ile entegre etmiştir (Rhae ve Garcia,2019). 1994'ten beri Küba'nın 16 ilindeki tıp fakültelerinde her tıp öğrencisi doğal olarak bir rotasyon yapar ve öğretilen tamamlayıcı tedaviler akupunktur, homeopati ve bitkisel ilaç ulusal müfredata dahil edilmiştir. Tamamlayıcı tıp için hipnoz, meditasyon, masaj, uzmanlaşmak için biyo-enerjik tıp vb. (Rhae ve Garcia,2019).

ABD, geleneksel ve tamamlayıcı tıp politikalarında ulusal düzeyde ilerleme kaydetmektedir. 2005 ve 2018 yılları arasında ulusal politikalar, kanunlar ve düzenleyiciler arasındaki dönemde T&CM sistemi geliştirildi. T&CM için kurulan ulusal program sayısı ve ofisler artmıştır (WHO,2019). Devlet düzeyinde T&CM uygulamaları ve sağlayıcıları için düzenlemeler yapılmıştır. 50 eyalete tüketici eğitim projeleri ve T&CM kullanan kişisel sağlık programları atandı. Ulusal Tamamlayıcı ve Bütünleştirici Sağlık Merkezi, özel sigorta sağlayıcıları tarafından T&CM hizmetleri özel sağlık yoluyla ödenmektedir (WHO,2019).

Etiyopya nüfusunun yaklaşık %80'i kırsal kesimde yaşamaktadır ve geleneksel ürünlere erişim imkanlari oldukça yüksektir. Modern sağlık tesislerine erişim imkanları zor olmasından dolayı geleneksel tıp uygulamaları yaygın olarak kullanılmaktadır (Kassaye ve ark., 2006). Her ikisini de kapsayan Etiyopya Ulusal Uyuşturucu Politikası bitkisel ilaçlar ve geleneksel ilaçlar ile Gıda, İlaç, Sağlık İdaresi ve Kontrol Otoritesi Etiyopya Sağlık Bakanlığı bünyesinde yer almaktadır. Addis Ababa'da ulusal T&CM Ofisi bulunmaktadır. 2009'dan beri T&CM sağlayıcıları için ulusal ve il düzeyinde taslak düzenlemeler mevcuttur. T&CM, ulusal ve eyalet düzeyinde uygulanan bitkisel ilaç tedarikçileri ile ilgili düzenlemelerdir. T&CM sağlayıcıları yalnızca özel sektör kliniklerinde çalışır. Bir ulusal veya eyalet hükümeti tarafından verilen sertifika uygulama için gereklidir (WHO,2019).

4. SONUÇ

Geleneksel ve tamamlayıcı tıbbın kullanımı T&CM'nin rolünü ülkelerin toplumlardaki uygulamalarını ve sağlık politikalarını tanımasına neden olmuştur (Knox, Fønnebø ve Falkenberg,2009). Timmerman, politika seçimlerinin örtülü olduğunu ve bazı durumlarda netlik olmaması ile izlenecek hedeflerin ve potansiyel stratejilerin belirsizliği, çelişkili olabileceğini belirtmektedir (Timmerman,2003). T&CM için biyomedikal, politik ve sabırlı topluluklar, hasta güvenliğini artırmaya yönelik uygulamalar karşı bir strateji izlenmektedir. WHO Geleneksel Tıbba uygun olarak 2014-2023 Stratejisine yönelik dernekler ve yeni sağlık politikaları sağlık sistemini yansıtmalıdır. T&CM politikaları geliştikçe dünyanın her yerindeki ülkeler zorluklarla karşı karşıya kalırken uygun sağlık düzenlemelerini geliştirmek, çağdaş uygulamaları yansıtmak veya mevcut uygulamalar yasalarla uygulanmalıdır (Knox, Fønnebø ve Falkenberg,2009). T&CM uygulamaları ile sigorta kapsamındaki bu hizmetlerden hastaların daha fazla fayda sağlayacağı tahmin edilmektedir. Bu nedenle, hükümetler bu uygulamalara yönelik politikalar ve yasal altyapıyı düzenlemektedirler. T&CM uygulamaları kanıta dayalı tıp ile daha güvenilir çerçevede yürütülmektedir (Biçer ve ark., 2019). Ayrıca,

geleneksel ve tamamlayıcı alanda hizmet verecek sağlık hizmetleri, eğitimleri bir şekilde belgelendirmek uluslararası bütünlüğü sağlamak ve denetimsiz uygulamalar için hekimlere eğitim verilmesi önerilebilir (Biçer ve ark., 2019).

Sonuç olarak, T&CM için sağlık politikası sadece Türkiye'de değil, gelişmiş ve gelişmekte olan ülkelerde uygulamalarda zorluklar mevcuttur. Dünya genelini ilgilendiren bir sorun olması nedeniyle birlikte çalışma durumu ülkeler bazında önemlilik ifade etmektedir. T&CM uygulamaları kanıta dayalı belgelere dahil edilmelidir (Leac ve ark., 2018). Kişiler tarafından üretilen hizmetler etkin kullanılacağı öngörülmektedir. Ayrıca ülkelerin sağlık turizmine olumlu katkı sağlayacağı düşünülmektedir. T&CM uygulamaları güvenilir ve etkinliği sağlanmalıdır.

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ÖN YARGILARIN KESİN YARGILARA DÖNÜŞMESİNDE MEDYANIN ROLÜ

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ÖZET

Genel anlamı ile bireyleri ya da grupları tanımadan, genel algılar ve kalıp yargılar çerçevesinde onları değerlendirmek şeklinde tanımlanabilen ön yargı, günlük yaşamda iletişim süreçlerini sekteye uğratan etkenlerden biridir. Ön yargıların oluşmasında toplum, aile ve birey yanında medya kaynaklı nedenler de söz konusudur. Gerek toplumsal gelişmelerden siyasete, sosyal yaşamdan sağlığa kadar birçok alanda bireyi etkileme gücü olan basın yayın organları, gerekse bireysel kullanıcıların da etkin rol oynadığı sosyal medya platformları; algı yönetimiyle kimi zaman ön yargıların ortaya çıkmasını, kimi zaman da var olan ön yargıların son yargılara dönüşmesini desteklemektedir. Basın yayın organları bunu sunum içeriğinden haber diline kadar tüm süreci hedef kitleye istenen mesajı istenen şekilde iletmeyi amaçlayarak yaparken, sosyal medya platformları da kişisel görüşlerin ve taraftar grupların bir araya gelmesiyle yapmaktadır. Bilinçli ya da bilinçsiz olarak gerçekleştirilen bu algı yönetimi; bireylerin farklı kişi ya da gruplara ilişkin düşünce ve yorumlarını etkilemekte; böylece objektif değerlendirmeden uzak, sorgulanmadan kabul edilen düşünceler ve buna bağlı yargılar ortaya çıkmaktadır. Bu durum da, uzun vadede ayrımcılığa ve ötekileştirmeye yol açmaktadır.

Bu çalışmada; bireysel ve toplumsal ön yargıların oluşmasında medyanın algı yönetimi irdelenecek ve bireye bu ön yargılarını yönetebilmesi için farkındalık kazandırılmaya çalışılacaktır.

Anahtar Kelimeler: Ön Yargı, Ayrımcılık, Etiketleme, Medya, Algı Yönetimi, Popüler Kültür, Ötekileştirme.

THE ROLE OF THE MEDIA IN THE TRANSFORMATION OF PREJUDGES INTO FINAL JURISDICTIONS

ABSTRACT

Prejudice, which can be defined as evaluating individuals or groups within the framework of general perceptions and stereotypes, is one of the factors that disrupt communication processes in daily life. In the formation of prejudices, there are media-based reasons besides society, family and individual. Media organs that have the power to influence individuals in many areas from social developments to politics, from social life to health, and social media platforms where individual users also play an active role; With perception management, it sometimes supports the emergence of prejudices and sometimes the transformation of existing prejudices into final judgments. While the media organs do this by aiming to convey the desired message to the target audience in the desired way, from the presentation content to the news language, social media platforms do this by gathering

personal opinions and supporter groups. Consciously or unconsciously, this perception management; it affects the thoughts and interpretations of individuals about different people or groups; Thus, thoughts that are far from objective evaluation and accepted without questioning and related judgments emerge. This, in turn, leads to discrimination and marginalization in the long run. In this study; The perception management of the media in the formation of individual and social prejudices will be examined and it will be tried to raise awareness so that the individual can manage these prejudices.

Keywords: Prejudice, Discrimination, Labeling, Media, Perception Management, Popular Culture, Othering.

GİRİŞ

Duygu ve düşüncelerin, akla uygun şekilde başkalarına aktarılması, bildirim ve haberleşme olarak tanımlanan iletişim (Türk Dil Kurumu Sözlüğü); insan ilişkilerinin temelini oluşturur. Çünkü her şey iletişimle gerçekleşir. İletişim süreçlerinde, iletilen mesaj, alıcı tarafından anlaşılıp yorumlanır ve geri bildirimler verilir. Televizyonda bir program izlerken, sevdiği bir şarkıyı dinlenirken, hatta saç rengini değiştirdiğinde dahi birey; bir iletişim sürecinin içinde bulunur. Her ne kadar iletişim denince akla ilk olarak iki ya da daha fazla kişinin konuşması gelse de; değişen saç rengini fark eden diğer kişinin gülümsemesi ya da şaşkınlıkla bakması da iletişimdir. İletişim göz göze gelinen an başlar; sürdürüp sürdürmemek taraflara bağlıdır. Çünkü süreç genellikle ilk mesaja bağlı olarak ilerler ve ilk mesaj (bir cümle, bir bakış, bir tepki olabilir) olumsuz olursa, etkili bir iletişim kurma şansı azalır. Bu doğrultuda da iletişim sürecinin hedeflenen mesajı verip vermediği gözlenebilir. İletişim süreçlerinin etkili olmasını engelleyen nedenlerden biri de, ön yargılardır. Bilgi sahibi olmadan fikir sahibi olunan tutumları tanımlayan ön yargılara medyada da sıkça rastlanmaktadır. Medya ortamında görülen ön yargılı temsiller farklı yollarla ortaya çıkarken; medya metinlerinde kullanılan dil, görüntü, haberin kaçıncı sayfada nasıl yer aldığı gibi birtakım unsurlar toplumda egemen olan ön yargıların pekiştirilmesine katkıda bulunmaktadır. Gerek yazılı gerekse görsel medyada sıklıkla karşımıza çıkan, bir kişiyi veya grubu yok sayma, dil hileleri, önemsizleştirme, stereotip oluşturma gibi yöntemler birtakım ön yargıların oluşmasını sağladığı gibi aynı zamanda toplum içerisinde yer alan mevcut ön yargıların da güçlenmesini sağlamaktadır. Medyada yer alan ön yargılar; medya tüketicilerinin algıları üzerinde önemli etkiye sahip olup, kişilerin tutum ve davranışlarının oluşmasında belirleyici olmaktadır (Utma, 2019: 2). Toplumun kalıplaşmış düşüncelerinden de beslenen bu ön yargılar, farklı medya kaynaklarında birbirini destekleyici haber içerikleri ve haber dili ile zamanla daha da yerleşik hale gelmektedir. Bu da bireysel ve toplumsal iletişim süreçlerini ve algıları olumsuz etkilemektedir. Farklı tür kalıplaşmış düşünceler, değişik iletişim çatışmalarına zemin hazırlayabilir. Örneğin; aşırı genellemeci ve değiştirme gayreti içinde olan bir kişinin, önyargılı ve tümden reddedici çatışmalar sergilemesi, ana-baba tavrı takınması ve karşısındakini yargılayarak savunuculuğa itmesi söz konusu olabilir (Dökmen; 2005: 97).

Bu çalışmada; bu bağlamda önce ön yargılar ve ayrımcılığın ne olduğuna değinilerek, “insanlar neden ön yargılara maruz kalıyor?” ve “insanların ön yargılarının kesin yargılara dönüşmesinde medyanın rolü nedir?” sorularına, bu durumların nedenleri ve örnek haberler irdelenerek yanıt aranacaktır.

1. Ön Yargılar, Ayrımcılık ve Paradigmalar

İletişim süreçleri her zaman istenen şekilde ilerlemeyebilir. Bunda birçok farklı etken yanında ön yargılar da etkilidir. Türk Dil Kurumu ön yargıyı bir şeyle ya da bir kimseyle ilgili olarak, belli bir olay için duymaya ve görmeye dayalı önceden gerçekleştirilmiş olumlu ya da olumsuz yargı olarak tanımlar. Ön yargı, kişi ya da gruplar hakkında yeterince fikir sahibi

olmadan genel algılar çerçevesinde onları değerlendirmektir. Ön yargı bir tutumdur, davranışa dönüştüğünde ayrımcılık ortaya çıkar. Ayrımcılık; geçerli bir nedene dayandırılmadan, ön yargılara dayalı olarak farklı özellikleri nedeniyle kişi ya da gruplara eşitlik çerçevesi dışında davranmaktır. Ayrımcılık, ön yargıya dayalı tutumların davranışa yansıyan halini ifade eder. Ayrımcılığın belirleyici özellikleri cinsiyet, din, etnik köken, engel durumu ya da cinsel kimlik olarak şekillenir.

Ön yargılar yaş, cinsiyet, dil, din, ırk, sosyo-kültürel yapı, meslek, medeni durum, fiziki görünüm gibi bireysel etkenler, ailenin yetiştirme tarzı, eğitim ortamları, medya gibi birçok farklı etkene bağlı olarak ortaya çıkar. Ön yargı ve ayrımcılığın sonucu olarak da etiketleme kendini gösterir. Etiketleme, sosyal psikolojide ön yargı ile ele alınabilecek bir kavramdır. Anlamı "leke, damga" olan Latince kökenli "stigma" sözcüğünden Türkçeye evrilen etiketleme, "damgalamak, lekelemek" anlamlarına gelir. Ön yargılar küçük yaşlarda aile içinde öğrenilmeye başlanan tutumlardır. Birey, önce aile içindeki yetişkinlerin, öfkeli oldukları zamanlarda kullandıkları ifadeleri ve etiketleri öğrenir. Bu şekilde ön yargılı olmaya atılan ilk adım, sosyalleşmeyle birlikte mahallede, okulda diğerlerinden duyulan yeni etiketler ve sıfatlarla devam eder. Birey bunlara maruz kaldıkça, bunlar zihninde yer eder ve benzer durumlarda kendisi de aynı kelimeleri ve etiketleri kullanarak ön yargılarını beslemeye başlar. Böylece zihninde ayrıştırmalar ve sınıflandırmalar da oluşur. Birey özellikle ergenlik döneminde diğerlerine isim takarak, onlarla alay ederek, fiziki farklılıklarına dayalı etiketlemelerde bulunarak bu dönemin kendisine bahşettiği yönlerden biri olan acımasızlığa da dayanarak var olma çabasını sergiler ve farklı olanı reddetme davranışını içselleştirmeye başlar. Zamanla bireyle birlikte beslenerek büyüyen ön yargılar, yetişkinlikte de devam ederek, bireyden kendisini beslemeye devam etmsini ister. Sahip olunan bu ön yargılar sosyal yaşantıda kullanılır ve aile yaşantısında çocuklara da aktarılır. Böylece döngü devam eder. Bu döngü, geleneksel ve yeni medya kaynaklarındaki içeriklerde de varlığını sürdürür.

Paradigmalar da ön yargılarda etkilidir. Paradigmalar, kişinin olaylara bakış açısıdır. Neyin nasıl algılandığının ifadesidir. Birey; bir kişiyi, bir durumu ya da bir yaşantıyı değerlendirirken çoğu zaman bu değerlendirmeye kendi değer sistemi çerçevesinde yorumlar katar. Eğer birey, iletişimlerinde kendisi için önemli olan bir şeyin bir başkası için önemsiz olabildiği gibi, kendisi için önemsiz olan bir şeyin bir başkası için önemli olabildiği farkındalığını içeren bir paradigmaya sahipse; diğerleriyle ilişkileri sağlıklı olur.

Her birey cinsiyet, yaş, sahip olduğu düşünceler ve birçok özelliğiyle farklı toplumsal grupların birer üyesidir. Sosyolog Ulus Baker; telaffuz ettiğimiz her yargı, her sözümüz bizi ortamın ve bağlamın ama esas önemlisi cemiyetin ya da toplumun içinde belli bir konuma yerleştirir (Baker, 2012: 359) der. Bireylerin bu üyelik etiketlerinden ibaret olmadığı düşünülse de "güç-değer" algısı bu düşünceyi yargılara yenik düşürebilir. Maddi ya da sosyal anlamda güçlü olmayan birey, değersiz algılanabilir. Bununla ilgili yapılan, takım elbiseli ve pejmürde giyimli iki farklı kişiye tepkilerin farklı olduğu sosyal deneyler bu algıyı destekler niteliktedir (www.youtube.com, E.T.: 22.12.2020).

Ön yargılara sebep olan tüm etkenler farklı nedenlerden kaynaklanır. Bu nedenlerin birbirinden ayrı alt nedenleri olsa da, hiçbiri birbirinden bağımsız değildir. Toplumun temel öğesi olan bireyin kendinden başlayarak aile, okul, toplum ve bunların tümünü etkileyen medya kaynaklı nedenler; sosyal yaşam içinde birbirlerinden etkilenerek birbirlerinin varlığını sürdürmelerine destek olurlar.

2. Ön Yargıların Birey Kaynaklı Nedenleri

Görünümlü Cam Benlik kavramının yaratıcısı Sosyolog Charles H. Cooley; "Ben olduğumu düşündüğüm kişi değilim, ben senin olduğumu düşündüğün kişi de değilim; ben senin olduğumu düşündüğünü sandığım kişiyim." der. Cooley'e göre cam benlik; başkalarına nasıl göründüğümüzü düşündüğümüzün yansımasıdır. Bu noktada öncelikle benlik

kavramından söz etmek gerekir. Benlik kavramı; bireyin kendine dair algıları, onun öz varlığıdır. Benlik kavramı kendini farklı şekillerde gösterebilir. Bireyin güzel olduğunu düşünmesi, diğeleri tarafından iyi biri olarak algılandığına inanması, başarılı olmayı amaç edinmesi gibi durumlar, benlik kavramı ile ilgili durumlardır. Birey, kendine ilişkin algılarıyla kendini içinde bulunduğu toplumda ve sosyal gruplarda konumlandırmış olur. Ancak benlik algısı her zaman doğru oluşmayabilir. Bireyin bu algıları önce aile içinde, daha sonra ise sosyal ortamlara karıştıkça çevresinin etkisiyle şekillenir. Olumlu ve olumsuz şekillenen bu algılar onun benlik kavramını oluşturur. Eğer birey, kötü iletişim süreçlerinin var olduğu bir aile ortamında büyümüşse, sürekli eleştirilmiş, yargılanmış ve yaftalanmışsa kendine ilişkin benlik algısı olumsuz olur. Bu durum da bireyin kendine güvenini zedeler ve birey içe kapanık, özgüveni düşük, çekingen bir imaj sergiler. Böylece kendisini de başarısız ve kötü iletişim süreçlerinin içerisinde bulur. Buna karşılık aldığı geribildirimler de benlik algısını olumlu etkilemediğinde, bireyin benliğine ilişkin bu olumsuz algısı daha derinleşerek ve sağlamlaşarak devam eder. Peki, kişi kendine ilişkin algısını değiştirebilir mi?

Büyüme sürecinde aileden, sosyalleştikçe çevreden alınan olumsuz geri bildirimlerden dolayı birey kimi zaman ön yargılara maruz kalmaktan korkar ve kendini kapatmayı tercih eder. Bu durumun temelinde, o güne kadar ön yargılara maruz kalmış olma durumu vardır ve birey çoğu zaman bunun farkında olmaz. Böylece birey, kendi içinde yönetemediği aynı ön yargıları kendine yöneltir ve bu da onun kabul görmeme korkusunu besler, özgüvenini zedeler. Gün gelir; diğerlerinden önce onların yerine o kendini yargılamaya başlar. Bireyin kendisine ilişkin bu olumsuz algısını olumluya çevirebilmenin ilk adımı; ne olduğunun ve olmadığının farkında olmaktır. Bunu yapabilmenin yolu da, klâsik söylemiyle "bardağın dolu tarafını görmek"ten; yani bireyin, kendi olumlu yönlerini ve başarılarını hatırlamasından geçer.

2.1. Ön Yargıların Aile Kaynaklı Nedenleri

Her birey çocukluğunda anne baba ile özdeşleşmeye başlar ve ailenin özelliklerine bağlı olarak kişilik şekillenir. Birey, ebeveyni ile kurduğu bağ ile onlara benzemeye başlar. Aile, temel değerlerin ve bakış açılarının kazandırıldığı, bireyin kişisel benlik tarihinin yazıldığı yerdir. Büyüme ve olgunlaşmaya bağlı olarak bu değerler ve bakış açıları değişebilir; ancak bu ne kadar gerçekleşse de aileden gelen içselleştirilmiş bazı düşünceler ve değerler varlıklarını korumaya devam eder. Böylece kimi zaman birey kendini, mantığının reddettiği davranışı sergilerken bulur. Yetişme döneminde aile içinde öğrenilen genel algılar ve kalıp yargılar zamanla değişebilmekle birlikte bunların her yaştan insanda var olduğunu söylemek mümkündür. Her yaştan insan ön yargılara maruz kalabildiği gibi kendisi de ön yargılı tutumlar sergileyebilir. Ailede öğrenilen bu tutumlar, farkında olunmadığında yetişkin hayatta da varlıklarını sürdürürler.

Ön yargılar da küçük yaşlarda aile içinde öğrenilmeye başlanan tutumlardır. Çocukken önce aile içinde etiketlemeler öğrenilir. Aile içindeki yetişkinlerin, öfkeli oldukları zamanlarda söyledikleri kelimeler ve kullandıkları etiketler, ön yargılara ilk adımın atılmasını sağlar. Birey, sosyalleşmeyle birlikte mahallede, okulda diğerlerinden duyulan yeni etiketler ve sıfatlarla karşılaşır. Bunlara maruz kaldıkça, bunlar zihninde yer eder ve benzer durumlarda kendisi de aynı kelimeleri ve etiketleri kullanarak ön yargılarını beslemeye başlar. Bu ön yargılar, zihinde ayrıştırmalara ve sınıflandırmalara sebep olur. Birey kendi gibi olanlarla arkadaş olurken, olmayanların varlığını dahi reddeder hale gelebilir. Sevmediklerine objektif yaklaşmamayı, haklı olsalar da bunu kabul etmemeyi öğrenir. Özellikle ergenlik döneminde diğerlerine isim takarak, onlarla alay ederek, fiziki farklılıklarına dayalı etiketlemelerde bulunarak var olma çabası verilir. Büyüme sürecinde zihinde bireyle bizimle birlikte beslenerek büyüyen bu ön yargılar, farkında olunmadıkça ve yönetilmedikçe yetişkinlikte de varlığını sürdürür. Sahip olunan bu ön yargılar aile yaşantısında da çocuklarza

aktarılır ve böylece döngü devam eder. Örneğin; çocukluktan itibaren anne babası tarafından kızların pembe erkeklerin mavi renkle özdeş olduğunun bu renk ürünlerle bilinç altına işlenmesi, pembe tişört giyen bir erkek görünce ona farklı bakılmasına sebep olabilir. Yahut kız çocuğun bebeklerle ve mutfak malzemeleriyle, erkek çocuğun kamyonlarla oynaması; kadın ve erkeğin toplumsal rollerini, sorgulamadan öğretildiği gibi kabul etmeyi beraberinde getirebilir. Bu nedenle; öncelikle yetişkinlerin farkındalık sahibi olması, küçük yaşlarda duyarlılığın gelişmesi ve ileriki dönemlerde bu bilincin yerleşmesi açısından önem arz etmektedir.

2.2. Ön Yargıların Eğitim Kaynaklı Nedenleri

Eğitim; belli bir bilim dalında, belli bir konuda bilgi ve beceri kazandırma, yetiştirme ve geliştirme ve yeni kuşakların toplum yaşamında yerlerini almaları için gerekli bilgi, beceri ve anlayışları edinmelerine, kişiliklerini geliştirmelerine yardım etme işidir (Google Türkçe Sözlük). Platon'a göre insan doğası doğuştan belirlenmiştir. Altın, gümüş, demir ve tunç yaratılışlı insanların varlığından söz eder. Platon'a göre eğitimin işlevi "doğan çocukların içlerine bu madenlerden hangilerinin katılmış olduğunu ortaya çıkarmak" gibi görünür. Oysa Platon'un eğitim konusunda söylediklerini dikkatle incelersek, insan doğasını şekil verilebilir, hatta yine bu insan doğasının tamamen eğitim tarafından yaratılabilir bir şey olarak gördüğünü söyleyebiliriz. Buna karşılık, Rousseau çocuğun fizyolojik ve psikolojik doğasını aynı ölçüde önemseyerek bu özelliklerin tanınmasını ve bu özelliklere uygun bir eğitim verilmesi gerektiğini savunur. Belirlenmiş bir amaca hizmet eden eğitim anlayışının çocuğun doğasına zarar vereceğini söyler (Burkaz; 2014: 101). Bu bağlamda; eğitim ortamları, eğitimcilerin kendi değer ve düşüncelerini öğrenciye empoze ettikleri değil, onların kendi düşünce ve değer sistemlerini oluşturmaları için yol gösterici oldukları ortamlar olmalıdır. Ancak ön yargıları kimi zaman eğitim ortamlarında da gözlemlemek mümkündür. 2019 yılının sonlarında Aksaray'da bir ilkokulda otizmli öğrencilerin, aynı okulda eğitim gören diğer öğrencilerin psikolojisini kötü etkiledikleri gerekçesi ile ayrımcılığa maruz kaldığı haber olarak basına yansımıştı (www.euronews.com, E.T.: 24.01.2021). Bu olay otizmin bir hastalık, hatta bulaşıcı bir hastalık gibi algılanmasına ve bu ön yargıya dayalı ortaya çıkan ayrımcılığa örnek teşkil etmektedir.

Eğitimci olmak, ön yargısız ve adil biçimde öğrenciye hayata dair rehberlik yapmaktır. Çünkü insanların, özellikle de çocukların, farklı özellikleri nedeniyle ön yargılara maruz kaldığı durumlar onların psikolojilerinde olumsuz etkilere sebep olabilmektedir. Örneğin; okul ortamlarında yaşına nazaran kilosu fazla olan çocuk "şişko", gözlüklü olan "dört göz", zayıf "çiroz", uzun boylu "fasulye sırığı", kısa "yer cücesi" gibi etiketlemelere maruz kaldığında, bu etiketlemeler yetişkin hayatta kendine ve diğerlerine yönelik olarak işlemeye devam eder.

Evrensel ahlâk yasaları çerçevesinde belirlenmeyen bir eğitim içeriğinde zamanla güç, ön yargı ve ötekileştirme yer alır. Bu da uzun vadede kişisel hakları ihlâl, şiddet, ihmal, istismar gibi durumların ortaya çıkmasına neden olur ki; bunlar, yaygınlaştıkça da normal algılanmaya başlar. Bu nedenle; eğitimde kişisel görüşler değil, kişisel haklara saygı ve evrensel değerler mihenk taşı olmalıdır.

2.3. Ön Yargıların Toplum Kaynaklı Nedenleri

Ttoplumsal ön yargılar ve kalıp yargılar, fikirler üzerinde etkilidir. Daha once sözü edilen ayrımcılık, bu ön yargıya dayalı tutumların davranışa yansıyan halini ifade eder ve ayrımcılık birçok farklı özelliğe bağlı olarak ortaya çıkar. Sosyolog Erving Goffman, damgalı ve normal insanların aynı sosyal ortamda olduğu anlara ve birbirleriyle doğrudan temas halinde oldukları durumlara (Goffman, 2014: 42) odaklanır. Ona göre insanlar birbirlerini "ne çirkin bir kadın / adam", "oranın insanları bir işe yaramaz" gibi söylemlerle farklı şekillerde

yaftalar. Bu noktada da ayrımcılık başlar. Bununla ilgili olarak Goffman; toplum ve toplumsal araçlar damgalanmış bireye büyük grubun üyesi olduğunu söyler ve bu bir nevi normal insan olma anlamına gelir; ama aynı zamanda toplum, damgalı bireye onun bazı açılardan farklı olduğunu ve bu farklılığı ret etmemesi gerektiğini, böyle bir çabanın boşuna olacağını da söyler (Goffman, 2014: 172) der.

Ön yargılar stereotiplerden de, yani toplum bazında hemfikir olunan görüşlerden de etkilenir. Kimi zaman ön yargılar "toplumun geneli böyle düşünüyor" argümanına dayanılarak savunulur. Böylece bireyin kendi içinde bu tutumunu değerlendirmesi gerekmez. Peki, gerçekten böyle midir? Toplumun genelinin düşündüğü doğru mudur? Einstein, insanların ön yargılarını parçalamak, bir atomu parçalamaktan daha zordur der. "Adama bak, hasta mıdır nedir", "delinin teki", "ruh hastası" gibi söylemlere; bir klinikten çıkan kişiye o an "hasta" yaftası yapıştırılmasına toplumda kimi zaman rastalanır. Klinikten çıkan kişinin doktorun arkadaşı olma ihtimali yahut yolda kendi kendine konuştuğu için deli denilen kişinin o an zihninde çok önemli bir problemi çözmeye çalışıyor olma ihtimali üzerinde durulmaması, öğrenilmiiş toplumsal ön yargıların sonucu olarak karşımıza çıkar. Birey, toplumsal ön yargılara dayanarak toplumun uzak durduğundan kendisi de uzak durma eğilimi gösterir.

3. Ön Yargıların Medya Kaynaklı Nedenleri ve Medyanın Algı Yönetimi

Medya; kitlelerle iletişimi sağlayan her türlü basılı ve görsel yayın organının genel adıdır ve toplumsal ön yargıların oluşmasında ve yönetilmesinde etkilidir. Medya, hedef kitlenin algısını, iletilen mesajların kendi istediği şekilde yorumlanmasını sağlayarak yönetir. Medyada algı yönetimi gerek konvansiyonel gerekse yeni medya kaynaklarında görülebilmektedir. Algı yönetimi; bilinç altı mesajlar vererek, kişilerin ve olayların istenen şekilde algılanmasını sağlamaktır. İletilen mesaj, alıcı tarafından iletenin arzu ettiği doğrultuda anlamlandırılıp yorumlanır ve böylece algı yönetimi gerçekleşir. Bu şekilde içselleştirilen bilgiler de bireyin tutum ve davranışlarına yansır. Stereotipler algı yönetiminde de etkilidir. Stereotipleştirme, içinde yaşanılan toplumun kültürel ve kimlik yapısıyla yakından ilişkili olmakla birlikte, somut gerçeklikle bir ilgisi bulunmamaktadır. Bireylerin zihninde önceden var olan yargıların zihinsel olarak oluşturulmuş bir imajı şeklinde karşımıza çıkmaktadır (Çağlar, 2019: 134).

3.1. Konvansiyonel Medya ve Ön Yargılar

Basılı ve görsel medyada yer alan içeriklerde sıklıkla gözlemlenen, kişisel özelliklere dayanarak oluşturulan haber içerikleri; bir grubu yok sayma, değersizleştirme, ötekileştirme ve stereotiplere dayalı cümleler kurma gibi yöntemler hedef kitlenin bu içerikleri yorumlarken de bu argümanlara dayanmasını sağlar ve bu da ön yargıların oluşmasını destekler. Özellikle haber içeriklerinin objektif olmayan cümlelerle sunulmasının, ön yargıların oluşumasında en büyük etken olduğunu söylemek mümkündür. Örneğin; "polis olan eşinden boşanmak zorunda kalan kadın…", "bekâr evinde olay…" ve benzeri cümleler ile başlayan sunumlarda aktarılmak istenen haber içeriğinin değil, habere konu olan bireylerin özelliklerinin ön plâna çıkarılması söz konusudur. Bu yönlendirici içerik, bireyin zihninde yargı mekanizmasının ve olayın sonucunun kişisel özelliklere bağlı gerçekleştiği algısının oluşmasını ve bireyin, yargılarını olayın sebebi ve sürecini göz ardı ederek kişisel özellikler üzerinden belirlemesini, yani ön yargılı olmasını destekler.Özellikle yazılı basında ön yargılara sebep olabilecek tarafgirlikte verilen haberler içeriklerinde cinsiyet ayrımcılığı da göze çarpmaktadır. Belirli bir ideoloji çerçevesinde hazırlanan haberler çoğu zaman hedef kitlenin yerine düşünerek aktarılmakta, nasıl düşünülmesi ve neyin nasıl algılanması gerektiği konusunda yönlendirici olmaktadır. Habere ilişkin seçilen çarpıcı bir fotoğraf ile özellikle vurgu yapılmak istenen noktaya dikkat çeken başlık, bu durumu net şekilde gösterir.

8 Haziran 1971 tarihli Hürriyet Gazetesi'nde, "150 kilo olduğu için memleketi Teksas'ta koca bulamaması ve İstanbul'da koca avına çıktığında sokakları titretmesi" şeklinde haber yapılan olan Mary adındaki kadın, buna çarpıcı bir örnektir. Fiziki görünümü alaycı bir dille haberleştirilen kadın, "hippi" ifadesiyle de etiketlenmektedir. Bu haber şu soruyu beraberinde getirmektedir: "Mary kadını idealize eden ölçülere sahip olsaydı nasıl bir dille haberleştirilecekti?"


150 kiloluk hippi Mary yürüdükçe sokakları titretiyor

Kaynak: 8 Haziran 1971, Hürriyet Gazetesi

Kaynak: 16 Temmuz 2015, Şok Gazetesi

Bu başlıklar, okuyucuda merak uyandırır ve başlığı okuyan kişi boşlukları kendi doldurur. Bu haberleştirme biçimi, okuyucuları farklı şekillerde etkileyerek ve farklı algılara sebep olabilir. Dikkat çekmek, okuyucuda ilgi uyandırmak, algıyı yönetmek gibi birçok amaca bağlı olarak cinsiyet ayrımcılığını da destekler nitelikteki yönlendirici haberler, medyanın gerçeklerin kendi seçtiği kısmını kendi belirlediği biçimde yansıttığının da göstergesidir. Bu nedenle, kadın temsilinin neden objektiflikten uzak olduğunun yanında bunun neden bu şekilde olduğunu da sorgulamak gerekir.

Bir haberi ilgi çekici kılmak ve haberin daha çok okuyucu tarafından takip edilmesini sağlamak için en çok kullanılan yöntem, kelime oyunu yapmaktır. Etik açıdan bakıldığında; bir haber daha çok okuyucuya ulaştırma isteği kabul edilir olmakla birlikte kişisel hakları ihlâl, toplumsal ön yargıları destekleme, şiddeti romantikleştirme, duyguyu olayın başka karakterine yöneltme gibi durumlar kabul edilir değildir. Bir olayı haber yapma kaygısının etik anlayışın önüne geçmemesi gerekir. Bunun altında, şu ana kadar değinilen birey, aile, eğitim ve medya kaynaklı sebepler olduğunu söylemek mümkündür. Bunlardan bağımsız, adil bir şekilde değerlendirme yapabilmek, öncelikle iyi bir medya okuryazarı olma gerekliliğini beraberinde getirir. Medya okuryazarlığına sonraki bölümlerde değinilecektir.

3.2. Sosyal Medya, Popüler Kültür ve Ön Yargılar

Popüler kültürün de ön yargıları beslediğini ve toplumsal dejenerasyona sebep olduğunu söylemek mümkündür. Popüler kültür; belli bir dönem için geçerli olan, hızlı üretilen ve hızlı tüketilen kültürel öğelerin bütünü (Türk Dil Kurumu Sözlüğü) olarak tanımlanır. Bireye mutluluğa, saygınlığa marka ürünler, pahalı telefonlar, şık kıyafetlerle sahip olunabileceğine; her daim ulaşamayacağı bir haz nesnesi sunarak, mutluluğa anda değil sürekli peşinden koşarak bir gün ulaşılabileceğine inanmasını öğreten popüler kültür, tektipleştirmeyi de beraberinde getirmiştir. Örneğin; güzellik algısı bu tektipleştirmeye örnek verilebilir. Sözel ifadede birçok insan doğallıktan yana olduğunu belirtmekle birlikte doğal olana değil, empoze edilene ilgi gösterir. Böylece öğrenilen güzellik kalıplarının dışındaki insanların kusur olarak algılanan özellikleri, diğer tüm özelliklerini perdelercesine o insanların karakterlerini önemsememeye yol açar. Burnu beğenilmeyene "Gargamel", boyu kısa olana "cüce" ifadelerinin kullanılması da, güzelliğin ve karizmanın salt bedensel özelliklerle ilgili algılanmasının sonucudur.

Moda ve teknolojinin gelişmesi de ön yargıları ve sınıflamayı destekler. Popüler kültürle birlikte marka giyim, pahalı telefonlar, lüks mekânlar ile birçok alanda "markan imajındır" etkisinin yaratıldığını söylemek mümkündür. Özellikle gençler arasında, gruba aidiyet geliştirmek ve dışlanmamak için bu daha önemli bir durum hatta değer olarak

algılanabilmektedir. İnsanların diğer insanlara tepkileri, onları algılayış biçimi, bakış açısı aynı olmamakla birlikte bunlar kimi zaman farkında olmadan ayrımcı davranmaya da sebep olur. Çocuklukta öğrenilen ve sonradan edinilen düşünceler farkında olmadan bireyi yönetir. Bu farkında olmama durumu da, ön yargının son yargıya dönüşmesinde önemli rol oynar. Birey, bu ön yargılarını dahil olduğu sosyal medya kaynaklarına da yansıtır.

3.3. Yankı Odası

Medya kaynaklarının dijital ortamdaki çeşitliliği, erişilebilir her türlü bilginin de çeşitliliğini artırmıştır. Bu durum birçok insanın ortak konularda bilgi alışverişi yapmasına imkân yaratırken, diğer yandan ideolojik paylaşımlara dayalı taraflı içeriklerin de yayılmasını hızlandırmıştır. Bu sayede de bireyler, kendi dünya görüşlerine yakın olan içeriklere ve kişilere daha yakın olma şansını yakalamıştır. Bu durum, Jamieson ve Cappella'ın tanımladığı "yankı odası" kavramını doğurmuştur.

Yankı odası; mesajların kendi içinde karşılıklı iletildiği, böylece her daim korunduğu izole bir medya ortamını, kapalı bir grubu ifade eder. Buna göre; aynı düşüncelere sahip kişilere sunulan bilgi, bu düşüncelere sahip sınırlı alanda kalır. Böylece bu düşünce doğruluğu araştırılmadan, sorgulanmadan benimsenir ve gerçek kabul edilir. Bireyler bu sınırların dışındaki kişilere ve karşıt görüşlere tepki oluştururlar ve onlara göre diğerlerinin düşüncelerinin doğru olma ihtimali yoktur. Yankı odası etkisini sosyal medya ortamlarında sıkça görmek mümkündür. Sosyal medya hesaplarında karşıt görüşlere sahip bireyleri arkadaş listelerinde bulundurmamak yankı odası etkisinde örnek verilebilir. Bireyler, sosyal çevresini benzer duygu ve düşünceleri de içine alan ortak özelliklere sahip olduğu kişilerden oluşturur. Ancak bu çevrenin sınırlarını kalın çizgilerle belirlemek, genel algı ve değerleri oluşturmada bu çerçeveyi referans kabul etmek diğerlerine karşı öfke duygusunun oluşmasına neden olabilir; birey reddetme davranışı sergileyebilir ve bunun farkında olamayabilir. Çünkü kalın çizgilerle kendi çizdiği sınırlar içerisinde ısrarla kaldığında kendi hakkında olumlu bir benlik algısı oluşturur. Doğruluğuna inandığı düşünceleri desteklendikçe kendine daha çok güvenir, aksi durumların doğru olma ihtimalinden daha çok uzaklaşır ve kendi yarattığı sanal gerçekliğin içinde kalır.

4. Medya Okuryazarlığı

Aufderheide'nin tanımıyla medya okuryazarlığı; çeşitli biçimlerde mesajlara ulaşma, analiz etme, değerlendirme ve iletme yeteneğidir (Akt: Arslan, 2019: 113). Verileri kullanabilme, analiz etme, sebep-sonuç ilişkileri bağlamında değerlendirme ve eleştirel düşünme becerilerini kapsayan medya okuryazarlığı; olayları güvenilir verilere dayanarak ele almayı sağalayan bir düşünme becerisidir. Günümüzde gerek geleneksel medya araçları (radyo, televizyon, gazete), gerekse yeni medya araçarı (bilgisayar, internet, cep telefonu vd.) birçok içeriğe maruz kalımasına sebep olmaktadır. Bilginin çokluğuna bağlı olarak bilgi kirliliğinin de artmasına neden olan bu durum karşısında medya okuryazarlığı önem kazanmaktadır. Çünkü sunulan ya da erişilen içeriğin doğruluğu, içeriğe konu olan kişiler ile okuyucular üzerinde bıraktığı etkiler ve nasıl değerlendirildiği önemlidir.

Medya etiği çerçevesinde değerlendirildiğinde, tiraj kaygısı nedeniyle medya kaynaklarının haberleri çekici kılmak için çarpıtma, sansasyonel başlıklar atma gibi yöntemlere başvurduğunu görmek mümkündür. Buna bağlı olarak kişisel hakları ihlâl, görsellerin kullanımı gibi durumlar da etik çerçevesinde ele alınabilecek durumlardır. Gerek geleneksel gerekse yeni medya kaynaklarında takip edilen bir haberin bunlar göz önünde bulundurularak değerlendirilmesini sağlayan medya okuryazarlığına sahip olunduğunda; sunulan her içeriğin objektif bakış açısıyla sunulmamış olabileceğini görebilmek, özellikle kadın haberlerindeki ayrımcı ve etiketleyici dili fark edebilmek ve buna göre değerlendirme yapabilmek daha mümkün olacaktır.

SONUÇ

Her birey cinsiyeti, yaşı, düşünceleri ve birçok özelliğiyle farklı toplumsal grupların birer üyesidir. İnsanların bu üyelik etiketlerinden ibaret olmadığı düşünülse de "güç-değer" algısı, çoğu zaman bu düşünceyi yargılara yenik düşürebiliyor. İletişimde temel amacının "anlaşılmak" olduğu düşünüldüğünde, sağlıklı bir iletişim için anlamak da anlaşılmak için önemlidir. Birey, kimi zaman karşısındakini anlamanın onun gibi düşünmek olduğunu zanneder. Ancak anlamak, kabul etmek demek değildir. Birey, karşısındaki ile aynı fikirde olmayabilir, düşüncesini yahut davranışını tasvip etmeyebilir; ancak yine de onu anlayabilir. Kişii, diyalog içinde olduğu kişiye "seninle aynı fikirde değilim, ama seni anlıyorum" ya da "yaptığını onaylamıyorum ama neden yaptığını anlıyorum" diyebildiğinde, kendisini sadece söze veya eyleme dayalı bir yargıdan uzaklaştırarak empatiye dayalı bir iletişim sürecinin içerisine bırakmış olur.

Üstün Dökmen, doğayı severiz, insanları severiz (en azından bir kısmımız); sevmek yeterli değil, anlamak da gerekli (Dökmen; 2005: 1) der. Yetişkinlik sürecine kadar birçok farklı etkene bağlı olarak şekillenen iletişim biçimleri, olumlu ve olumsuz birçok özellik taşıyabilir. Örneğin; öğrenilen toplumsal cinsiyet kavramları, bireyin gözünde kadın ve erkek arasındaki toplumsal ve sosyal kültürü belirler ve bunlara dayalı rolleri beraberinde getirir. Yahut insan merkezli bir yaşam anlayışı da, doğanın diğer unsurlarının önemini geri plânda tutmaya ve önemsememeye neden olabilir. Tüm bunların olmasında öenmli bir etken olan medya da, kullandığı dil ile okuyucunun algısını şekillendirebilmektedir. Okuyucu kadın ya da erkek olsun; bu dil zamanla konu ile ilgili ön yargıların oluşmasını veya var olan ön yargıların daha da yerleşmesini beraberinde getirmektedir. Bu bağlamda; medyada içerik oluşturan tarafın da, okuyucu olan tarafın da kendisine sorması gereken sorular mevcuttur. Bir içerik oluştururken "mağduru daha da mağdur etmemek, mağduru ifşa ederken faili saklamamak, insan ya da hayvan olsun bir tarafı hedef göstermemek, içeriği cinsiyet üzerinden belirlememek, söylentilere dayanmadan kesin bilgilere dayalı içerik oluşturmak, ön yargı ve etiketlerden uzak durmak, olmayanı olmuş gibi sunmamak", yapılması gereken eylemler olarak karşımıza çıkmaktadır. Bunun yanında okuyucunun da, iyi bir medya okuryazarı olması, "içerik dili ne kadar objektif, ayrımcı ifadelere yer verilmiş mi, kesin bilgilere dayanılmış mı, bu içerikte hak ihlâli var mı?" sorularını sorması gerekmektedir.

Sonuç olarak; içeriği sunan medya kaynağının da içeriği takip eden bireylerin de bu bakış açıları çerçevesinde alagı ve değerlendirmelerini şekillendirmesi, medyadaki ön yargıya dayalı içeriklerin daha net fark edilmesini ve bu ön yargıların yönetilmesini kolaylaştıracaktır.

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SELECTIVITY AND STABILITY OF HERBICIDES AND HERBICIDE TANK MIXTURES ON DUO SYSTEM AND COVENTIONAL GRAIN MAIZE (ZEA MAYS L.)

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Abstract

The research was conducted during 2018 - 2020 on pellic vertisol soil type. Under investigation was cycloxydim-tolerant grain maize hybrid Trilogi duo (Zea mays L.), FAO 350. Factor A included the years of investigation. Factor B included untreated control, 7 soil-applied herbicides by conventional technology: Sulcotrack (sulcotrione + terbuthylazine), Successor TX (petoxamide + terbuthylazine), Acris (dimethenamid-P + terbuthylazine), Deflexo mix (S-metolachlor + terbuthylazine), Click duo (terbuthylazine + pendimethalin), Bismarck KS (clomazone + pendimethalin), Pledge 50 VP (flumioxazine); 6 foliar-applied herbicides by conventional technology: Sovereign OD (nicosulfuron + sulcotrione), Mistral plus (dicamba + nicosulfuron), Spandis (prosulfuron + dicamba + nicosulfuron), Arigo WG (mesotrione + nicosulfuron + rimsulfuron), Collage 64 OD (thiphensulfuron-methyl + nicosulfuron), Capreno SC (tembotrione + thiencarbazone-methyl); 8 herbicide tank mixtures by Duo system technology: Starane gold + Focus ultra (fluroxypyr + florasulam + cycloxydim), Kabadex extra + Focus ultra (mesotrione + florasulam + cycloxydim), Callisto plus + Focus ultra (mesotrione + dicamba + cycloxydim), Magneto top 464 SL + Focus ultra (2.4-D + dicamba + cycloxydim), Peak 75 WG + Focus ultra (prosulfuron + cycloxydim), Permit + Focus ultra (halosulfuron-methyl + cycloxydim), Bentador + Focus ultra (bentazone + cycloxydim), Onyx + Focus ultra (pyridate + cycloxydim).

The highest grain yields are obtained by use of herbicide tank mixtures by technology Duo system Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra, Starane gold + Focus ultra and Permit + Focus ultra. High grain yields are also obtained by use of foliar herbicides by conventional technology Spandis, Arigo and Mistral plus. The use of soil-applied herbicides Sulcotrack, Successor, Acris, Deflexo mix, Click duo, Bismarck and Pledge in maize crops leads to lower grain yields due to their inefficacy against perennial graminaceous and broadleaved weeds and against the annual broadleaved weed Xanthium strumarium L. The most unstable are untreated control, herbicide tank mixtures Onyx + Focus ultra and Peak + Focus ultra, foliar-applied herbicide Collage and soil-applied herbicide Successor. Technologically the most valuable are herbicide tank mixtures Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra and Starane gold + Focus ultra by Duo system technology, which followed by foliar-applied herbicides Spandis, Arigo, Mistral plus, Capreno and Sovereign by conventional technology. Soil-applied herbicides Pledge, Bismarck and Successor, foliar-applied herbicide Collage and herbicide tank mixtures Peak + Focus ultra and Onyx + Focus ultra have low estimates.

Keywords: grain maize, herbicides, herbicide combinations, selectivity, stability

INTRODUCTION

Maize is most often weeded with late spring broadleaved weeds – Xanthium strumarium L., Amaranthus retroflexus L., Chenopodium album L., Datura stramonium L., Solanum nigrum L., Polygonum aviculare L., Abutilon teophrasti Medic. Late spring graminaceous weeds are also widespread – Setaria viridis Beauv., Echinochloa crus-galli L., Panicum sanguinale L. The reason for their multiplication is improper crop rotation, application of inappropriate herbicides, inaccurate doses and others (Dawoud et al., 2006; Pajić et al., 2009; Korpanov et al., 2010).

Perennial graminaceous weeds Sorghum helepense Pers., Cynodon dactylon Pers. and Agropyrum repens L. and perennial broadleaved weeds Cirsium arvense Scop. and Convolvulus arvensis L. are multiplying greatly. The reason for this are gaps in agricultural technology - the use of cutters and disc implements in weeding with rhizome and root shoot weeds (Vancetovic et al., 2010; Dragičević et al., 2012).

When growing cold-resistant maize hybrids, due to their early sowing, the competitors of maize are also early spring weeds, which are characteristic of sunflower – broadleaved weeds such as Sinapis arvensis L. and Falopia convolvulus Leve) and graminaceous weeds such Avena fatua L. (Sinzar et al., 1998; Michel, 2001).

Conventional technology for maize cultivation has unresolved problems in controlling some perennial graminaceous weeds such as Cynodon dactylon Pers. and Agropyrum repens L., which necessitated the introduction of the new Duo system technology in maize (Jovovic et al., 1999; Asadi et al., 2009; Delchev, 2018, 2020 and 2021).

The purpose of this study was to establish the selectivity and stability of some herbicides and herbicide tank mixtures on Duo system and conventional grain maize by influence of different meteorological conditions.

MATERIALS AND METHODS

The research was conducted during 2018 - 2020 on pellic vertisol soil type. Under investigation was cycloxydim-tolerant grain maize hybrid Trilogi duo (Zea mays L.), FAO 350. Two factors experiment was conducted under the block method, in 4 repetitions; the size of the crop plot was 15 m^2. Factor A included the years of investigation. Factor B included untreated control, 7 soil-applied herbicides by conventional technology: Sulcotrack, Successor TX, Acris, Deflexo mix, Click duo, Bismarck KS, Pledge 50 VP; 6 foliar-applied herbicides by conventional technology: Sovereign OD, Mistral plus, Spandis, Arigo WG, Collage 64 OD, Capreno SC; 8 herbicide tank mixtures by Duo system technology: Starane gold + Focus ultra, Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top 464 SL + Focus ultra, Peak 75 WG + Focus ultra, Permit + Focus ultra, Bentador + Focus ultra, Onyx + Focus ultra. Active substances of herbicides, their doses and treatment periods are shown in Table 1. Soil-applied herbicides were treated during the period after sowing before emergence. Foliar-applied herbicides were treated during 5-7 maize leaf stage. All of herbicides and herbicide tank mixtures were applied in a working solution of 300 l/ha. Due to of low adhesion herbicide Spandis was used in addition with adjuvant Dash HC – 1 l/ha, herbicide Arigo WG – with adjuvant Trend 90 – 0.1 %, herbicide Capreno SC – with adjuvant Mero 80 EC – 2 l/ha, herbicide Kabadex extra – with adjuvant Dasoil 26-2N – 500 ml/ha and herbicide Peak 75 WG – with adjuvant Atplus – 0.2 %,

The selectivity of herbicides and herbicide tank mixtures has been established through their influence on grain yield. The math processing of the data was done according to the method

of analyses of variance (Shanin 1977; Barov, 1982; Lidanski 1988). The stability of herbicides and herbicide tank mixtures for grain yield with relation to years was estimated using the stability variances σ_i^2 and S_i^2 of Shukla (1972), the ecovalence W_i of Wricke (1962) and the stability criterion YS_i of Kang (1993).

RESULTS AND DISCUSSION

Evaluation of grain yields obtained during treatment with the respective herbicides and herbicide tank mixtures was made (Table 2). The results show that there is a positive correlation between their biological efficacy against weeds and grain yields.

Table 1. Investigated variants

№	Variants	Active substance	Doses	Treatment period
1	Control – untreated	-	-	-
Conventional technology				
Soil-applied herbicides				
2	Sulcotrack	sulcotrione + terbuthylazine	2.6 l/ha	ASBE
3	Successor TX	petoxamide + terbuthylazine	4 l/ha	ASBE
4	Acris	dimethenamid-P + terbuthylazine	3 l/ha	ASBE
5	Deflexo mix	S-metolachlor + terbuthylazine	3.5 l/ha	ASBE
6	Click duo	terbuthylazine + pendimethalin	4 l/ha	ASBE
7	Bismarck KS	clomazone + pendimethalin	2 l/ha	ASBE
8	Pledge 50 VP	flumioxazine	80 g/ha	ASBE
Foliar-applied herbicides				
9	Sovereign OD	nicosulfuron + sulcotrione	2 l/ha	5-7 leaf
10	Mistral plus	dicamba + nicosulfuron	1.2 l/ha	5-7 leaf
11	Spandis	prosulfuron + dicamba + nicosulfuron	500 g/ha	5-7 leaf
12	Arigo WG	mesotrione + nicosulfuron + rimsulfuron	330 g/ha	5-7 leaf
13	Collage 64 OD	thiphensulfuron-methyl + nicosulfuron	1 l/ha	5-7 leaf
14	Capreno SC	tembotrione + thiencarbazone-methyl + isoxadifen-ethyl (antidote)	290 ml/ha	5-7 leaf
Duo system technology				
Herbicide tank mixtures				
15	Starane gold + Focus ultra	fluroxypyr + florasulam cycloxydim	1.2 l/ha 2 l/ha	5-7 leaf 5-7 leaf
16	Kabadex extra + Focus ultra	mesotrione + florasulam cycloxydim	300 ml/ha 2 l/ha	5-7 leaf 5-7 leaf
17	Callisto plus +	mesotrione + dicamba	2 l/ha	5-7 leaf

	Focus ultra	cycloxydim	2 l/ha	5-7 leaf
18	Magneto top 464 SL + Focus ultra	2.4-D + dicamba cycloxydim	1 l/ha 2 l/ha	5-7 leaf 5-7 leaf
19	Peak 75 WG + Focus ultra	prosulfuron cycloxydim	15 g/ha 2 l/ha	5-7 leaf 5-7 leaf
20	Permit + Focus ultra	halosulfuron-methyl cycloxydim	50 g/ha 2 l/ha	5-7 leaf 5-7 leaf
21	Bentador + Focus ultra	bentazone cycloxydim	2 kg/ha 2 l/ha	5-7 leaf 5-7 leaf
22	Onyx + Focus ultra	pyridate cycloxydim	500 ml/ha 2 l/ha	5-7 leaf 5-7 leaf
Herbicide Spandis was used in addition with adjuvant Dash HC – 1 l/ha, herbicide Arigo WG – with adjuvant Trend 90 – 0.1 %, herbicide Capreno SC – with adjuvant Mero 80 EC – 2 l/ha, herbicide Kabadex extra – with adjuvant Dasoil 26-2N – 500 ml/ha and herbicide Peak 75 WG – with adjuvant Atplus – 0.2 %, ASBE – after sowing, before emergence				

The lowest grain yields are obtained by the untreated control, as a result of the strong weed infestation with broadleaved and graminaceous weeds and self-sown plants of Clearfield and ExpressSun sunflower (Helianthus annuus L.).

Table 2. Influence of some herbicides and herbicide tank mixtures on maize grain yield (2018 - 2020)

Factor A Factor B	2018		2019		2020		Mean (Factor B)	
	kg/ha	%	kg/ha	%	kg/ha	%	kg/ha	%
Control – untreated	6060	100	5680	100	6666	100	6135	100
Conventional technology								
Soil-applied herbicides								
Sulcotrack	6951	114.7	6435	113.3	7533	113.0	6973	113.7
Successor	6914	114.1	6515	114.7	7406	111.1	6945	113.2
Acris	6921	114.2	6532	115.0	7526	112.9	6993	114.0
Deflexo mix	7024	115.9	6475	114.0	7566	113.5	7022	114.5
Click duo	6987	115.3	6452	113.6	7533	113.0	6991	113.9
Bismarck	6902	113.9	6452	113.6	7499	112.5	6951	113.3
Pledge	6866	113.3	6407	112.8	7466	112.0	6913	112.7
Foliar-applied herbicides								
Sovereign	7193	118.7	6759	119.0	8000	120.1	7317	119.3
Mistral plus	7375	121.7	6873	121.0	8086	121.3	7445	121.3
Spandis	7411	122.3	6901	121.5	8133	122.0	7482	122.0
Arigo	7393	122.0	6873	121.0	8146	122.2	7471	121.8
Collage	7314	120.7	6873	121.0	7873	118.1	7353	119.9
Capreno	7260	119.8	6771	119.2	8066	121.0	7366	120.1

Duo system technology								
Herbicide tank mixtures								
Starane gold + Focus ultra	7502	123.8	7009	123.4	8246	123.7	7586	123.6
Kabadex extra + Focus ultra	7569	124.9	7123	125.4	8333	125.0	7675	125.1
Callisto plus + Focus ultra	7587	125.2	7100	125.0	8326	124.9	7671	125.0
Magneto top + Focus ultra	7533	124.3	7072	124.5	8259	123.9	7621	124.2
Peak + Focus ultra	7096	117.1	6680	117.6	7666	115.0	7147	116.5
Permit + Focus ultra	7575	125.0	7134	125.6	7559	113.4	7423	121.0
Bentador + Focus ultra	7108	117.3	6612	116.4	7893	118.4	7204	117.4
Onyx + Focus ultra	7084	116.9	6549	115.3	7646	114.7	7093	115.6
Mean (Factor A)	7165	-	6694	-	7792	-	-	

LSD, kg/ha:

F.A	p≤5%=227	p≤1%=281	p≤0.1%=342
F.B	p≤5%=331	p≤1%=382	p≤0.1%=435
AxB	p≤5%=423	p≤1%=459	p≤0.1%=504

The highest grain yields are obtained when using the herbicide tank mixtures by the technology Duo system Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra, Starane gold + Focus ultra and Permit + Focus ultra. The differences between these variants are small and have not been mathematically proven. These herbicide tank mixtures have very high herbicide efficacy against all annual and perennial broadleaved and graminaceous weeds and against sunflower self-sown plants.

High grain yields are also obtained by use of foliar-applied herbicides by conventional technology Spandis, Arigo and Mistral plus. They are lower than those for herbicide tank mixtures by Duo system technology. The reason for this is that these herbicides cannot control perennial graminaceous weeds Cynodon dactylon Pers. and Agropyrum repens L. Grain yields by foliar-applied herbicides Capreno, Collage and Sovereign are lower. These herbicides, in addition to not being able to control perennial graminaceous weeds Cynodon dactylon Pers. and Agropyrum repens L., are less efficacy against perennial graminaceous weed Sorghum helepense Pers., as well as against perennial broadleaved weeds Cirsium arvense Scop. and Convolvulus arvensis L.

Grain yields by herbicide tank mixtures Bentador + Focus ultra, Peak + Focus ultra and Onyx + Focus ultra are even lower. The reason for this is that these herbicide tank mixtures are poorly efficacy against perennial broadleaved weeds Cirsium arvense Scop. and Convolvulus arvensis L.

Low grain yields are obtained by use of soil-applied herbicides Sulcotrek, Successor, Akris, Deflexo mix, Click duo, Bismarck and Pledge. These herbicides are inefficacy against perennial graminaceous weeds Sorghum helepense Pers., Cynodon dactylon Pers. and Agropyrum repens L., against perennial broadleaved weeds Cirsium arvense Scop. and Convolisulus arvensis L., as well as against the annual broadleaved weed Xanthium strumarium L. Only herbicide Successor has a low efficacy of 10 % against Cirsium arvense Scop. and 15 % against Convolvulus arvensis L., but on the other hand this herbicide shows low phytotoxicity against maize plants. However, grain yields by use of the seven soil-applied herbicides are higher than with weed infested, untreated control.

Table 3. Analysis of variance for grain yield

Source of variation	Degrees of freedom	Sum of squares	Influence of factor, %	Mean squares	Fisher's criterion	Level of significance
Total	197	1596928	100	-	-	-
Tract of land	2	1179844	5.1	50996.4	10.1	*
Variants	65	1206806	91.5	67734.5	33.0	***
Factor A – Years	2	952332	72.9	10209.0	29.2	***
Factor B – Herbicides	21	118697	12.4	8343.9	12.3	***
AxB	42	10746	6.2	897.4	13.1	**
Pooled error	130	85004	3.4	282.7	-	-

*p≤5% **p≤1% ***p≤0.1%

It was done an analysis of variance for grain yield (Table 3). It shows that the influence of the tested variants is 91.5 % of total variation of the data, very well proven at $p \leq 0.1$ %. The years have the biggest influence on grain yield – 72.9 % on the variants. It is very well proven at $p \leq 0.1$ %. It is conditioned by the unequal reaction of the variants to the change in the environmental conditions. The reason is the large differences in the meteorological conditions during the three years of investigation. The strength of influence of herbicides and herbicide tank mixtures is 12.4 %. Their influence is very well proven at $p \leq 0.1$ %. There is a proven interaction between variants and meteorological conditions of years (A x B) – 6.2 %. It is well proven at $p \leq 1$ %.

Based on proven herbicide x year interaction, it was evaluated stability parameters for each variant for maize grain yield with relation to years (Table 4). It was calculated the stability variances σ_i^2 and S_i^2 of Shukla, the ecovalence W_i of Wricke and the stability criterion YS_i of Kang.

Table 4. Stability parameters of herbicides and herbicide tank mixtures for grain yield with relation to years

Variants	$\bar{x}$	σ_i^2	S_i^2	W_i	YS_i
Control – untreated	6135	159.2**	198.3*	402.7	-5
Conventional technology					
Soil-applied herbicides					
Sulcotrack	6973	44.8	55.6	91.3	10+
Successor	6945	76.5	197.1*	334.7	7
Acris	6993	57.9	61.5	87.3	13+
Deflexo mix	7022	60.7	72.3	92.4	14+
Click duo	6991	60.9	87.8	82.0	11+
Bismarck	6951	99.1	44.0	186.4	7
Pledge	6913	91.6	47.5	140.8	6
Foliar-applied herbicides					

Sovereign	7317	38.7	133.4	148.7	16+
Mistral plus	7445	43.2	126.8	123.4	18+
Spandis	7482	42.3	123.4	111.1	20+
Arigo	7471	42.3	121.2	100.1	19+
Collage	7353	141.4*	73.7	239.8	8
Capreno	7366	32.9	116.7	112.2	17+
Duo system technology					
Herbicide tank mixtures					
Starane gold + Focus ultra	7586	43.7	23.5	91.7	21+
Kabadex extra + Focus ultra	7675	52.5	17.3	76.5	23+
Callisto plus + Focus ultra	7671	48.6	13.2	49.1	22+
Magneto top + Focus ultra	7621	53.7	10.8	55.6	22+
Peak + Focus ultra	7147	132.2**	19.7	232.3	8
Permit + Focus ultra	7423	40.2	18.3	77.4	18+
Bentador + Focus ultra	7204	34.4	28.9	88.8	15+
Onyx + Focus ultra	7093	126.7**	34.5	223.3	8
Mean	7217				13.4
LSD (p=0.05)	423				

Stability variances (σ_i^2 и S_i^2) of Shukla, which recorded respectively linear and nonlinear interactions, unidirectional evaluate the stability of the variants. These variants which showed lower values are considered to be more stable because they interact less with the environmental conditions. Negative values of the indicators σ_i^2 and S_i^2 are considered 0. At high values of either of the two parameters - σ_i^2 and S_i^2, the variant are regarded as unstable. At the ecovalence W_i of Wricke, the higher are the values of the index, the more unstable is the variant.

It is found, using the first three parameters of stability, that the most unstable are the weed infested, untreated control, followed by herbicide tank mixtures Onyx + Focus ultra and Peak + Focus ultra, by foliar-applied herbicide Collage and by soil-applied herbicide Successor. In these variants values of stability variance σ_i^2 and S_i^2 of Shukla and ecovalence W_i of Wricke are the highest and mathematically proven. In the untreated control the instability is of linear and nonlinear type - proven values of σ_i^2 and S_i^2. The reason for this instability is the large variation in grain yields over the years of experience. At herbicide tank mixtures Onyx + Focus ultra and Peak + Focus ultra and at foliar-applied herbicide Collage the instability is of linear type – proven values of σ_i^2. Values of S_i^2 are not proven. At soil-applied herbicide Successor the instability is of nonlinear type – proven values of S_i^2. Values of σ_i^2 are not proven. The reason for the high instability of herbicide tank mixtures Onyx + Focus ultra and Peak + Focus ultra and at foliar-applied herbicide Collage is their lower herbicide efficacy. The reason for the high instability of soil-applied herbicide Successor is his higher phytotoxicity with relation to grain maize. Other variants have high stability for grain yield, because they interact poorly with the conditions of years during maize vegetation.

To evaluate the complete efficacy of each variant should be considered as its effect on maize grain yield and its stability - the reaction of maize during the years. Valuable information about the value of technologic value of the variant give the stability criterion YS_i of Kang for simultaneous assessment of yield and stability, based on the reliability of the differences in yield and variance of interaction with the environment. The value of this criterion is experienced that using nonparametric methods and warranted statistical differences we get a summary assessment aligning variants in descending order according to their economic value.

Generalized stability criterion YS_i of Kang, taking into accounts both the stability and value of yields gives negative assessments only of untreated control, characterizing it as the most unstable and as the lowest yields.

According to this criterion, the most valuable technology appears herbicide tank mixtures Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra and Starane gold + Focus ultra. These variants combine high levels of grain yield and high stability of this index during the years.

From the viewpoint of technology for maize growing, high rating also have foliar-applied herbicides Spandis, Arigo, Mistral plus, Capreno and Sovereign, herbicide tank mixtures Permit + Focus ultra and Bentador + Focus ultra and soil-applied herbicides Deflexo mix, Akris, Click duo and Sulcotrek. They combine relatively good grain yields with high stability during the years of the study.

Soil-applied herbicides Pledge, Bismarck and Successor and foliar-applied herbicide Collage by conventional technology and herbicide tank mixtures Peak + Focus ultra and Onyx + Focus ultra by Duo system technology have low estimates. Soil-applied herbicide Successor receives low estimates due to its higher phytotoxicity with relation to grain maize. Other soil-applied and foliar-applied herbicides and herbicide tank mixtures receive low estimates due to their lower herbicide efficacy.

CONCLUSION

The highest grain yields are obtained by use of herbicide tank mixtures by technology Duo system Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra, Starane gold + Focus ultra and Permit + Focus ultra.

High grain yields are also obtained by use of foliar herbicides by conventional technology Spandis, Arigo and Mistral plus.

The use of soil-applied herbicides Sulcotrack, Successor, Acris, Deflexo mix, Click duo, Bismarck and Pledge in maize crops leads to lower grain yields due to their inefficacy against perennial graminaceous and broadleaved weeds and against the annual broadleaved weed Xanthium strumarium L.

The most unstable are untreated control, herbicide tank mixtures Onyx + Focus ultra and Peak + Focus ultra, foliar-applied herbicide Collage and soil-applied herbicide Successor.

Technologically the most valuable are herbicide tank mixtures Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra and Starane gold + Focus ultra by Duo system technology, which followed by foliar-applied herbicides Spandis, Arigo, Mistral plus, Capreno and Sovereign by conventional technology.

Soil-applied herbicides Pledge, Bismarck and Successor, foliar-applied herbicide Collage and herbicide tank mixtures Peak + Focus ultra and Onyx + Focus ultra have low estimates.

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SOSYAL MEDYADA GELİŞMELERİ KAÇIRMA KORKUSUNUN İŞTEN AYRILMA NİYETİ ÜZERİNDEKİ ETKİLERİ: NEVŞEHİR İLİNDE BANKACILIK SEKTÖRÜ ÖRNEĞİ

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Özet

Bu çalışma, farklı sektörlerde; sosyal medyada gelişmeleri kaçırma korkusunun ve işten ayrılma niyeti arasındaki ilişkileri inceleyen çalışmaların az olmasından dolayı önemlidir. Bu yönüyle de literatüre katkıda bulunulacağı düşünülmektedir. Gelişmeleri kaçırma korkusu (fomo), bireyin bulunmadığı ortamlarda diğer insanların ne yaptıkları ile ilgili olarak kaygı veya endişe durumudur. İşten ayrılma niyeti (bağlanma çıktıları), kişinin iş şartlarından memnun olmadıklarında gerçekleştirdikleri davranış durumudur. Çalışanların işten tatminsizliğini ifade etmektedir. Gelişmeleri kaçırma korkusu kişilere çeşitli zararlar verebilmektedir. Bu zararlarda çalışanların işten soğuyarak işlerini terk etmek istemelerine sebep olabilmektedir. Çalışmada amacımız, Türkiye' de çeşitli sektörlerde faaliyet gösteren bireylerin sosyal medyadaki gelişmeleri kaçırma korkusu ile işten ayrılma niyeti arasındaki ilişki ile bu değişkenlerin oluşmasını sağlayan öncüller arasındaki etkilerin ortaya çıkarılmasını amaçlamaktadır. Araştırma kapsamında kurulan hipotezlerin test edilmesi amacıyla Türkiye' de farklı sektörlerde çalışan bireylerden veri toplanacaktır ve elde edilen bu veri sayısal analiz yöntemleri kullanılarak analiz edilecektir. Bu hedef doğrultusunda çalışmamıza uygun anket formu düzenlenmektedir. Literatür taraması yapılmıştır. Hazırlanan anket uygulama aşamasındadır. Anketteki veriler İşten Ayrılma Niyeti ölçeği ve Gelişmeleri Kaçırma Korkusu ölçeği yardımıyla toplanmıştır. Analiz neticesinde elde edilen sonuçlar yorumlanacaktır. Bu çalışma bulgularının literatüre katkı sağlayacağı ve sonuçların çözüm üreticilerine yararlı bilgiler sunacağı düşünülmektedir. Türkiye örnekleminde bulunan ilk araştırma olması nedeniyle, bu çalışmanın söz konusu değişkenleri ele alan gelecek araştırmalara ışık tutacağı düşünülmektedir.

Anahtar Kelimeler: Gelişmeleri Kaçırma Korkusu (Fomo), İşten Ayrılma Niyeti (Bağlanma Çıktıları), Sosyal Medya, Nevşehir, Bankacılık Sektörü.

THE EFFECTS OF THE FEAR OF MISSING OUT (FOMO) IN SOCIAL MEDYA ON TURNOVER INTENTIONS IN THE BANKING SECTOR: NEVŞEHİR PROVINCE SAMPLE

Abstract

This study is considerable because there are few studies examining the relationship between fear of missing out on developments in social media and intention to quit in people' work sectors. Fear of missing out (fomo) developments is a anxiety or anxiety about what other people do in environments where the individual is absent. The intention to quit from

work (attachment outcomes) is the behavior of the person when they are not satisfied with the business conditions. It expresses the dissatisfaction of the employees from work. Fear of missing the developments can cause various harm to people. These losses can cause employees to want to leave their jobs by getting cold from their work. Our aim in the study is to reveal the relationship between the fear of missing the developments in social media of individuals operating in the banking sector in Turkey and the intention to quit and the precursors that led to the formation of these variables. In the scope of the research, data is collected from different sector in Turkey to test the established hypotheses and this data is analyzed by using numerical analysis methods. In accordance with this goal, a suitable questionnaire form is prepared for our study. A literature review is conducted. The prepared questionnaire is at the application stage. The data in the questionnaire are collected with the help of the scale of the fear of missing out (fomo) and the scale of turnover ıntentions (attachment outputs). As a result of the analysis, the obtained results are interpreted. It is thought that the findings of this study is contribute to the literature and the results provide useful information to solution producers. Because of the initial sample survey in Turkey, variables of this study are thought to shed light on future research.

Keywords: The Fear Of Missing Out (Fomo), Turnover Intentions (Attachment Outputs), Social Media, Nevşehir, Banking Sector.

1. GİRİŞ

Literatürde gelişmeleri kaçırma korkusu olarak ifade edilen fomo, hayatımızın ayrılmaz bir parçası olan akıllı telefonlar yardımıyla sanal ortamda daha çok bulunma isteği ve bireyin bulunmadığı ortamlarda diğer insanların ne yaptıkları ile ilgili olarak kaygı veya endişe duyma durumudur (Aydın, 2018). Teknolojide meydana gelen gelişmeler, hayatımızı önemli derecede kolaylaştırmakla beraber birtakım olumsuz sonuçlarıda beraberinde getirmektedir. Çağımızda teknolojinin getirdiği bir kaygı olarak nitelendirilen gelişmeleri kaçırma korkusu yabancı kaynaklarda bir süredir yer alırken, Türkçe kaynaklarda henüz yeni kullanılmaya başlanmış ve bu konuda kaynaklar sınırlıdır (Çetinkaya, 2019: 35).Fomo kısaltması ilk olarak Patrick McGinnis tarafından kullanılmıştır (Turhan, 2019: 9).Gelişmeleri kaçırma korkusu (fomo) kavramını tanımlayan ilk araştırmacı Przybylski'dir. Przybylski' nin tanımına göre, "Birey kendi yokluğunda diğerlerinin eğlenceli zaman geçirdiğini düşünmektedir ve bu durumu birey rahatsızlık verici olarak nitelemektedir" (Bulunmaz, 2018: 47).2013 yılında Oxford Sözlüğü bazı gazete ve dergilerde gelişmeleri kaçırma korkusu (fomo) tanımını yayınlamıştır ; "Genellikle bir sosyal medya sitesinde yapılan bildirimler ile tetiklenen ve o sırada heyecanlı ya da ilginç bir gelişmenin/olayın başka bir yerlerde oluyor olabileceği ile ilgili kaygı" şeklinde tanımlanmıştır (Altınay Bor, 2018:39). Literatürdeki bir başka tanıma göre : "Gelişmeleri kaçırma korkusu, sosyal kaygı olarak bilinmekte ve bunu tetikleyen önemli durumlardan birisi sosyal medya ağlarından gelen bildirimler olduğu düşünülmektedir. Bu kaygıya sebep olan durum insanların yeni bir deneyim veya hoşlarına gidecek olan bir fırsatı kaçırmış olma ihtimali düşüncesidir" (Terzi, 2019:37). Başka bir tanımda; "GKK kavramı, önemli bir şeyi kaçırmaya yönelik anksiyete durumu" şeklinde tanımlanmaktadır (Özkaynar Beşenk, 2018:18). Grohol' a göre ise fomo, "Çeşitli sosyal etkileşimlere nüfuz eden gerçek bir duygudur" (Gürdin, 2019:1262).İngilizce anlamı Fomo, Türkçede Gelişmeleri Kaçırma Korkusu olarak adlandırılan bu terim ; "Bireyin kendisinin bulunmadığı ortamda, başkalarının doyurucu deneyimler yaşayacaklarından duyduğu endişeyi tanımlamakta ve birey bu endişe sonucunda başkaları ve onların yaptıklarıyla sürekli bağlantıda kalmayı arzulamaktadır" şeklinde tanımlanmaktadır (Özcan ve Koç, 2019:2853)."Kişinin sosyal ağlarla olan ilişkisi; izleme ve güncelleme davranışı dünyada Fear of Missing Out (FOMO)

ülkemizde ise "Gelişmeleri Kaçırma Korkusu (GKK)" olarak tanımlanmaktadır (Aslan, 2018:23).

Tablo 1: Gelişmeleri kaçırma korkusu (fomo) ile ilgili bazı araştırma sonuçları

(Turhan, 2019)	Turhan (2019) yüksek lisans tezinde bireyin duygusal zeka ve karakteristik özelliklerinin fomo üzerindeki etkisini incelemiştir. Araştırma Sağlık Bilimleri Fakültesi öğrencilerine üzerine yapılmıştır. Öğrenciler kişilik testine tabi tutulmuştur. 472 kadın ve 92 erkek olmak üzere toplam 564 öğrenci ile iletişime geçilmiştir. Verilerin analizinde, çoklu regresyon modeli, t testi ve anova kullanılmıştır. Elde edilen analiz sonuçlarına göre duygusal zeka ve fomo arasında negatif yönlü anlamlı bir ilişki bulunurken, davranış ve tecrübe arasında pozitif yönlü anlamlı bir ilişki olduğu tespit edilmiştir.
(Erdoğan ve Şanlı, 2019)	Makalelerinde üniversite öğrencilerinin fomo korkularının sosyal medya üzerindeki davranışlarını incelemeye yönelik bir araştırma yapmıştır. Araştırma Karamanoğlu MehmetBey Üniversitesi Sağlık Bilimleri Fakültesi öğrencileri üzerine yapılmıştır. Araştırmada regresyon analizinden yararlanılmıştır. Elde edilen sonuçlara göre öğrencilerin fomo korkuları ile sosyal davranışları arasındaki ilişkinin anlamlı ve pozitif yönlü bir ilişkinin olduğu saptanmıştır.
(Aslan, 2018)	Yüksek lisans tezinde, bireylerdeki dikkat eksikliği ve dürtüselliğin sosyal medya kullanımının fomo üzerindeki etkisi incelenmiştir. Araştırma 425 kadın, 307 erkek olmak üzere 732 kişi üzerinde yapılmıştır. Verilerin analizi SPSS 24 programı ile yapılmıştır. Verileri analizinde korelasyon ve regresyon analizi kullanılmıştır. Elde edilen analiz sonuçlarına göre dikkat eksikliği ve sosyal medya kullanımı anlamlı bir ilişki olmazken, dürtüsellik ve sosyal medya kullanımı arasında anlamlı bir ilişkinin bulunduğu tespit edilmiştir.
(Altınay Bor, 2018)	Yüksek lisans tezinde, ergen yaştaki kişilerin sosyal medya üzerindeki davranışları ve fomo ile sosyal endişe arasındaki ilişkiyi incelemiştir. Bu amaçla anket formu oluşturulmuştur. Anket Gaziantep-Şahinbey ilçesinde devlet okullarında öğrenim gören 14-18 yaş arasındaki 500 öğrenci üzerinde uygulanmıştır. Araştımanın analizinde SPSS 21.0 programı yardımıyla t-testi, tek yönlü ANOVA, tanımlayıcı istatistikler, Kruskal Wallis H testi ve pearson korelasyon analizlerinden faydalanılmıştır. Elde edilen sonuçlar neticesinde ergen kişilerin sosyal medyaya yönelik davranışlarının olumlu olduğu görülmüştür. Ergen kişilerin fomo düzeyleri düşük seviyede çıkarken sosyal endişeleri orta düzeyde çıkmıştır. Sosyal medyada fomo korkusu ile sosyal endişe arasındaki ilişkinin pozitif yönlü ve anlamlı olduğu sonucuna ulaşılmıştır.
(Şenel, 2018)	Yüksek lisans tezinde, değişik kıtlık mesajlarının, müşterilerin plan yapmadan satın alma davranışı üzerindeki

	etkisi ile gelişmeleri kaçırma korkusunun bu bağlam içindeki rolü analiz edilmiştir. Araştırma 753 üniversite öğrencisinden elde edilen veriler ile analiz edilmiştir. Öğrencilere yüz yüze ve online anket uygulanmıştır. Elde edilen sonuçlara göre, fark edilen kıtlığın, müşterilerin plansız şekildeki satın alma davranışı bağlamında fomonun rolünün yüksek seviyede olduğu sonucuna varılmıştır.
(Özkaynar Beşenk, 2018)	Yüksek lisans tezinde, kişilerin sosyal medya kullanma ölçüleri ile bu yöndeki nedenlerin incelemesi bakımından gelişmelerden uzak kaldığındaki korku ölçüleri ile duygusal şekil arasındaki ilişki incelenmiştir. Araştırmaya kadın, erkek ayırt etmeksizin 732 kişi dahil olmuştur. Bu amaçla araştırmada anket formu kullanılmıştır. SPPSS 24.0 programı aracılığıyla faklılıkların belirlenmesinde Mann Whitney U testi kullanılmıştır. İlişki seviyelerini ölçmek amacıyla Spearman Korelasyon analizi kullanılmıştır. Elde edilen sonuçlara göre erkeklerin kadınlara sosyal medya kullanma seviyelerinin yüksek olduğu sonucuna ulaşılmıştır.
(Bulunmaz, 2018)	Yüksek lisans tezinde, bireylerin duygusal zeka seviyelerinin ve bireylerin kullandıkları duygusal şekillerin; sigara bağımlılığı, sosyal medya kullanımı ile fomo korkusu seviyesine bir etki yapıp yapmadığını araştırmaktadır. Araştırma gönüllülük esası ile yapılmış olup İstanbul, İzmir ve Denizli'de oturan 732 üniversite mezunu kişiye uygulanmıştır. Araştırma analizinde tanımlayıcı istatistikler, korelasyon analizi, Mann Whitney U testi kullanılmıştır. Analiz sonucunda sigara bağımlılığı ve diğer veriler arasında anlamlı ilişki bulunmazken, duygusal zeka ile sosyal medya kullanımının bireylerdeki etkisi üzerinde anlamlı ilişkiye rastlanmıştır.
(Terzi, 2019)	Yüksek lisans tezinde, üniversite öğrencilerinin sosyal medyadaki gelişmeleri kaçırma korkusunun, yalnızlık ve bireylerarası ilişki yönünden ilişki olup olmadığını incelemektedir. Araştırmanın katılımcıları 18-24 yaş aralığında Üsküdar Üniversitesi öğrencilerinden oluşmaktadır. Araştırma kapsamında 100 öğrenciye ulaşılmıştır. Veriler SPSS 24 programı ile analiz edilmiştir. Verilerin analizinde; t-testi, Mann Whitney U testi, Kruskal Wallis H testi, Kolmogorov-Smirnov testi, korelasyon analizi ve regresyon analizi uygulanmıştır. Analiz sonuçları neticesinde gelişmeleri kaçırma korkusunun bireylerarası ilişkide ve yalnızlık üzerinde anlamlı bir ilişkiye rastlanmamıştır.
(Çetinkaya, 2019)	Doktora tezinde, sosyal medyada gelişmeleri kaçırma korkusunun ve kişinin satın satın alma niyetini detaylı bir şekilde incelemiştir. Gelişmeleri kaçırma korkusunun tüketicinin satın alma davranışına etkisini incelemek amacıyla anket formu oluşturmuştur. Araştırmayı google formlarda oluşturduğu anket ile sosyal medya ve e-posta ile kullanıcılara ulaşmaktadır. Anket 18 yaş üzerindeki kişilere uygulanmış ve toplam 1623 anket analiz edilmiştir. Analiz sonucunda sosyal

	medyadaki gelişmeleri kaçırma korkusu ve bireylerin tatil satın alma davranışı arasında anlamlı bir ilişkiye ulaşılmıştır.
(Özcan, 2019)	Doktora tezinde, kişilik özellikleri ile sanal kaytarma arasındaki ilişkide gelişmeleri kaçırma korkusunun rolünü incelemiştir. Bu amaçla Türkiye'de kamu ve özel bankalarda çalışan 443 kişiye anket uygulanmıştır. Anketten elde edilen verileri analiz etmek amacıyla regresyon analizi kullanılmıştır. Analiz sonucunda, kişilik özellikleri ile sanal kaytarma arasında bir ilişki olmadığı ve gelişmeleri kaçırma korkusunun üst düzeyde rolü olduğu sonucuna ulaşılmıştır.
(Özcan ve Koç, 2019)	Makalelerinde, kişilerin çalışma yaşamlarını olumsuz etkileyen sosyal medya bağlılığı, sorunlu akıllı telefon kullanımı ve sanal kaytarma gibi pek çok olumsuz sonuca neden olan gelişmeleri kaçırma korkusunun sebeplerini açığa çıkarmayı hedeflemişlerdir. Bu amaç doğrultusunda anket hazırlanmıştır. Ankette çalışanların demografik özellikleri, iş yükleri ve gelişmeleri kaçırma korkusu seviyelerine yönelik sorular bulunmaktadır. Çalışma kapsamında 443 kişiden veri toplanmıştır. Verileri analiz etmek için t-testi, tek yönlü ANOVA ve regresyon analizi kullanılmıştır. Analiz sonucunda, yaş ve eğitim seviyesi ile gelişmeleri kaçırma korkusu arasında olumsuz ilişki bulunurken, iş yükleri ve gelişmeleri kaçırma korkusu arasında olumlu ilişkiye rastlanmıştır.
(Uyar vd, 2018)	Makalelerinde, üniversitede öğrenim gören ön lisans öğrencilerinin fomo düzeylerini tespit etmek ve bazı veriler yönünden incelemektedir. Bu hedef için Mustafa Kemal Üniversitesi Antakya Meslek Yüksek Okulu 287 ön lisans öğrencisine fomo ölçeği uygulayarak veri toplanmaktadır. Verileri test etmek amacıyla ferakans, yüzde, ortalama, t-testi ve anova testi uygulanmıştır. Analiz sonucuna göre ön lisans öğrencilerinin fomo seviyelerinin orta seviyede olduğu görülmüştür.
(Gökler ve ark, 2016)	Çalışmasında fomo ölçeğinin Türkçe sürümünün geçerlilik ve güvenilirliğinin test edilmesi incelenmektedir. Bu amaçla Eskişehir Osmangazi Üniversitesi'ndeki iki fakültede 18 yaş üzerindeki 200 öğrenci ile anket yapıldı. 200 kişinin 105'i kadın 95'i erkektir. Verilerin analizinde Cronbach Alfa, faktör analizi ve korelasyon analizi kullanılmıştır. Analiz sonuçlarını bakıldığında fomo ölçeğinin öğrenciler için geçerli ve güvenilir ölçek olduğu sonucuna ulaşılmıştır.
(Gürdin, 2019:1262)	Grohol'a göre ise fomo, "Farklı sosyal etkileşimlere etki eden gerçek bir histir"

Literatüre baktığımızda işten ayrılma niyeti; personelin yapmakta olduğu işine karşı olumsuz davranışlara sahip olması durumunda işyerini ve işini isteğiyle bırakma eylemi olarak ifade edilebilir (Yılmaz, 2018).

Tablo 2: İşten ayrılma niyeti ile ilgili bazı araştırma sonuçları

(Dönmez, 2019)	Yüksek lisans tezinde, örgüt kültürünün işten ayrılma niyetine ne yönde bir etki bıraktığını incelemektedir. Bu amaçla İstanbul'da terminalde çalışan personellere anket formu düzenlenmiştir. Anket formları çalışanlara whatsapp veya e-mail ulaşmaktadır. Veriler regresyon analizi ile test edilmiştir. Analiz sonucunda örgüt kültürü ile işten ayrılma niyeti arasında bir ilişkinin bulunmadığı görülmüştür.
(Yaman, 2019)	Yüksek lisans tezinde, katılımcı liderlik türünün bir işletmedeki personellerde iş stresi ve işten ayrılma niyeti üzerine bir inceleme yapılmıştır. Araştırma Niğde ilinde toplam 230 kişi üzerinde yapılmıştır. Verilerin analizinde t-testi, regresyon analizi, korelasyon analizi kullanılmıştır. Sonuç olarak, katılımcı liderlik türünün iş stresiyle pozitif yönde bir ilişki olduğu, işten ayrılma niyeti ile de negatif yönde ilişki olduğu görülmüştür.
(Heybetzade, 2019)	Çalışmasında personellerin işlerindeki performansı, işlerindeki tatmini ve işten ayrılma niyetleri arasındaki ilişkiyi incelemektedir. Bu amaçla İstanbul Beyoğlu ilçesinde bir şirkette istihdam eden 300 çalışana anket yapılmıştır. Ankete 253 çalışan dahil olmuş fakat 210 anket elde edilmiştir. Analiz sonucuna göre iş performanslarının pozitif yönde olduğu görülmüştür. Bu sonuca göre işten ayrılma niyetlerinde negatif yönde bir ilişkinin olduğu görülmüştür.
(Aras, 2016)	Doktora tezinde katılım bankaları üzerinde bir araştırma yapmıştır. Tezinde işveren markasının, örgütsel bağlılık ve işten ayrılma niyeti kavramları arasındaki ilişkiyi incelemektedir. Araştırmada veriler anket yoluyla toplanmış olup, SPSS ve AMOS programları ile test edilmiştir. Katılım bankasında toplam 578 personel ankete katılmıştır. Çalışmanın sonucu olarak işveren markası ile örgütsel bağlılık arasında pozitif bir ilişki bulunurken, işveren markası ile işten ayrılma niyeti arasında negatif bir ilişki bulunduğu görülmüştür.
(Durmaz, 2019)	Yüksek lisans tezinde hizmet sektöründe yöneticilere ait liderlik özelliklerinin personeller için kuruma bağlılık ve işten ayrılma niyeti arasındaki ilişkisi araştırılmıştır. Bu bağlamda çalışmada korelasyon tekniği kullanılmıştır. Araştırma Tokat ilinde faaliyet gösteren 73 işletmede çalışmaları süreleri belli olmayan personeller üzerine yapılmıştır. Bu amaçla anket formu oluşturulmuştur. Ankete katılan toplam personel sayısı 267'dir. Anketten elde edilen verilerin yorumlanmasında korelasyon, faktör analiz ve regresyon tekniği kullanılmıştır. Sonuç olarak; liderde bulunan özelliklerin personelin örgüte olan sadakatini artırırken, işten ayrılma niyeti üzerinde olumsuz bir etki bıraktığı görülmüştür.
(Erdur, 2019)	Çalışmasında, personellerin iş stresi, depresyon düzeyleri ve işten ayrılma niyeti arasındaki ilişkinin ölçülmesi amaçlanmıştır. Bu amaçla anket formundan yararlanılmıştır. Anket formu Bankacılık sektöründe faaliyet gösteren 279 personel üzerinde uygulanmıştır. Anket formundan ortaya çıkan veriler faktör analizi, anova, korelasyon, t-testi gibi yöntemleri kullanarak yorumlanmıştır. Elde edilen sonuca bakıldığında iş stresi, depresyon düzeyi ve işten ayrılma niyeti arasında anlamlı ve güçlü bir ilişkinin olduğu

	sonucuna varılmıştır.
(Karadağ Ak, 2019)	Çalışma bankacılık sektöründe gerçekleştirilmiştir. Çalışmada işten ayrılma niyetinin, iş tatmini ve kaygı seviyeleri arasında nasıl bir ilişkinin bulunduğu ölçülmek istenilmiştir. Bu amaçla Konya ilinde faaliyet gösteren özel ve kamu sektöründe bulunan katılım bankalarında faaliyet gösteren 413 banka personeline anket formu uygulanmıştır. Verileri analiz etmede anova ve manova yöntemleri kullanılmıştır. Verilerin analizi sonucunda personellerin kaygı seviyeleri ile iş tatminleri arasında bir ilişkinin bulunmadığı görülmüştür. Personellerin kaygıları ve işten ayrılma niyetleri arasında ise anlamlı ve pozitif yönde bir ilişkinin bulunduğu görülmüştür.
(Uzun, 2019)	Çalışma Bankacılık sektöründe gerçekleşmektedir. Çalışmada Türkiye'de Bankacılık alanında faaliyet gösteren personeller üzerinde gerçekleştirilen performans değerlendirmesinin, personellerin işteki tatmini ve işten ayrılma niyetleri arasında bir ilişkinin olup olmadığı incelenmiştir. Bu amaçla personellere anket formu uygulanmıştır. Anketten elde edilen verilerin yorumlanmasında faktör analizi, güvenilirlik analizi, t-testi ve anova gibi yöntemler kullanılmıştır. Anketten elde edilen sonuçlara göre personellerin performans değerlendirmesi ile işten ayrılma niyetleri arasında negatif yönde bir ilişkiye rastlanmıştır.
(Türker, 2013)	Çalışmanın amacı bankacılık alanında faaliyet gösteren iş görenlerin, stres ve işten ayrılma niyetlerinin bankalarına olan sadakati üzerinde bir ilişkinin araştırılmasıdır. Bu amaçla çalışmada anket yöntemi kullanılmıştır. Çalışma İstanbul'daki özel ve yabancı sermayeli 508 banka çalışanı üzerinde gerçekleşmiştir. Anketten elde edilen sonuçlara göre personellerin stres seviyeleri ile işten ayrılma niyetleri arasında pozitif ilişkiye rastlanmıştır. İşgörenlerin örgüte olan sadakatları ve stres seviyeleri arasında negatif ilişki görülmüştür. İşten ayrılma niyeti ve örgüte olan sadakatları arasında ise bir negatif bir ilişkinin olduğu görülmüştür.
(Eren, 2019)	Çalışma kozmetik sektöründe faaliyette bulunan bir işletme üzerinde gerçekleşmiştir. Çalışmada işveren markasının, işten ayrılma niyeti arasındaki ilişkinin tespit edilmesi amaçlanmıştır. Bu amaçla çalışmada anket tekniğinden yararlanılmıştır. Çalışmanın evrenini 1050 kozmetik çalışanı oluşturmaktadır. 1050 çalışandan sadece 286 kişiden geri dönüş olmuştur. Anket verilerine göre işveren markası ile işten ayrılma niyeti arasında negatif bir ilişki olduğu görülmüştür. Sonuç olarak personelin işveren markasını ne kadar iyi idrak ederse işten ayrılmaları o kadar az olmaktadır.
(Dalmış, 2018)	Çalışma havacılık sektöründe faaliyette bulunan bir işletme üzerinde gerçekleşmiştir. Çalışmada sivil havacılık sektöründeki bir işletmedeki personellerin örgüte olan sadakati ve işten ayrılma niyeti arasında ilişkinin test edilmesi amaçlanmıştır. Çalışmada anket tekniğinden faydalanılmıştır. Anket formu Ankara Esenboğa havaalanı personellerine uygulanmıştır. Anket toplam 242 kişinin dahil olması ile gerçekleşmiştir. Anketten elde edilen veriler SPSS ve Amos yardımıyla analiz edilmiştir. Verilerin test edilmesinde korelasyon ve YEM analizi kullanılmıştır. Çalışma sonucuna

	bakacak olursak personellerin kuruma olan sadakatleri ile işten ayrılma niyetleri arasında negatif bir ilişkinin olduğu görülmüştür.
(Günday, 2016)	Çalışmasında kişilerin kurumdaki stres algılarının işten ayrılma niyetine olan etkisi incelenmektedir. Bu amaçla çalışmada anket yönteminden faydalanılmıştır. Toplamda 200 beyaz yaka personele anket düzenlenmiştir. Anketten oluşan veriler korelasyon, regresyon ve anova teknikleri ile analiz edilmiştir.Verileri analizi sonucunda personellerdeki örgütsel stres ve işten ayrılma niyetleri arasında pozitif yönde bir ilişki olduğu görülmüştür.
(Akıllıoğlu, 2017)	Çalışmasında tükenmişliğin ve işten ayrılma niyeti üzerindeki etkisini incelemektedir. Çalışma Kastamonu ilinde banka personelleri üzerinde gerçekleşmiştir. Bu amaçla çalışmasında anket formundan yararlanmıştır. Ankete 132 katılım göstermiştir. Anketten elde veriler SPSS ile analiz edilmiştir. Tükenmişlik ile işten ayrılma niyeti arasındaki ilişkiyi ölçmek için korelasyon analizi uygulanmıştır. Anketten elde edilen verilere göre tükenmişlik ile işten ayrılma niyeti arasında pozitif yönde bir ilişki olduğu sonucuna ulaşılmıştır.
(Karataş, 2019)	Araştırma bankacılık sektöründe gerçekleşmektedir. Çalışmasında işe adanmışlık, örgütsel adalet ve işten ayrılma niyetinin birbirleriyle olan ilişkisi ele alınmaktadır. Bunun için 400 banka çalışanına anket düzenlenmiştir. Anketten elde veriler SPSS ile test edilmiştir. Verilerin analizinde faktör analizi, korelasyon ve regresyon analizi kullanılmıştır. Anketten elde edilen sonuçlar neticesinde örgütsel adalet ile işe adanmışlık ve işe adanmışlık ve işten ayrılma niyeti arasında pozitif ilişkinin olduğu görülmüştür.
(Tarakçı, 2016)	Çalışmasında, akademik kurumlardaki yetenek yönetiminin personelin örgüte olan sadakatini, iş tatminini ve işten ayrılma niyeti arasındaki etkiyi incelemektedir. Çalışmasında Karadeniz Bölgesi'nde çalışan 362 akademik personele anket düzenlenmiştir. Anketten elde edilen veriler SPSS programı ile analiz edilmiştir. Verilerin analizinde t testi, anova ve regresyon tekniği kullanılmıştır. Anketten elde edilen veriler neticesinde yetenek yönetiminin örgüte bağlılık ve iş tatmini arasında pozitif yönde bir ilişki olduğu görülmüştür. Yetenek yönetiminin, örgüsel bağlılık ve işten ayrılma niyeti arasında ise negatif yönde bir ilişki olduğu sonucuna ulaşılmıştır.

2. YÖNTEM

Araştırmanın bu kısmında, araştırmanın amacı, yöntemi, konusu, örneklemi, araştırmada kullanılan veri toplama araçları, araştırmanın hipotezleri ve verilerin analizi hakkında bilgi verilecektir.

2.1. Örneklem

Araştırmada, farklı demografik özelliklere sahip olan banka müşterilerinin katılım bankacılığı faaliyetleri ile ilgili tutumlarını ölçmek amacıyla Aksaray ilinde bir uygulama gerçekleştirilmiştir. Müşterilerin katılım bankacılığı faaliyetlerine yönelik tutum ve davranışlarını ölçmek, katılım bankacılığının gelişimi açısından önemli olmaktadır.

2.2. Veri Toplama Tekniği ve Ölçekler

Çalışmada, sosyal medyada gelişmeleri kaçırma korkusu ve işten ayrılma niyeti arasındaki ilişki araştırılmıştır. Veri toplama aracı olarak anket kullanılmıştır. Bu kapsamda toplam 251 katılımcıya ulaşılmıştır. Veriler SPSS (IBM SPSS Statistics 21) paket programı kullanılarak analiz edilmiştir. Araştırmada kullanılan anket 3 bölümden oluşmuştur. İlk bölümde demografik sorular yer almaktadır. Katılımcılar ile ilgili genel bilgilerin yer aldığı kısımdır. Diğer bölümler ise, katılımcıların sosyal medya bağımlılığı ve son bölümde işten ayrılma niyeti yer almaktadır. Bu bölümlerde 5' li likert ölçeği kullanılmıştır. Ölçekte 1=Kesinlikle Katılmıyorum, 2=Katılmıyorum, 3=Ne Katılıyorum Ne Katılmıyorum, 4=Katılıyorum ve 5=Kesinlikle Katılıyorum şeklindedir. 40 sorudan oluşan sosyal medya bağımlılığı ve işten ayrılma niyeti olmak üzere iki faktör tarafından açıklanmaktadır.

3. ARAŞTIRMANIN BULGULARI

Çalışmada öncelikle katılımcıların demografik özelliklerine ait frekans analizi yapılmıştır. Elde edilen bulgular Tablo 3'de yer almaktadır.

Tablo 3: Katılımcıların demografik özelliklerine ait frekans analizi

CİNSİYET	**FREKANS (n)**	**YÜZDESEL DAĞILIM (%)**
Kadın	130	**51,8**
Erkek	121	**48,2**
YAŞ GRUBU	**(n)**	**%**
18 yaş ve altı	2	0,8
18-22	82	**32,7**
23-27	37	14,7
28-32	25	10,0
33-37	56	22,3
38-42	22	8,8
43 ve üstü	27	10,8
MEDENİ DURUM	**(n)**	**%**
Evli	98	39,0
Bekar	147	**58,6**
Boşanmış	6	2,4
EĞİTİM DÜZEYİ	**(n)**	**%**
İlkokul	0	0
Ortaokul	0	0
Lise	22	8,8
Önlisans	35	13,9

Lisans	115	**45,8**
Lisansüstü	79	31,5
MESLEKİ DURUM	**(n)**	**%**
Kamu Kurumu	67	26,7
Özel Sektör – alan	49	19,5
Öğrenci	103	**41,0**
Serbest Meslek Sahibi	15	6,0
Ev Hanımı	5	2,0
Çalışmıyorum	11	4,4
Emekli	1	0,4
AYLIK GELİR DÜZEYİ	**(n)**	**%**
1000tl'den az	84	33,5
1001-2000TL arası	18	7,2
2001-3000TL arası	17	6,8
3001-4000TL arası	25	10,0
4001TL ve üstü	107	**42,6**
GELİR GETİRİCİ BİR İŞTE	**(n)**	**%**
Çalışanlar	137	**54,6**
Çalışmayanlar	111	44,2
Emekliler	3	1,2

Tablo 3'e göre, katılımcıların %51,8'i kadın %48,2'si erkektir. Katılımcıların %32,7 'sini18-22 yaş grubu oluşturmaktadır. %58,6 oranında bekar katılımcılar yer almışlardır. Katılımcıların %45,8'ini lisans düzeyinde eğitim sahibi olanlar oluşturmaktadır. Çalışmada %41 oranında öğrenci katılımcı yer almıştır. 4001TL ve üstü katılımcı %41,6 oranındadır. Çalışan katılımcıların oranı ise %54,6'dır. Sosyal medya Bağımlığı örneklemine ait güvenilirlik katsayısını ifade eden Cronbach's Alpha değeri Tablo 4'de yer almaktadır.

Tablo 4: Sosyal medya bağımlılığı örneklemine ait güvenilirlik katsayısı

Reliability Statistics	
Cronbach's Alpha	N of Items
,906	30

Tablo 4'e bakıldığında güvenilirlik katsayısını gösteren Cronbach's Alpha'nın %90 değer aldığı görülmektedir. Bu değer bağımlılık örneklemine ait Tablo 5'de bağımlılık örneklemindeki faktörlere ait ortalama ve standart sapma değerleri yer almaktadır.

Tablo 5: Sosyal medya bağımlılığı örneklemindeki faktörlere ait ortalama ve standart sapma değerleri

Item Statistics			
	Mean	**Std. Deviation**	**N**
Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum	2,92	1,389	234
Sosyal medyada planladığımdan daha uzun süre kalırım	3,62	1,312	234
Kendimi mutsuz hissettiğim zamanlarda sosyal medyada olmak beni rahatlatır	3,18	1,370	234
Sosyal medyada çok zaman geçirdiğimden işlerimi aksatıyorum	2,82	1,495	234
Sosyal medyaya gerekmedikçe girmem	2,63	1,257	234
Sosyal medya yüzünden verimliliğimin azaldığını fark ediyorum.	3,25	1,444	234
Sosyal medyada çok zaman geçirdiğim için çevremdekiler beni eleştirirler.	2,47	1,378	234
Sosyal medyayı kullanırken biri beni rahatsız ettiğinde, sosyal medya kullanımım kesintiye uğradığından sinirleniyorum.	2,30	1,392	234
Sosyal medyada iken kendimi özgür hissediyorum	2,75	1,384	234
Sabah uyandığımda ilk işim sosyal medyaya girmek olur	2,81	1,508	234
Sosyal medya kullanmayı sevmiyorum	2,26	1,216	234

Güncel olaylardan haberdar olmak için sosyal medyadan ayrılamıyorum	3,32	1,170	234
Çevremde birileri varken bile, sosyal medyada olmayı tercih ederim	2,47	1,240	234
Özel bazı duyuruları görebilmek ya da paylaşabilmek için sosyal medyada daha çok zaman geçiriyorum	3,16	1,183	234
Sosyal medyadan dolayı aile üyelerini ihmal ettiğim olur	2,37	1,318	234
İnsani amaçlı sosyal projelerde yer almak için sosyal medyayı kullanmaktan kendimi alamıyorum	2,63	1,162	234
Sosyal medyada bağlantı kurduğum insanlara kendimi daha iyi anlatıyorum	2,51	1,285	234
Sosyal medyadaki arkadaşlıkları gerçek yaşamdaki arkadaşlıklara tercih ederim	1,72	1,091	234
Sosyal medya gruplarıyla iletişim halinde olabilmem için sosyal medyayı daha uzun süre kullanırım	2,41	1,234	234
Çeşitli sosyal duyarlılıklar konusunda çabuk haberdar olma isteği beni daha çok sosyal medyada olmaya itiyor	3,09	1,178	234
"Başkalarının" deneyimlerinin benim deneyimlerimden daha doyurucu olması beni korkutur	2,18	1,193	234
"Arkadaşlarımın" deneyimlerinin benim deneyimlerimden daha doyurucu olması beni korkutur	2,04	1,147	234
Arkadaşlarımın ben yokken eğlendiklerini öğrendiğimde endişelenirim	2,03	1,193	234
Arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim	1,88	1,146	234
Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim	2,86	1,358	234

için önemlidir			
Bazen neler olup bittiğini takip etmek için fazla zaman harcayıp harcamadığımı merak ederim.	3,05	1,259	234
Arkadaşlarımla buluşma fırsatını kaçırmış olmak canımı sıkar	3,18	1,405	234
İyi bir zaman geçirdiğimde bunun detaylarını çevrimiçi (online) olarak paylaşmak benim için önemlidir	2,39	1,228	234
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar	3,55	1,387	234
Tatile çıktığımda arkadaşlarımın ne yaptığını takip etmeye devam ederim	2,75	1,355	234

Tablo 6: İşten ayrılma niyetine ait güvenilirlik katsayısı

Reliability Statistics	
Cronbach's Alpha	N of Items
,732	3

Tablo 6'ya bakıldığında güvenilirlik katsayısını gösteren Cronbach's Alpha'nın %73 değer aldığı görülmektedir. Bu değer işten ayrılma niyeti örneklemine ait Tablo 7'de işten ayrılma niyeti örnekleminin faktörlerine ait ortalama ve standart sapma değerleri yer almaktadır.

Tablo 7:İşten ayrılma niyeti örneklemine ait faktörlerin ortalama ve standart sapma değerleri

Item Statistics			
	Mean	Std. Deviation	
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim	2,79	1,642	47
Sık sık işi bırakmayı düşünüyorum	1,79	1,141	47
Muhtemelen önümüzdeki sene yeni bir iş arayacağım	2,63	1,612	47

İşten ayrılma niyetinin cinsiyete göre farklılık gösterip göstermediğini belirlemek için Mann Whitney U Testi yapılmıştır. Elde edilen bulgular Tablo 8'de yer almaktadır.

Tablo 8: Cinsiyet - işten ayrılma niyeti ilişkisi

Faktörler	Cinsiyet	Sıra Numaraları Ortalaması	Mann Whithey U	Wilcoxon W	Z	P
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	Kadın	140,61	5726,000	12986,000	-3,676	**,000***
	Erkek	108,22				
Sık sık işi bırakmayı düşünüyorum.	Kadın	116,56	6663,500	14919,500	-2,024	**,043***
	Erkek	132,97				
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	Kadın	135,67	6250,000	13510,000	-2,641	**,008***
	Erkek	112,58				

Yapılan Mann Whitney U testi sonucunda Tablo 8'de belirtilen işten ayrılma niyeti faktörleri cinsiyete göre farklılık göstermektedir. Sosyal medya bağımlılığının cinsiyete göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim ve Muhtemelen önümüzdeki sene yeni bir iş arayacağım'' faktörlerinin kadınlara göre daha önemli olduğu, ''Sık sık işi bırakmayı düşünüyorum'' faktörünün ise erkeklere göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının cinsiyete göre farklılık gösterip göstermediğini belirlemek için Mann Whitney U testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 9'da gösterilmiştir.

Tablo 9: Cinsiyet- sosyal medya bağımlılığı ilişkisi

Faktörler	Cinsiyet	Sıra Numaraları Ortalaması	Mann Whithey U	Wilcoxon W	Z	P
Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum.	Kadın	139,17	6040,500	13421,500	-3,167	**,002***
	Erkek	108,22				
Sosyal medya gruplarıyla iletişim halinde olabilmem için sosyal medyayı daha uzun süre kullanırım.	Kadın	112,40	6131,000	14387,000	-2,926	**,003***
	Erkek	138,33				
Çeşitli sosyal duyarlılıklar konusunda çabuk haberdar olma isteği beni daha çok sosyal medyada olmaya itiyor.	Kadın	135,90	6463,500	13844,500	-2,424	**,015***
	Erkek	114,42				
Bazen neler olup bittiğini takip etmek	Kadın	136,32	6408,500	13789,500	-2,513	**,012***

için fazla zaman harcayıp harcamadığımı merak ederim.	Erkek	113,96				
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar.	Kadın	134,36	65 32,000	13 792,000	-2,195	**0 ,028***
	Erkek	114,93				

Yapılan Mann Whitney U testi sonucunda Tablo 9'da belirtilen sosyal medya bağımlılığı faktörleri cinsiyete göre farklılık göstermektedir. Sosyal medya bağımlılığının cinsiyete göre karşılaştırılması sonucunda ''Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum ve sosyal medya gruplarıyla iletişim halinde olabilmem için sosyal medyayı daha uzun süre kullanırım'' faktörlerinin erkeklere göre daha önemli olduğu, ''Çeşitli sosyal duyarlılıklar konusunda çabuk haberdar olma isteği beni daha çok sosyal medyada olmaya itiyor, bazen neler olup bittiğini takip etmek için fazla zaman harcayıp harcamadığımı merak ederim ve Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar'' faktörlerinin ise kadınlara göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının yaşa göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 10'da gösterilmiştir.

Tablo 10: Sosyal medya bağımlılığı - yaş ilişkisi

Faktörler	**18 yaş ve altı**	**18-22**	**23-27**	**28-32**	**33-37**	**38-42**	**43 ve üstü**	**Chi-Square**	**f**	**Sig.**
Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir.	133,00	146,31	117,70	99,06	116,87	142,30	100,80	16,444		**0 ,012***
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar.	83,50	146,49	120,64	105,04	117,55	123,18	103,13	13,855		**0 ,031***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 10'da belirtilen sosyal medya bağımlılığı faktörleri yaşa göre farklılık göstermektedir. Sosyal medya bağımlılığının yaşa göre karşılaştırılması sonucunda ''Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir ve Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar'' faktörlerinin 18-22 yaşındaki katılımcılara göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin yaşa göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 11'de gösterilmiştir.

Tablo 11: İşten ayrılma niyeti - yaş ilişkisi

Faktörler	**18 yaş ve altı**	**18-22**	**23-27**	**28-32**	**33-37**	**38-42**	**43 ve üstü**	**Chi-Square**	**f**	**Sig.**
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	215,50	160,06	169,38	82,78	82,96	100,77	99,98	74,598		**0,000***
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	199,50	156,08	163,82	92,74	90,48	105,45	88,13	59,341		**0,000***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 11'de belirtilen işten ayrılma niyeti faktörleri yaşa göre farklılık göstermektedir. İşten ayrılma niyetinin yaşa göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim ve Muhtemelen önümüzdeki sene yeni bir iş arayacağım'' faktörlerinin 18 yaş ve altı katılımcılara göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının medeni duruma göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 12'de gösterilmiştir.

Tablo 12: Sosyal medya bağımlılığı - medeni durum ilişkisi

Faktörler	**Evli**	**Bekar**	**Boşanmış**	**Chi-Square**	**f**	**Sig.**
Sabah uyandığımda ilk işim sosyal medyaya girmek olur.	107,84	136,55	164,17	11,493		**0,003***
Arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim.	112,40	132,63	166,00	7,745		**0,021***
Bazen neler olup bittiğini takip etmek için fazla zaman harcayıp harcamadığımı merak ederim.	111,01	133,24	174,00	8,788		**0,012***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 12'de belirtilen sosyal medya bağımlılığı faktörleri medeni duruma göre farklılık göstermektedir. Sosyal medya bağımlılığının medeni duruma göre karşılaştırılması sonucunda ''Sabah uyandığımda ilk işim sosyal medyaya girmek olur, arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim ve Bazen neler olup bittiğini takip etmek için fazla zaman harcayıp harcamadığımı merak ederim'' faktörlerinin boşanmış kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin medeni duruma göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 13'de gösterilmiştir.

Tablo 13: İşten ayrılma niyeti - medeni durum ilişkisi

Faktörler	Evli	Bekar	Boşanmış	Chi-Square	f	Sig.
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	85,90	152,93	88,58	56,109		**0,000***
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	89,57	149,54	94,00	45,499		**0,000***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 13'de belirtilen işten ayrılma niyeti faktörleri medeni duruma göre farklılık göstermektedir. İşten ayrılma niyetinin medeni duruma göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim ve muhtemelen önümüzdeki sene yeni bir iş arayacağım.'' faktörlerinin bekar kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının eğitim düzeyine göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 14'de gösterilmiştir.

Tablo 14: Sosyal medya bağımlılığı - eğitim düzeyi ilişkisi

Faktörler	Lise	Önlisans	Lisans	Lisansüstü	Chi-Square	f	Sig.
Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum.	83,82	143,60	126,83	127,17	10,082		**0,018***
Kendimi mutsuz hissettiğim zamanlarda sosyal medyada olmak beni rahatlatır.	78,38	127,44	121,80	142,56	14,246		**0,003***
Çevremde birileri varken bile,	98,91	120,79	120,44	142,30	8,430		**0,038***

sosyal medyada olmayı tercih ederim.							
Sosyal medyada bağlantı kurduğum insanlara kendimi daha iyi anlatıyorum.	102,50	110,87	120,62	142,32	,937	8	**0,030***
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar.	83,23	121,01	143,78	111,13	9,316	1	**0,000***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 14'de belirtilen sosyal medya bağımlılığı faktörleri eğitim düzeylerine göre farklılık göstermektedir. Sosyal medya bağımlılığının eğitim düzeyine göre karşılaştırılması sonucunda ''Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum'' faktörünün önlisans katılımcıları, ''Kendimi mutsuz hissettiğim zamanlarda sosyal medyada olmak beni rahatlatır, çevremde birileri varken bile, sosyal medyada olmayı tercih ederim ve sosyal medyada bağlantı kurduğum insanlara kendimi daha iyi anlatıyorum.'' faktörlerinin lisansüstü katılımcılara ve ''Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar'' faktörünün ise lisans katılımcılara göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin eğitim düzeyine göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 15'de gösterilmiştir.

Tablo 15: İşten ayrılma niyeti - eğitim düzeyi ilişkisi

Faktörler	**Lise**	**Önlisans**	**Lisans**	**Lisansüstü**	**Chi-Square**	**f**	**Sig.**
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	116,77	138,51	137,10	103,57	12,510		**0,006***
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	109,55	144,21	131,82	109,55	8,908		**0,031***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 15'de belirtilen işten ayrılma niyeti faktörleri eğitim düzeyine göre farklılık göstermektedir. İşten ayrılma niyetinin eğitim düzeyine göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama

sürecine gireceğim ve muhtemelen önümüzdeki sene yeni bir iş arayacağım ve Muhtemelen önümüzdeki sene yeni bir iş arayacağım.'' faktörlerinin önlisans kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının mesleklere göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 16'da gösterilmiştir.

Tablo 16: Sosyal medya bağımlılığı - meslek ilişkisi

Faktörler	**Kamu Kurumu**	**Özel Sektör - alan**	**Öğrenci**	**Serbest Meslek Sahibi**	**Ev Hanımı**	**Çalışmıyorum**	**Emekli**	**Chi-Square**	**df**	**Sig.**
Sosyal medyada çok zaman geçirdiğimden işlerimi aksatıyorum.	137,59	92,06	141,48	89,67	96,50	109,55	182,00	24,045	2	**,001***
Güncel olaylardan haberdar olmak için sosyal medyadan ayrılamıyorum.	121,00	133,17	132,31	72,13	155,20	111,45	46,00	13,127	1	**,041***
Arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim.	128,36	105,65	131,69	103,23	84,90	176,18	228,50	17,724	1	**,007***
Arkadaşlarımın "aralarındaki şakaları, muhabbetleri"	107,51	106,82	142,69	139,23	124,50	136,64	133,00	14,637	1	**,023***

anlamak benim için önemlidir.										

Yapılan Kruskal-Wallis H testi sonucunda Tablo 16'da belirtilen sosyal medya bağımlılığı faktörleri mesleklere göre farklılık göstermektedir. Sosyal medya bağımlılığının mesleklere göre karşılaştırılması sonucunda ‘‘Sosyal medyada çok zaman geçirdiğimden işlerimi aksatıyorum ve arkadaşlarımın “aralarındaki şakaları, muhabbetleri” anlamak benim için önemlidir.’’ faktörlerinin öğrenci, ‘‘Güncel olaylardan haberdar olmak için sosyal medyadan ayrılamıyorum’’ faktörünün ev hanımı, ‘‘arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim’’ faktörünün çalışmayan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin mesleklere göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 17'de gösterilmiştir.

Tablo 17: İşten ayrılma niyeti - meslek ilişkisi

Faktörler	**Kamu Kurumu**	**Özel Sektör - alan**	**Öğrenci**	**Serbest Meslek Sahibi**	**Ev Hanımı**	**Çalışmıyorum**	**Emekli**	**Chi-Square**	**f**	**ig.**	**S**
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	77,44	96,49	166,11	111,43	149,90	173,14	106,00	81,565		**,000***	**(**
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	82,11	102,60	160,65	104,90	142,90	176,86	48,50	67,149		**,000***	**(**

Yapılan Kruskal-Wallis H testi sonucunda Tablo 17'de belirtilen işten ayrılma niyeti faktörleri mesleklere göre farklılık göstermektedir. İşten ayrılma niyetinin mesleklere göre karşılaştırılması sonucunda ‘‘Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim ve muhtemelen önümüzdeki sene yeni bir iş arayacağım.’’ faktörlerinin çalışmayan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının aylık gelir düzeyine göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 18'de gösterilmiştir.

Tablo 18: Sosyal medya bağımlılığı - aylık gelir düzeyi ilişkisi

Faktörler	**1000 TL'den az**	**1001-2000TL arası**	**2001-3000TL arası**	**3001-4000TL arası**	**4001TL ve üstü**	**Chi-Square**	**f**	**Sig.**
Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum.	142,10	136,14	120,06	87,92	120,48	12,760		**0,013***
Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir.	134,99	150,17	158,91	104,12	113,90	12,456		**0,014***
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar.	134,38	150,61	145,88	88,38	118,70	13,111		**0,011***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 18'de belirtilen sosyal medya bağımlılığı faktörleri aylık gelir düzeylerine göre farklılık göstermektedir. Sosyal medya bağımlılığının aylık gelir düzeylerine göre karşılaştırılması sonucunda ''Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum'' faktörünün 1000TL'den az, ''Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir'' faktörünün 2001-3000TL arası, ''Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar'' faktörünün ise 1001-2000TL arası aylık geliri olan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin aylık gelir düzeyine göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 19'da gösterilmiştir.

Tablo 19: İşten ayrılma niyeti - aylık gelir düzeyi ilişkisi

Faktörler	**1000TL'den az**	**1001-2000TL arası**	**2001-3000TL arası**	**3001-4000TL arası**	**4001TL ve üstü**	**Chi-Square**	**f**	**Sig.**
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	174,44	165,00	142,62	103,08	82,71	90,709		**0,000***

Sık sık işi bırakmayı düşünüyorum.	1 10,07	13 6,69	1 46,18	1 49,80	1 24,01	1 0,694		**0 ,030***
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	1 67,17	16 5,50	1 28,15	1 29,54	8 3,55	7 5,613		**0 ,000***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 19'da belirtilen işten ayrılma niyeti faktörleri aylık gelir düzeylerine göre farklılık göstermektedir. İşten ayrılma niyetinin aylık gelir düzeylerine göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim ve muhtemelen önümüzdeki sene yeni bir iş arayacağım'' faktörlerinin 1000TL'den az, ''Sık sık işi bırakmayı düşünüyorum'' faktörünün 3001-4000TL arası aylık geliri olan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. Sosyal medya bağımlılığının gelir getirici bir işte çalışıp çalışmama durumuna göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 20'de gösterilmiştir.

Tablo 20: Sosyal medya bağımlılığı - gelir getirici bir işte çalışıp çalışmama durumu ilişkisi

Faktörler	**Çalışanlar**	**Çalışmayanlar**	**Emekliler**	**Chi-Square**	**f**	**Sig.**
Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum.	118,15	136,81	46,50	8,090		**0,018***
Arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir.	110,78	143,36	131,83	13,017		**0,001***
Arkadaşlarımla buluşma fırsatını kaçırmış olmak canımı sıkar.	114,51	138,26	151,67	7,297		**0,026***
Planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar.	114,40	138,78	91,83	8,114		**0,017***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 20'de belirtilen sosyal medya bağımlılığı faktörleri gelir getirici bir işte çalışıp çalışmama durumuna göre farklılık göstermektedir. Sosyal medya bağımlılığının gelir getirici bir işte çalışıp çalışmama durumuna göre karşılaştırılması sonucunda ''Sosyal medyayı gerçek dünyadan bir kaçış olarak görüyorum, arkadaşlarımın "aralarındaki şakaları, muhabbetleri" anlamak benim için önemlidir ve planlanmış bir buluşmayı (mezunlar günü, vb.) kaçırmak canımı sıkar'' faktörlerinin çalışmayan, ''Arkadaşlarımla buluşma fırsatını kaçırmış olmak canımı sıkar.''

faktörünün emekli olan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır. İşten ayrılma niyetinin gelir getirici bir işte çalışıp çalışmama durumuna göre farklılık gösterip göstermediğini belirlemek için Kruskal-Wallis H testi yapılmıştır. Elde edilen bulgular içerisinde anlamlı değere sahip olan faktörler Tablo 21'de gösterilmiştir.

Tablo 21: İşten ayrılma niyeti - gelir getirici bir işte çalışıp çalışmama durumu ilişkisi

Faktörler	**Çalışanlar**	**Çalışmayanlar**	**Emekliler**	**Chi-Square**	**f**	**Sig.**
Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim.	87,01	171,26	179,00	91,068		**0,000***
Muhtemelen önümüzdeki sene yeni bir iş arayacağım.	90,91	166,07	161,83	72,953		**0,000***

Yapılan Kruskal-Wallis H testi sonucunda Tablo 21'de belirtilen işten ayrılma niyeti faktörleri gelir getirici bir işte çalışıp çalışmama durumuna göre farklılık göstermektedir. İşten ayrılma niyetinin gelir getirici bir işte çalışıp çalışmama durumuna göre karşılaştırılması sonucunda ''Önümüzdeki sene aktif olarak yeni bir iş arama sürecine gireceğim'' faktörünün emekli, ''Muhtemelen önümüzdeki sene yeni bir iş arayacağım'' faktörünün çalışmayan kişilere göre daha önemli olduğu sonucuna ulaşılmıştır.

4. SONUÇ

Çalışmada sosyal medya bağımlılığı ile işten ayrılma niyeti ilişkisi incelenmiştir. Araştırma bulgularına göre, katılımcılar üzerinde etkili olan faktörlerden ''Sosyal medyada planladığımdan daha uzun süre kalırım.'', ''Planlanmış bir buluşmayı (mezunlar günü. vb.) kaçırmak canımı sıkar.'', ''Güncel olaylardan haberdar olmak için sosyal medyadan ayrılamıyorum.'', ''Sosyal medya yüzünden verimliliğimin azaldığını fark ediyorum.'' ve ''Kendimi mutsuz hissettiğim zamanlarda sosyal medyada olmak beni rahatlatır.'' en etkili faktörler olarak tespit edilmiştir. Sonuçlara göre, katılımcılar genellikle güncel gelişmeleri ve arkadaş çevresinin faaliyetlerini takip edebilmek için sosyal medyayı kullanmaktadırlar. Sosyal medyada mutsuz hissettikleri dönemlerde vakit geçirerek fazla zaman harcamaktadırlar. Bunun aksine ''Arkadaşlarımın" deneyimlerinin benim deneyimlerimden daha doyurucu olması beni korkutur.'', ''Arkadaşlarımın ben yokken eğlendiklerini öğrendiğimde endişelenirim.'', ''Arkadaşlarımın neler yaptığını bilmediğim zamanlarda kaygı hissederim.'', ''Sık sık işi bırakmayı düşünüyorum.'' ve ''Sosyal medyadaki arkadaşlıkları gerçek yaşamdaki arkadaşlıklara tercih ederim.'' faktörlerinin katılımcılar açısından etki derecesi en düşük faktörler olduğu belirlenmiştir. Bulgulara göre, katılımcılar sosyal medyada bilgi edinme ve bu konuda çevresine üstünlük sağlama amacıyla vakit geçirmeyi daha az tercih etmektedirler.

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INTEGRATED STEM EDUCATION AS PREMISE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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ABSTRACT

Today, STEM education is believed to be an integrated curriculum, which provides opportunities for "more relevant, less fragmented, and more stimulating experiences for learners. Currently, Nigerian societies demand graduates who may be able to compete with the global workforce and solve environmental problems, which is the main target of sustainable development. Thus, Education for Sustainable Development (ESD) has been launched as one of the key answers to dealing with the sustainability of education at all levels. This study investigated the relationship between integrated STEM education and Education for Sustainable Development. A survey research design was adopted to gather relevant information from over 1000 science teachers in Sokoto state using an online questionnaire. The online survey designed using Google form was shared to the science teachers in the state via their social media group chat platforms. However, printed copies were distributed to the teachers during the first summit of Science Teachers Association of Nigeria (STAN) held in Sokoto State. Only 537 questionnaires were retrieved, hence used for data analysis using SPSS 25. The p-value of the Pearson correlation coefficient of .591 revealed that there is no significant relationship between integrated STEM education and education for sustainable development. The study concluded that there is a need to demonstrate to the teachers the importance of sustainability in a nation like Nigeria where resources are embedded almost everywhere.

Keywords: STEM Education, Education, Sustainable Development, Teachers

INTRODUCTION

Countries with a deteriorating level of poverty were the main target of Millennium Development Goals (MDGs), to which rich countries were to add their solidarity and assistance through finances and technology. Later, it was obvious that no nation could resolve those issues of MDGs on its own due to disparities between and within nations, a worsening of poverty, hunger, ill-health and illiteracy and continuing deterioration of the ecosystem on which we depend for our well-being. The Sustainable Development (SD) goals will, necessarily, have a different feel about them. Sustainable development is eluding the entire planet. Thus, a global partnership for SD was established to pose goals and challenges for all countries—not what the rich should do for the poor, but what all countries together should do for the global wellbeing of this generation and those to come.

In many countries, the current level of basic education is too low, severely hindering national plans for a sustainable future. The impact of little and/or poor-quality education severely limits the options available to a nation for developing its short- and long-term sustainability plans. This recognition of the need for quality basic education sets Education for Sustainable Development (ESD). UNESCO (1992) maintained that it is widely agreed that education is the most effective means that society possesses to confronting the challenges of the future. Education, to be certain, is not the whole answer to every problem. But education, in its broadest sense, must be a vital part of all efforts to imagine and create new relations among people and to foster greater respect for the needs of the environment. The relationship between education and SD is complex. Generally, research shows that basic education is key to a nation's ability to develop (Rufa'i, 2014) and achieve sustainability targets. Education can enhance the status of women, improve agricultural productivity, raise the standard of living, enhance environmental protection, and yield technology. On the other hand, technology and science are the simplest means for eliminating poverty by providing high-income and middle-income economies to low-income economies. For SD of any nation, integrated knowledge and skills of science, technology, engineering, and mathematics are needed to develop improved medicines, diagnostics, electrification, high-yield seeds, and the internet which could reorganise human activity to combine improving living standards (Sachs, 2012).

EDUCATIONAL SYSTEM IN NIGERIA

If education is to be effective, it must result in changes in all behavioural components of a human being. Thus, education was seen as a process in which human behaviour is modified to be in closer agreement with some models or ideals determined by the values of society (Dahama & Bhatnagar, 1987). This gives the individual the opportunity to raise and build a better society individually and collectively. It is on this note that the development and prosperity of any nation depend on the quality of the education received by its citizens (Rufa'i, 2014). Developed countries that excelled in terms of economy, industry and other aspects of developments have demonstrated excellence in their system of education.

In Nigeria, the educational system, at the period after independence, according to Ezeobata (2007), was at a stage of survival series for every subject 'proves its usefulness' to maintain its position in the national curriculum for the development of the nation. This situation brought about the constitution of the National Educational Research Council (NERC) at that time which came up with the first curriculum conference that was held by Nigerians in 1960. It is maintained that the conference yielded a positive result towards addressing educational issues in the country by providing the directions of the entire system, the curriculum content as well as the first new goals of education that were set in Nigeria. The conference also led to the development of the first National Policy on Education that emerges

in 1977, which was revised in 1981, 1998, 2004 and 2014. The revision of the 1981 policy came up with the new system of education called the 6-3-3-4 system of education.

In the same vein, Uwaifo & Uddin (2009) explained that, in 1982, the Nigerian educational system witnessed the full implementation of the new 6-3-3-4 system of education that emerged with a variety of reforms. Dike (2009) noted that the most important aspect in the national policy on education is the clear direction and focus according to the system of education in the country for industrializing the nation. On the other hand, Babafemi (1999) noted that the establishment of the 6-3-3-4 system of education was a decisive move for achieving technological growth of the country since the nation is far off from the major goals of the program as stipulated in the national policy. These signify the need for the integration of STEM education in Nigeria.

The introduction of the 6-3-3-4 system of education comprised of six years of primary school education, three years of Junior Secondary School (JSS), three years of Senior Secondary School (SSS) and four years of post-secondary education (Omotayo, et al., 2008). The curriculum of the 6-3-3-4 system of education emphasized science, mathematics, pre-vocational studies including technology and engineering. After the 1990 conference, Nigeria tried so many times on how to modify the 6-3-3-4 system of education to be able to make it in line with conference objectives. When President Olusegun Obasanjo was elected in 1999, Nigeria come-up with another educational system titled the Universal Basic Education (UBE) program, which was signed into law in 2004. The UBE scheme was the country's confirmation of the pronouncement on "Education For All" (Omokhodion, 2008). The Federal Ministry of Education (FME, 2005) stated that the scheme comprised of a ten-year plan that is aimed at:

i. align curriculum content with the nation's vision

ii. prepare teachers to deliver new curriculum content;

iii. and, "ensure periodic review, effectiveness and relevance of the curriculum at all levels to meet the needs of the society and the world of work".

The UBE policy is referred to as the 9-3-4 system. It implies nine years of primary/basic, tuition-free, and mandatory education for the whole Nigerians; preceded by three years in SSS and four years in post-secondary education. With regards to curriculum development and implementation, according to Marinho (2009) the scheme pledges to:

i. introduce modern pedagogical approaches to stimulate high-cognitive developments in students, which includes student-centred learning like inquiry-based learning.

ii. strengthen cross-cutting themes to concentrate the curriculum content and scope.

iii. create a curriculum that is more adaptable and flexible to disenfranchised groups.

iv. comprise of indigenous education concepts within several disciplines.

v. support school-to-work partnerships, together with the inclusion of entrepreneurial skills.

vi. raise awareness about diversity, tolerance, ethics, and civic responsibility.

vii. promotion consciousness on emerging subjects such as HIV/AIDS environmental conservation, family existence, sexuality, and gender concerns.

In a concise note, Woolman, Marinho (2009), disclosed that the 9-3-4 scheme of education consists of primary school (comprising of children within the ages of 6 to 11) of six

lower basic and three middle basic classes. The objective at this stage is to encourage devotion in the development of science, technology, and engineering, in addition to instilling citizenship and community moral values in children. The three years of senior secondary school education in Nigeria has been designed to inter-relate or inter-connect various science subjects (biology chemistry and physics) with mathematics and technology (computer studies) to satisfy requirements for a senior secondary school programme in the National Policy on Education (NPE) (2004). Thus, for over a decade, Nigeria's science colleges have been integrating Science, Technology and Mathematics (STM) in secondary school classroom instructions, neglecting engineering for technical colleges in the country. Today, engineering seems to have occupied a significant aspect in an integrated curriculum, hence STEM education expatiates all over the world, in term of values and effectiveness.

INTEGRATED STEM EDUCATION AND DEVELOPMENT OF A NATION

If the science, technology, engineering and mathematics are taught separately, it is known as "silos" (S-T-E-M) while an integrated STEM is an instructional approach that enables students of all four disciplines to gain more experiences and skills to settle the problem arise while learning through appropriate instruction practice (Thibaut, Knipprath, Dehaene & Depaepe; 2018). Integrated STEM education is the best approach compared to "silos" in 21st-century learning. STEM education was believed to be an integrated curriculum, which provides opportunities for "more relevant, less fragmented, and more stimulating experiences for learners (Thibaut et al., 2018).

Many definitions have been provided for STEM education by various studies. As cited by Thibaut et al. (2018), the National Society of Professional Engineers (2013) maintained that to provide all citizens with the competencies necessary to succeed in this new information-based and highly technological society, education in the fields of science, technology, engineering and mathematics (STEM) is becoming increasingly more important. However, Shaughnessy (2013) mentioned that "STEM education refers to solving problems that draw on concepts and procedures from mathematics and science while incorporating the teamwork and design methodology of engineering and using appropriate technology". Honey, Pearson & Schweingruber (2014) defined STEM education in a simplest term as "working in the context of complex phenomena or situations on tasks that require students to use knowledge and skills from multiple disciplines". Moreover, Pitt (2018) defines STEM Education as pre-vocational learning or even training to encourage students to pursue science and maths in a particular route to professional work in engineering and technology.

Studies show that STEM education has varying advantages to both members of society, teachers and students. According to Khalik, Talib, & Aliyu (2019), STEM education helps to raise the literacy of people in science and technology around the world. Integrated STEM education has a positive effect on student attitudes and interests in school (Tseng, Chang, Lou & Chen, 2013) and motivation toward learning (Gutherie, Wigfield & VonSecker, 2000). Since Nigeria's secondary school curriculum give more emphasis on mathematics, science (biology, chemistry and physics) and pre-vocational studies (technology and engineering) in both science and technical colleges, it is imperative that STEM education will be an essential factor to be considered in ensuring the sustainability of its education.

POSITION OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

Education for Sustainable Development (ESD) has been launched as one of the key answers to dealing with the sustainability of education at all levels (Pauw et al., 2015). In the 1992 Rio de Janeiro conference, Agenda 21 is divided into forty chapters; each chapter focuses on an issue central to sustainability. Initial thoughts concerning ESD were captured in Chapter 36 of Agenda 21, "Promoting Education, Public Awareness and Training", which is dedicated to the specific issue of education (Paul & Scott, 2007). It identifies three major

thrusts to begin the work of Education for Sustainable Development (ESD): improving basic education; reorienting existing education to address sustainable development, and developing public understanding, awareness, and training. It should also be noted that the role of education is not isolated to chapter 36 but is mentioned in all the other chapters of Agenda 21.

Hedefalk, Almqvist, & Östman (2015), view ESD as education about, in and for the environment. Education about the environment emphasises knowledge about how natural systems work, such as water cycles, ecological systems and how plants grow. Education in the environment emphasises direct experiences in nature. Education for the environment emphasises active participation in solving environmental problems or making socially just and sustainable choices.

Paul & Scott (2007) maintained that ESD is education that addresses learning skills, perspectives, and values that guide and motivate people to seek sustainable livelihoods, participate in a democratic society, and live in a sustainable manner. The central focus of ESD is to prepare the children in school to become responsible citizens in the future, such that they could be able to participate in a democratic society to help in shaping the future of the society in a sustainable fashion (Burmeister, Rauch, & Eilks, 2012). They should learn to take responsibility for both themselves and future generations, based on the concept of sustainable development.

Since the birth of the idea of ESD, the concept has been under constant debate with respect to its objectives, terminology, and implications. However, to thoroughly implement ESD in formal education, the UN formally announced the Decade of Education for Sustainable Development (DESD) for the years 2005- 2014 (UNESCO, 2005). Following the fact that United Nation's ESD framework ends in the year 2014, almost all educational institutions all over the world at all levels, including elementary and secondary schools, have endlessly worked to contribute to the sustenance of education to enabling upcoming generations of learners to become responsible individuals and promote sustainable development in our world (Eilks, 2015).

Education for Sustainable Development (ESD) is the educational process of achieving human resources with capacities to contribute to the development endeavours of a particular country based on its priorities (Madar et al., 2017). Education is critical for promoting sustainable development and improving the capacity of the people to address environmental and development issues (UNCED, 1992). To be successful, ESD, like all good education, must blend knowledge and skills (Hopkins & McKeown, 2002). ESD must provide practical skills that will enable people to continue learning after they leave school, secure sustainable livelihoods, and live sustainable lives. These skills include:

i. the ability to communicate effectively both orally and in writing;
ii. the ability to think about systems (both natural and social systems);
iii. the ability to think in time – to forecast, to think ahead, and to plan;
iv. the ability to think critically about value issues;
v. the ability to comprehend quantity, quality, and value;
vi. the capacity to move from awareness to knowledge to action;
vii. the ability to work cooperatively with other people;
viii. the capacity to use various processes – knowing, inquiring, acting, judging, imagining, connecting, valuing, questioning, and choosing; and
ix. the capacity to develop an aesthetic response to the environment

A study conducted by Cebrián & Junyent (2015) to explore: (i) the factors influencing academic staff engagement in Education for Sustainable Development; and (ii) the views and vision of academic staff in relation to Education for Sustainable Development at the University of Southampton, provides evidence on different views and visions of academics in relation to ESD and several contradictions between its principles and the role of Higher

Education. The study employs exploratory action research study and consisted of two differentiated research stages. In Stage I, 14 academic staff members from different disciplines were interviewed as a reconnaissance phase of a typical action research cycle. In Stage II, a facilitator role for curriculum development was adopted by one of the authors as part of her doctoral studies. It suggests that although academics might have a personal interest and motivation to engage in ESD, factors such as the lack of time and financial resources, lack of deep understanding of sustainability, current curriculum structures and ways of delivery, academic pressures, external factors, lack of organisational support and existing organisational conditions block their engagement in ESD.

PROBLEM STATEMENT

Science, Technology, Engineering, and Mathematics (STEM) fields have been immensely important to the advancement of many countries throughout the world over the last century. "Since World War II, science, mathematics and technical education subjects have been seen as the foundational knowledge needed by citizens for national development" (Fan & Ritz, 2013). Thus, the effectiveness of these fields of STEM have been studied by different scholars, biology (Carmona, Domezain, García-Gallego, Hernando, Rodríguez & Ruiz-Rejón, 2009), chemistry (Burmeister, Rauch, & Eilks, 2012; Eilks & Rauch, 2012; Horváth, 2018 and Juntunen & Akselab, 2014), physics (Chaorui, 2009; Engström, Gustafsson, & Niedderer, 2011 and Ibeh et al., 2013), mathematics (Akinmola, 2014; Gerretson, Howes, Campbell, & Thompson, 2008 and Renert, 2011), engineering (Ye, 2003). Unfortunately, many countries (Australia, the US and other developed countries) begin to show concern over the declining interest in the STEM fields amongst secondary school students which potentially has been slowing their technological advance (Connolly et al., 2015). To tackle this declining interest, For example, Australia's government has gone as far as creating a "National Action Plan" to increase the effectiveness of its schools' science and mathematics education thereby establishing Commonwealth Scientific and Industrial Research Organisation (CSIRO), a government organization for helping the increase student interest in STEM fields through outreach and research. In a further attempt to increase students interest, scholar begin to combine different STEM fields, technology and science (Eilks, 2015 and Madar, Subari, Mohamed, & Baqutayan, 2017) and technology and engineering (Ceylan & Ozdilek, 2015). It appears that the link for establishing connection between Integrated STEM education (where science, technology, mathematics and engineering are mixed) and ESD is missing.

OBJECTIVES OF THE STUDY

The objectives of the study are to:

i. Find out the relationship between integrated STEM education and education for sustainable development

ii. Determine the adequacy of instructional materials and classroom environment for integrating STEM education into education for sustainable development.

iii. Assess factors preventing secondary school teacher's engagement in education for sustainable development in Nigeria.

RESEARCH QUESTIONS

The research questions for the study include:

i. Is there any significant relationship between integrated STEM education and education for sustainable development?

ii. How adequate are instructional materials and classroom environment for integrating STEM education into education for sustainable development?

    a. How adequate are instructional material for integrating STEM education into education for sustainable development?

    b. How adequate is the classroom environment for integrating STEM education into education for sustainable development?

iii. Are there any significant factors preventing secondary school teacher's engagement in education for sustainable development in Nigeria?

HYPOTHESIS

The researcher hypothesized that there is no significant relationship between integrated STEM education and education for sustainable development.

METHODOLOGY

The study adopted a survey research design to cover a large population of the study. According to Mathew and Ross (2010) population refers to the total number of people or objects that can be included as a research subject. It could also be referred to as consisting of the whole set of individuals that the researcher is interested in and to whom the findings of the research can be generalized. The study will cover all science and technical secondary schools' teachers, colleges of education science teachers and science teachers of universities in Sokoto state. Generally, as stated by the ministry of education Sokoto state (2011), there are 645 science teachers. These science secondary schools are owned by the federal and state government; hence they are all public schools. Public science and technical secondary schools were chosen because (i) they offer and give emphasis on only science, mathematics and technical (technology and engineering) education; (ii) students must fulfil the requirements including passing entrance examination before they secure admissions; (iii) have adequate instructional resources compare to non-science and technical schools. To ensure effective representation of the population, purposive sampling was adopted for the collection of data with the research instrument.

The questionnaire used for data collection comprises of seven sections with titles including demographic information, Integrated STEM Education Scale, Education for Sustainable Development Scale, Instructional Strategies for implementing STEM Education, Instructional Strategies for Achieving Education for Sustainable Development, Adequacy of Instructional Materials for Integration of STEM Education, Adequacy of Classroom Environment for Integration of STEM Education and Factors preventing Teachers Engagement in Education for Sustainable development. Two different Likert scale anchors were used, indicated in Appendix A. The rating scale is provided in Table 1 below.

Table 1: Quantitative instrument' four-points Likert scale response rating

SN	1st Indicator	2nd Indicator	core
1	Strongly Agree	Very Adequate	1
2	Agree	Adequate	2
3	Disagree	Fairly adequate	3
4	Strongly Disagree	Inadequate	4

The internal consistency of the items in the instrument was determined using Cronbach's Alpha reliability coefficient indicated in Table 2. According to Tavakol & Dennick (2011), the measure of internal consistency of an instrument with more than two alternatives like the Likert scale can be determined through Cronbach's alpha. Cronbach's Alpha Coefficient is normally the most suitable kind of reliability for the quantitative instrument (questionnaires) where there are a series of possible answers for every item (McMillan and Schumacher, 2006).

Table 2: Reliability coefficient of the instrument

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.862	.936	12

According to Tavakol & Dennick (2011), the closer the coefficient to 1, the more reliable the instrument. It can be observed from Table 2 that the p-value of Cronbach's alpha (0.862) is closer to 1. Thus, the instrument is reliable.

Results and Discussion

The instrument contains seven sections including demographic information, Integrated STEM Education Scale, Education for Sustainable Development Scale, Instructional Strategies for implementing STEM Education, Instructional Strategies for Achieving Education for Sustainable Development, Adequacy of Instructional Materials for Integration of STEM Education, Adequacy of Classroom Environment for Integration of STEM Education and Factors preventing Teachers Engagement in Education for Sustainable development.

Table 3: Demographic Information of the respondents

Items			
		Freq	**%**
Gender	Male	216	77%
	Female	121	23%
	Total	**337**	**100%**
Qualification	Diploma	16	3%
	NCE	153	47%
	Bachelor's Degree	141	45%
	Master	17	5%
	PhD	0	0
	Total	**337**	**100%**
Experience	5 Year and Below	76	14%
	6 to 10 years	102	38%
	11 to 15 years	87	35%
	16 to 20 years	54	10%
	21 to 25 years	5	1%
	26 to 30 years	13	2%
	Total	**337**	**100%**
Level of Specialization	Secondary School Teacher	268	69%
	College of Education Teacher	141	36%
	University Teacher	28	5%
	Total	**337**	**100%**

It can be observed from Table 3 that while about 77% of the respondents are male, 23% are female classroom teachers. In terms of their qualifications, over 47% of the respondents are NCE holders, about 45% have Bachelor's degree, not fewer than 5% have master's degree, and 3% have a diploma. Moreover, the teaching length which is otherwise called the experience of the respondents indicated that the majority (73%) of the respondents have been in the teaching profession between 6 to 15 years. Finally, over 69% of the respondents are secondary school teachers.

i. Is there any significant relationship between integrated STEM education and education for sustainable development?

Table 4: Correlation coefficient of integrated STEM education and Education for Sustainable Development

		STEM	ESD
STEM	Pearson Correlation	1	.591**
	Sig. (2-tailed)		.000
	N	537	537
ESD	Pearson Correlation	.591**	1
	Sig. (2-tailed)	.000	
	N	537	537

**. Correlation is significant at the 0.01 level (2-tailed).

It can be observed from Table 4 that the p-value is greater than 0.05, which indicated that there is no significant relationship between Integrated STEM and Education for Sustainable development. Thus, the hypothesis that says "there is no significant relationship between integrated STEM education and Education for Sustainable development" is accepted.

ii. (a) How adequate are instructional material for integrating STEM education into education for sustainable development?

Table 5: Adequacy of Instructional Materials for Integration of STEM Education

/N	Items		req	%	Mode
	Equipment, such as Beakers, Test tubes, Tongs, Racks, Funnels, Volumetric flask, Droppers, Ring stand, clamps, Thermometer, Bunsen burners, Balances, Pipettes, Burettes, Voltmeter, Ammeter, Galvanometer, Copper wires, Cells, Rheostats,	Highly Adequate		0	
		Adequate	2	2	
		Fairly Adequate	34	4	
		Inadequate	91	5	**Inadequate**

Optical instruments, Magnets, slides, Petri dishes, Microscopes	**Total**	**37**	**100**	**1**
Consumable materials	Highly Adequate		0	0
	Adequate		1	0
	Fairly Adequate	1	1	1
	Inadequate	75	8	8
	Total	**37**	**100**	**1** **Inadequate**
Safety such as Gloves, Googles and eyewash station	Highly Adequate		0	0
	Adequate		0	0
	Fairly Adequate		0	0
	Inadequate	37	100	1
	Total	**37**	**100**	**1** **Inadequate**
Information Technology (IT) resources	Highly Adequate		0	0
	Adequate		0	0
	Fairly Adequate		2	0
	Inadequate	35	95	1
	Total	**37**	**100**	**1** **Inadequate**
Level-appropriate textbooks	Highly Adequate		0	0
	Adequate	4	11	6
	Fairly Adequate	68	26	6
	Inadequate	35	5	2
	Total	**37**	**100**	**1** **Fairly Inadequate**
Robotics programming resources	Highly Adequate		0	0
	Adequate		0	0
	Fairly Adequate		0	0
	Inadequate	37	100	1
	Total	**37**	**100**	**1** **Inadequate**

Construction tools such as saws, measuring devices, and hammers	Highly Adequate		(	0	
	Adequate	4		6	
	Fairly Adequate	24	0	3	
	Inadequate	79	3	1	**Fairly Inadequate**
	Total	**37**	**00**		
Electronic materials such as computers, design programs, robotics kits, and calculators	Highly Adequate		(	0	
	Adequate		(	0	
	Fairly Adequate	1		4	
	Inadequate	16	6	9	
	Total	**37**	**00**	1	**Inadequate**
Other materials used in a design, which could include wood, styrofoam, glue, cardboard, or construction paper	Highly Adequate		(	0	
	Adequate		(	0	
	Fairly Adequate	63	0	3	
	Inadequate	74	0	7	
	Total	**37**	**00**	1	**Inadequate**

From Table 5, it can be observed that except for items 5 & 7 the mode class for almost all items is 4, which indicated an "inadequate" state of instructional materials. This means that there is inadequate equipment used for science instruction; consumable materials; Safety such as Gloves, Googles and eyewash station; Information Technology (IT) resources; Robotics programming resources; Electronic materials such as computers, design programs, robotics kits, and calculators; and Other materials used in a design, which could include wood, styrofoam, glue, cardboard, or construction paper. Thus, it can be understood that there are inadequate instructional materials **for** integrating STEM education in Nigeria's public secondary schools.

ii. (b) How adequate is the classroom environment for integrating STEM education into education for sustainable development?

Table 6: Adequacy of Classroom Environment for Integration of STEM Education scale

/N	Items		req	%	Mode
	Laboratories for carrying out sophisticated practical experiments with expensive equipment	Highly Adequate	(	0	
		Adequate	(	0	
		Fairly Adequate	1	8	
		Inadequate	96	2	
		Total	**37**	**1 00**	**Inadequate**
	Information technology (IT) resources in the classrooms	Highly Adequate	(	0	
		Adequate	(	0	
		Fairly Adequate	30	1 9	
		Inadequate		9	
		Total	**37**	**1 00**	**Inadequate**
	Classroom size	Highly Adequate	(	0	
		Adequate	6	1 2	
		Fairly Adequate	03	3 8	
		Inadequate	68	5 0	
		Total	**37**	**1 00**	**Inadequate**

It can be observed from Table 6, that the mode class for all items is 4, which indicated an "inadequate" state of the classroom environment. Thus, it can be understood that there is an inadequate classroom environment for integrating STEM education into education for sustainable development. Scholars like Guo et al. (2012) believed that the classroom environment predicts student achievement. Interestingly, the classroom environment is mostly considered as a multidimensional construct that comprises general ratings of students' literacy, quality of classroom instruction, appropriate use of feedback for evaluation, and instructional discourse between teachers and students.

ii. Are there any significant factors preventing secondary school teacher's engagement in education for sustainable development in Nigeria?

Table 7: Factors preventing Teachers Engagement in Education for Sustainable development Scale

/N	Items		Freq	%	Mode
	Lack of time	Strongly Agree	37	14	
		Agree	86	25	
		Disagree	23	12	
		Strongly Disagree	5	10	
		Total	**37**	**100**	**Agree**
	Lack of financial support	Strongly Agree	94	37	
		Agree	27	12	
		Disagree	0	14	
		Strongly Disagree	6	12	
		Total	**37**	**100**	**Strongly Agree**
	Lack of deep understanding of sustainability	Strongly Agree	1	36	
		Agree	65	24	
		Disagree	03	23	
		Strongly Disagree	8	37	
		Total	**37**	**100**	**Agree**
	Current curriculum structures	Strongly Agree	4	18	
		Agree	27	12	
		Disagree	62	24	
		Strongly Disagree	4	16	
		Total	**37**	**100**	**Disagree**
	Ways of instructional delivery	Strongly Agree	21	30	
		Agree	36	12	
		Disagree		37	

		6			
	Strongly		4		
	Disagree	4		8	
			5	1	Stron
	Total	**37**	**00**		**gly Agree**
Academic pressures	Strongly		3	6	
	Agree	45	4		
			4		
	Agree	5		8	
			1	2	
	Disagree	23	3		
	Strongly		2		
	Disagree	4		4	
			5	1	Stron
	Total	**37**	**00**		**gly Agree**
External factors	Strongly				
	Agree		0	0	
			3		
	Agree	4		6	
			3	6	
	Disagree	24	0		
	Strongly		1	3	
	Disagree	79	3		
			5	1	Disag
	Total	**37**	**00**		**ree**
Lack of organizational support	Strongly				
	Agree		0	0	
			5	9	
	Agree	16	6		
			2		
	Disagree	1		4	
	Strongly				
	Disagree		0	0	
			5	1	Agre
	Total	**37**	**00**		**e**
Existing organizational conditions	Strongly				
	Agree		0	0	
			3	7	
	Agree	74	0		
			1	3	
	Disagree	63	0		
	Strongly				
	Disagree		0	0	
			5	1	Agre
	Total	**37**	**00**		**e**

While current curriculum structures and external factors did not prevent teachers from engaging in education for sustainability, Table 7 indicated that lack of time, lack of financial support, lack of deep understanding of sustainability, ways of instructional delivery, academic pressures, lack of organizational supports and existing organizational conditions are the most

severe factors preventing secondary school teacher's engagement in education for sustainable development in Nigeria. Many teachers in developing countries think that the average duration of classroom instruction in secondary school (40 minutes) is not enough for them to integrate lessons that promote sustainability. Countries like Nigeria had no installed resources in the homeroom; teachers have to outsource the resources, install them for instruction to start and dismantle/uninstall them after the instruction is completed. Time becomes a deteriorating factor for ensuring education for sustainability in countries with a similar case with Nigeria.

The concept of sustainability is built around three components which include economic, environmental, and social. Thus, Education for sustainability (sustainable development) focuses on the cultivation of knowledge and skill that was geared towards enhancing these three components. Therefore, to ensuring sustainability, classroom instruction is expected to promote understanding of how human will have access to the resources that they require, financial and other; to keep the balance of all of earth's environmental systems while natural resources within them are consumed by humans at a rate where they can replenish themselves; and ensure universal human rights and necessities are attainable by all human being, who have access to enough resources to keep their families and communities healthy and secure. This is a 'must know' area all teachers need to understand in order to integrate education for sustainable development.

Table 7 reveals that almost all of the respondents believed that one of the problems preventing teachers from engaging in education for sustainability is the ways of instructional delivery. Today with the advancements of technology, the ways of instructional delivery have become dynamic (Brierton et al., 2016). In some instances, it is most appropriate to have an instructor deliver the instruction, while in other situations, a variety of media may be employed. Recently, it appears that every new instructional effort tends to include a computer. Thus, the teacher needs to identify instructional approaches that will lead to the achievement of the terminal objective. These instructional approaches should be based on current theories of learning and results of learning research, the characteristics of the medium that will be used for instructional delivery, the content to be taught, and the characteristics of the learners who will receive the instruction. The variations between the low and high achievers among students defend largely on the ways a teacher delivers his instruction in the classroom. Thus, the student's ability to understand concepts and phenomena may be determined by the approach teacher uses for the instructional delivery (Olibie & Ezeoba, 2014). Regardless of a particular instructional delivery form, student interaction with instructors, other students, and content is widely regarded as fundamental in today's classrooms.

CONCLUSION

Education for sustainable development becomes the bedrock for ensuring an undisturbed future for the upcoming generation. The study informed the relevance of STEM education and sustainability to developing nations. Although, the result revealed that there is no relationship between STEM education and Education for sustainable development, both of them have an unmeasurable impact on the development of society. This study reveals that Nigeria, as a giant of Africa, needs to lead away for sustainability in its continent. Abundant natural resources are waiting to be explored by secondary school students when STEM education integrated fully. We fear that members of the Nigerian community may misuse those natural resources in such a way that will compromise the future of the nation.

Finally, there is an urgent need for training classroom teachers on the modalities of integrating STEM education and education for sustainable development. There is a need to demonstrate to the teachers the importance of sustainability in a nation like Nigeria where resources are embedded almost everywhere. All these could be done through the professional development of a teacher.

RECOMMENDATION

The study recommends that both states and federal ministries of education need to ensure that the increments of the annual budget for education reach 27% in order to cater for the required funding. Similarly, the government should provide adequate instructional materials for the integration of STEM education and they should work toward achieving an effective classroom environment for integration of STEM education.

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MATHEMATICAL MODELLING AND NUMERICAL ANALYSIS OF FLOW IN SPRING-LOADED CHECK VALVE

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Abstract: Check valves are one of the most important elements of hydraulic systems. These valves, are self-acting safety valves and allow flow in the desired direction while not allowing flow in the opposite direction. In this study, flow analysis was performed for check valves and the flow coefficient was calculated. Good evaluation of check valves is very important in the design phase of the systems. In the definition of a valve, some characteristic curves obtained as a result of experiments performed in the laboratory. The first and most important factor in valve selection is the control characteristic. Here, the flow coefficient, which is an indicator of the valve's flow permeability, must be calculated. This coefficient value is determined by the valve manufacturers with experiments for each diameter and disc opening. The flow coefficient (K_v) is a design factor that relates the pressure drop (ΔP) across the valve to the flow rate (Q). Kv is defined as the flow rate in cubic meters/hour [m^3/h] of water at 16°C with a pressure drop of 1 bar across the valve in metric units. In this study, flow analyzes of a spring-loaded disced check valve were executed. First, numerical analyzes were performed with different pressure and flow rates in the fully open position of the disc. Although these analyses give a value idea of the K_v value, they do not correspond to the exact results. Therefore, the static character of the check valve is mathematically modeled. For 11 different boundry conditions, how far the fluid can open the disc from the fully closed position was calculated, and computational fluid dynamics analyzes were performed by creating a solid model at these disc openings. The output pressures obtained as a result of the analyzes and the K_v flow coefficient of the check valve were calculated, at the same time real values were obtained with the test method thanks to valve manufacturer. The numerical results were compared with the experiments. When the error rate between them was calculated, it was observed that the results of the analyzes with different opening values were closer to the experimental results at low inlet pressures. It is thought that the developed model can be used as a preliminary step before moving on to a different expensive test setup for each check valve.

Key Words: Check Valve, Flow Coefficient, Computational Fluid Dynamics, Mathematical Modelling

YAY İLE KAPATILAN KLAPEDEN GEÇEN AKIŞIN MATEMATİKSEL MODELİ VE NÜMERİK ANALİZİ

Özet

Çek valfler, hidrolik sistemlerin en önemli elemanlarından birisidir. Geri akışı önlemek ve tek yönlü akışa yol vermek üzere gerekli görülen tüm tesislerde kullanılan bu vanalar, kendi kendine işleyen emniyet vanalardan olup, istenilen yöndeki akışa izin verirken ters yöndeki akışa izin vermez. Çek valflerin iyi değerlendirilmesi sistemlerin tasarım aşamasında oldukça önemlidir. Her vananın sistem için istenen görevini yerine getirebilmesi için iyi tanımlanması gerekmektedir. Bir vananın tanımlanmasında laboratuvarda yapılan deneyler sonucu elde edilen tanım eğrileri kullanılmaktadır. Vana seçiminde ilk bakılan ve en önemli etken, kontrol karakteristiğidir. Burada vananın akış geçirgenliğinin bir göstergesi olan akış katsayısı hesaplanmalıdır. Bu katsayı değeri, vana üreticileri tarafından her çap ve açıklık için deneylerle belirlenmektedir. Akış katsayısı (K_v), valf boyunca basınç düşüşünü (ΔP) akış debisi(Q) ile ilişkilendiren bir tasarım faktörüdür. K_v, metrik birimlerde vana boyunca 1 bar basınç düşüşü ile 16°C sıcaklıktaki suyun metreküp/saat [m^3/h] cinsinden akış debisi olarak tanımlanır. Bu çalışmada yay ile kapatılan klapeli çek valfin akış analizleri gerçekleştirilmiştir. İlk olarak klapenin tam açık olduğu konumunda farklı basınç ve debi değerleri ile nümerik analizler gerçekleştirilmiştir. Bu analizler, K_v değeri için bir fikir verse de tam doğru sonuçlar vermemektedir. Bu nedenle, çek valfin statik karakteri matematiksel olarak modellenmiştir. 11 farklı giriş koşulu için akışkanın klapeyi tam kapalı konumdan ne kadar mesafeye kadar açabildiği hesaplanmış ve bu açıklıklarda katı model oluşturularak hesaplamalı akışkanlar dinamiği analizleri gerçekleştirilmiştir. Analizler sonucu elde edilen çıkış basınçları ile çek valfin K_v akış katsayısı hesaplanmış, aynı zamanda vana üreticisi ile birlikte deney yöntemiyle gerçek değerler elde edilmiştir. Nümerik sonuçlar, yapılan deneyler ile karşılaştırılmış ve klapenin tam açık olduğu analizlere göre farklı açıklık değerlerine sahip geometrilerin akış analizlerinin deneysel verilere daha yakın sonuçlar verdiği görülmüştür. Aralarındaki hata oranı hesaplandığında özellikle farklı açıklık değerlerine sahip analizlerin düşük giriş basınçlarındaki sonuçlarının deneysel sonuçlara daha yakın olduğu gözlemlenmiştir. Geliştirilen modelin her çek valf için farklı pahalı test düzeneğine geçmeden önce ön aşama olarak kullanılabileceği düşünülmektedir.

Anahtar Kelimeler: Çek Valf, Akış Katsayısı, Hesaplamalı Akışkanlar Dinamiği, Matematiksel Model

INTRODUCTION

Valves are machine elements that preventing flow, adjusting flow coefficient and pressure, control the flow direction and preventing the reverse flow. Valve selection requires great care during the design of the system. In case of failure of the valve, it may adversely affect the entire piping system and cause large energy losses. Therefore, fluid mechanics studies on valves are very important. Valves are evaluated in many different classes according to flow control type, connection types, flow direction, manufacturing and material condition. According to design / working principle; Gate Valve, Globe Type Valve, Butterfly Valve, Ball Valve, Plug Valve, Diaphragm Valve, Piston Valve. And according to its function; On-Off Valves, Flow Control Valves, One Way Flow/Reverse Prevention (Check Valve), Pressure Regulating Valves (Regulation), Pressure Relief Valves, Level Control Valves, Special Valves. In scope of this study check valve was examined. The main function of check

valves is a type of valve that prevents reverse flow by closing the disc to protect mechanical equipment in case of reverse flow in piping systems. The function of check valves becomes even more important when it comes to relatively expensive components found in most systems, such as pumps and compressors, because reverse flow can cause serious damage to the internal parts of the equipment. Check valves are frequently preferred in most systems in use today. An operator or controller is not needed for check valves, which are an automatic valve that opens in direct flow and closes in reverse flow. Their operation depends only on the flow direction of the process, which can be achieved by a pump or a pressure drop. Check valves have a ball or disc that sits on a surface. The ball or disk is slightly wider than the flow through hole. The closing element begins to open when the incoming fluid pressure overcomes the pressure on the closing element. In the reverse flow case, the disc returns to its place and closes the flow hole. Thus, it does not allow the flow to move in the opposite direction (Zappe and Smith 2004 , ss.153). Check valves have great application in industries such as pumping station, nuclear power plants and boiler units, but the pressure surge or disc fluctuation that usually occurs in the valve raises interest in experiments and numerical modeling (Turesson, 2011).

Praveen and Pathan performed 3D numerical simulations and experiments to measure the flow coefficient and fluctuation. The authors, who made separate analyzes for each geometry created at different opening values, did not fully model the dynamic behavior of the valve. When the numerical values obtained from the simplified model were compared with the experimental data, the difference between them was found to be approximately 14.51%. It is stated that the model created in the study, which is claimed to be used up to 20%, can be used before the experimental method (Praveen and Pathan, 2017).

The aim of Beune's article is to examine the effect of valve dynamics on constant flow performance by numerical methods. The approach is to include fluid-structure interaction (FSI) in computational fluid dynamics (CFD) calculations of flow through a safety valve. Subsequently, the opening characteristic of a high pressure safety valve and possible valve instabilities can be discerned, which may not be evident in steady-flow simulations in non-moving mesh. As a result, the design of a safety valve can be evaluated and improved to avoid as much as possible flow imbalances during valve operation. Therefore, it is recommended to use the FSI multimesh method presented to investigate the sensitivity to valve dynamics and the continuous flow method in small disc lifters to determine the opening characteristics. (Beune, Kuerten, and Van Heumen 2012).

The purpose of the sizing procedure of the safety valve operating in liquids was research on the selection of the valve flow area by taking into account the effect of viscosity change through a flow coefficient (K_v) calculated on the basis of the flow Reynolds Number. The authors have presented in the literature highly accurate CFD reviews of the behavior of safety relief valves (SRV) for both compressible and incompressible flow regimes. The obtained results showed that the force acting on the valve disc may exhibit a non-monotonic behavior while the discharge coefficient decreases for increasing values of fluid viscosity. They concluded that changes in the force exerted by the flow affect operating performance and in some cases lead to an additional reduction in valve flow capacity. Critical evaluation of the results suggested a modification of the sizing procedure recommended by the reference standards (Dossena et al. 2017).

Zhang et al., who developed a dynamic model of a spring load pressure relief valve using the conservation of mass and momentum principles together with the strict dynamical equation, determined the valve discharge coefficient numerically using a simplified two-dimensional model with Ansys FLUENT. The dynamic properties of the valve are investigated in terms of pressure set point, disc lift and spring parameters during the transient discharge flow and a mathematical model is derived for a direct acting spring loaded pressure

relief valve. The developed mathematical model predicts the disc behavior and inlet-outlet flow rate of the relief valve during transient (dynamic behavior) and equilibrium state. Although a simplified geometry is considered, the methodology can be applied to more complex geometries. Two fronts are followed as the next step in the current analysis. Within the scope of the study, the flow coefficient (Kv) was determined numerically by using the 2D temporal analysis of the flow in the valve and an experimental setup was constructed to compare it with the model predictions (Zhang et al. 2018).

In this study, static analyzes were performed in the geometry where the disc was fully open and the calculated flow coefficient (K_v) value was compared with the experimental data. As a result of the comparison, it was observed that the numerical K_v values deviated from the experimental K_v values. This deviation does not give accurate information about the flow coefficient and is not suitable for use as a preliminary study. Therefore, the behavior of the disc opening under different boundary conditions was investigated. The forces acting on the disc were examined and the disc motion was modeled mathematically. With the developed mathematical model, the movement of the disc was examined and the opening amount of the disc was obtained under different boundary conditions. With these opening amounts, the geometry of the valve was revised and the numerical analyzes were repeated.

MATERIAL AND METHOD

Each valve must be well defined in order to fulfill its intended function for the system. In defining a valve, Control Characteristics, Head Loss Characteristics, Cavitation Characteristics, Regulation Characteristics, On/Off Torque characteristics. The definition curves obtained as a result of experiments carried out in the laboratory are used. The first and most important factor in valve selection is the control characteristic. There are three types of control characteristics: quick opening, linear and equal percentage, and this feature is selected according to the function of the valve. The flow coefficient (K_v) is the most important subheading of the control characteristic. This coefficient value is used in valve selection.

$$Q=K_v\,(\Delta P)^{0.5}$$

The value calculated with the formula should be calculated by the valve manufacturers and added to the manual. The K_v curves of each manufactured valve can be determined by experiments for each diameter, design and opening. The flow coefficient is very important in terms of understanding the hydraulic characteristics of the valves and is a value that must be calculated to understand the cavitation. It was mentioned that each control valve has a unique numerical K_v value. The flow coefficient (K_v) is a design factor that relates the pressure drop (ΔP) across the valve to the flow rate (Q). K_v is defined as the flow rate in cubic meters/hour [m^3/h] of water at 16°C with a pressure drop of 1 bar across the valve in metric units. C_v is the flow coefficient in imperial units. It is defined as the flow rate of water in US Gallons per minute [gpm] at a temperature of 60° Fahrenheit with a pressure drop of 1 psi across the valve. Laboratory tests and units of different flow variables are used in the calculation and application of the flow coefficient. (Rahmeyer and Driskell 1985). However, these test setups are expensive and test times are long. Numerical methods can be used before starting these tests, which should be repeated especially during the design phase of the valves. When examining the behavior of a check valve, it can be analyzed numerically with the help of computational fluid dynamics, which can perform multidimensional analysis. However, for design and optimization, this method is time and financially expensive as it needs to be iteratively repeated.

Mathemathical Modelling

The equations governing the valve movement are derived according to Newton's second law. In reality, check valves are not limited to one degree of freedom, but only 1-dimensional movement of the flap is modeled in this study.

$$F = ma$$

where F is the net force acting on the valve; m is the mass to be moved; a is the acceleration of the mass as a result of the force. m is not just the mass of the disc. In addition to this mass, spring (m_s) and fluid (m_f) masses should also be included in the calculation. As the disc accelerates, a fluid mass around it also accelerates, thus creating an additional mass. The added mass depends on the density of the fluid, the disc geometry, etc. depends on various factors. Therefore, the fluid mass, which does not give a constant value, is neglected in the model as it is not very effective on the valve characteristic. According to the equivalent kinetic energy analysis, the effective spring mass can be treated as one third of the total spring mass. Although the contribution of the spring mass is negligible, it is included in the model due to its simplicity. According to these values,

$$m = m_{klape} + m_s + m_f$$

The net force is obtained when the forces acting on the valve disc are calculated as the pressure force (F_p), spring force (F_s), the force formed by the seating surface and the stoppers (F_c), the fluid drag force (F_d), the constant and temporary flow forces (F_f).

$$F = F_p + F_s + F_c + F_d + F_f$$

If the effect of the movement of the valve on the flow pattern around it is neglected, both the hydrodynamic force and the pressure loss created by the valve will depend only on the flow through the valve and the position of the valve.

The spring force acts as a counter force in the disc displacement.

$$F_s = -k(x + x_0)$$

where k is the spring coefficient and x_0 is the pre-compression distance of the spring. Although the damping force generated by the spring is negligible, this small effect has also been taken into account within the scope of the study. The most important force in the system is the pressure force, which is the force that the fluid pressure coming to the valve creates on the disc. The value calculated by multiplying the known inlet pressure values with the area obtained from the disc geometry is used. Other forces are neglected to avoid complicating the mathematical model as they are less and negligible forces to understand the hydrodynamic behavior of the disc. Calculation of these values manually is also difficult, these forces can be obtained as a result of numerical analysis in studies where calculation is important.

The most common method used to model the disc dynamics is the single translational degree of freedom model created with a 1-dimensional mass-spring-damper system. The mathematical model created in the study is also 1-dimensional and reduced to the mass-spring-damper system.

The equation of motion written for an object of mass m, damping coefficient c and spring stiffness k can be expressed with,

$$F - k(x + x_0) - c\frac{dx}{dt} = m\frac{d^2x}{dt^2}$$

Mechanical Modelling

The mathematical model of the valve was created with the MATLAB/Simulink program. In accordance with Newton's second law, the forces acting on the disc were determined as above and the effect of this force on the calculated mass was examined. The dumping effect of the spring (damper) affects the speed of the disc. As it is compressed, the increasing spring force affects the system as a negative force back to the system. The values

obtained as a result of the mathematical model were examined both numerically and visually (graphically). Figure 1 shows the mathematical model created with the Simulink program.

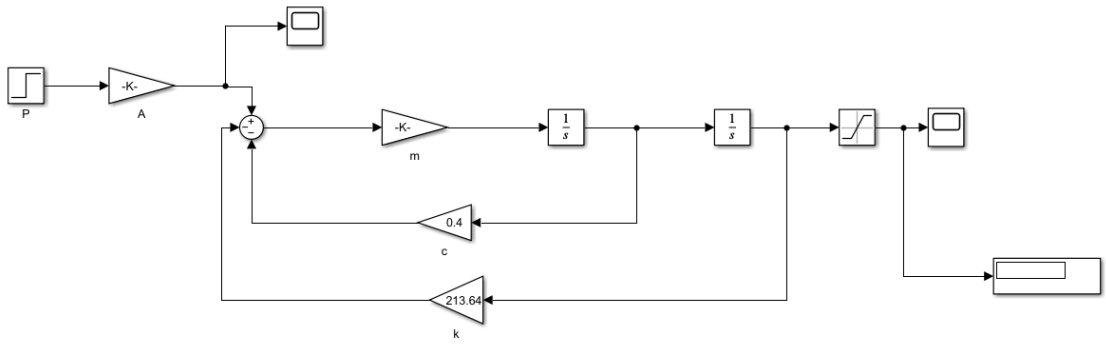


Figure 6 Mechanical Model of Disc

The fluid pressure coming into the system creates a force equal to the surface area of the disc. Afterwards, the damper, which starts to accelerate with 1/(total mass), tries to dampen the movement with the disc effect created by the spring and the fluid. Check valves are normally closed by the weight of the cover and the effect of the spring force. Since the spring force is proportional to the closing, the closing will increase as this force increases. As it gets compressed, the increasing spring force tries to stop the disc at variable values. These two values constantly affect the system negatively. Although 1-dimensional analysis is performed, it is possible to examine the dynamic behavior of the disc with this method. The disc, which makes an oscillating movement for a while according to the incoming returns, comes to dynamic balance after a while and settles at a value. This oscillating motion can be observed with the help of the Simulink Scope block.

The values obtained as a result of the mathematical model give how far the disc can be opened from the seat with the effect of the fluid coming from the fully closed state of the valve. The opening values of the disc, which cannot be obtained by experimental methods, give positive results for estimation, although they are not exact results. With the help of these outputs, the geometry created in SolidWorks program was reviesed and analyzed numerically in Ansys Fluent program. Output pressures are obtained in numerical analysis, where flow rate and inlet pressure are given as inlet conditions. By calculating the pressure difference, the flow coefficient of the valve was calculated for each analysis. Obtained values were compared with experimental methods.

Numerical Modelling

In this study, we worked with ANSYS Fluent analysis program. Because Ansys Fluent is industry-leading, fast, reliable and leading analysis software. The mechanical drawing of spring closed check valve is made with the help of SolidWorks program. The flow geometry of this check valve was extracted and the analyzes were started. One of the most important issues in numerical analysis is meshing. Mesh quality directly affects numerical analysis results which a method of expressing a physical problem numerically. The purpose of Mesh is to break a complex geometry into small pieces that the simulation can run. In the mesh structure created in this study, structures with predominantly tetrahedrons and with a skewness value of less than 0.88 were used.

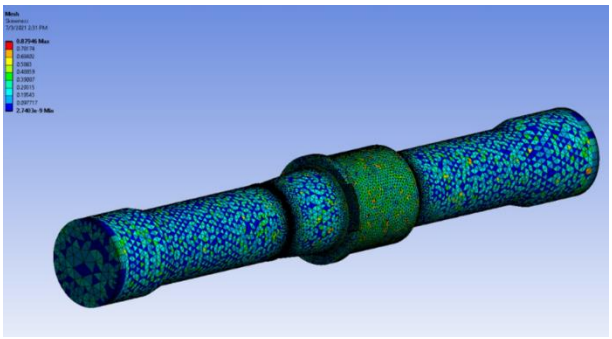


Figure 7 Geometry of the valve(left) and skewness of the flow domain(right).

At this stage, the flow geometry is extracted from the mechanical drawing, the mesh structure is created so that the mesh quality is at acceptable levels, and the geometry is ready to be analyzed. It is an important parameter to determine the flow regime of the water before starting the analysis. Flow regimes can be laminar, turbulent or transitional. As a result of the calculation, it was seen that the flow in the check valve was turbulent and the flow model was defined to Ansys, the k-ε model, which is a turbulent model. After this step, water is defined as a fluid and inlet pressure and volumetric flow are defined as boundary conditions. After the necessary definitions are completed, the analysis is performed.

The analysis was performed at separate boundary conditions for stiff and soft spring check valves. As the analysis results, although the soft spring check valve provides the desired values, the required precision results could not be obtained with the stiff spring check valve. Upon this mathematical model was created. As the outputs of this mathematical model, the disk openings were changed and stiff spring check valve was analyzed again.

Experimental Method

The aim of the experiment is to calculate the K_v coefficient by using the pressure difference that will occur in the spring loaded check valve. The main machine elements to be used for the test are pump, throttling valve, pressure gauge, flowmeter and check valve.

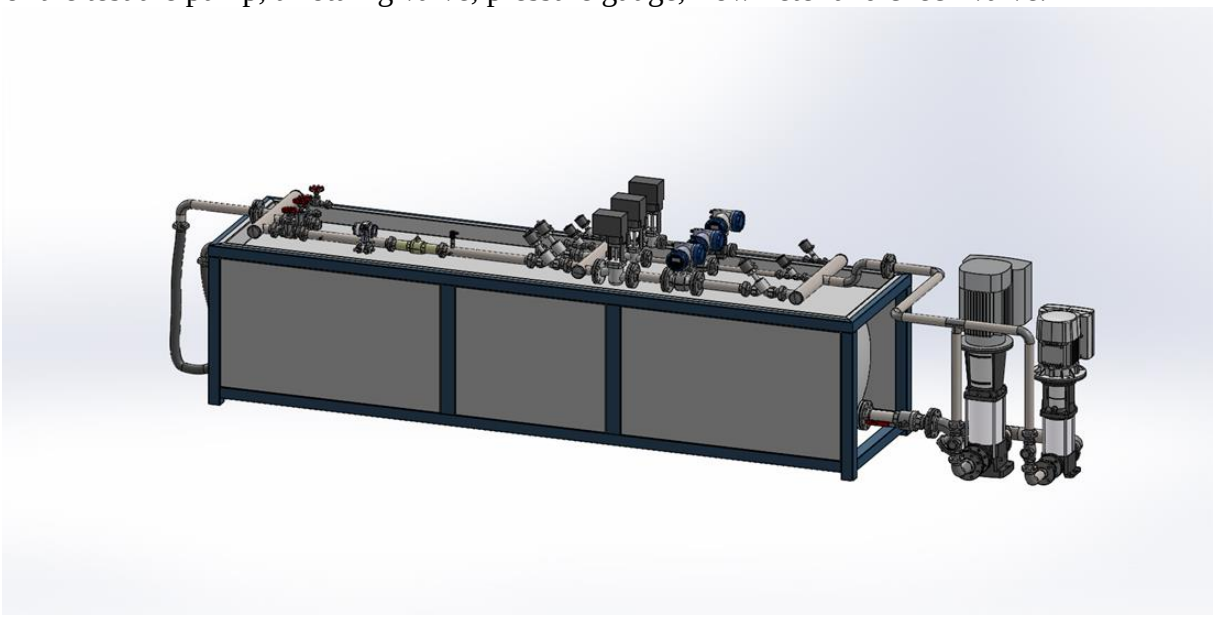


Figure 8 Experimental setup

The test fluid for this experiment is water and the experiments were carried out in an environment at 20 °C. The primary purpose of the experiment is to ensure that the differential pressure is at the desired level. The flow rate of the water sent from the pump and the inlet pressure just before it enters the check valve are measured with the help of the flow meter.

Here, differential pressure is obtained with the help of two pressure gauges located at the inlet and outlet of the check valve, and K_v is calculated with the help of the flow required to create the differential pressure.

Experiment with explanation in the scope of the paper was repeated in 11 different boundary conditions and K_v values were calculated according to this equation below.

$$k_v = \frac{\dot{Q}}{\sqrt{\Delta P}}$$

RESULTS AND DISCUSSION

The analyzes were performed under the same conditions in the position where all dynamic movements were neglected and the disc was fully open. The purpose of this analysis is to examine how much the obtained results deviate from the real values when static analysis is desired as a preliminary study. The analysis results for the soft spring and hard spring of the valve, which is assumed to have no dynamic behavior, are as follows:

Table 8 For Soft Soring Check Valve

Number of Analysis	INLET PRESSURE (bar)	FLOW RATE (m^3/h)	EXPERIMENTAL Differential Pressure (bar)	ANSYS Fully Open Differential Pressure (bar)	EXPERIMENTAL KV (m^3/h)	ANSYS Fully Open KV (m^3/h)
1	1,12	1,2060	0,0511	0,0522	5,335	5,2785186
2	2,13	1,6940	0,1001	0,1016	5,3542	5,3145507
3	3,25	2,1100	0,1528	0,1566	5,3978	5,3319562
4	4,19	2,3900	0,1958	0,2003	5,4012	5,3401988
5	2,93	2,7100	0,2506	0,2603	5,4135	5,3116837
6	3,48	2,9900	0,3033	0,3092	5,4291	5,3771413
7	4,08	3,2400	0,3569	0,3625	5,4234	5,3813471
8	4,78	3,4800	0,4088	0,4198	5,4428	5,3710355
9	6,03	3,9000	0,5066	0,5257	5,4793	5,3789266
10	4,75	4,7200	0,7480	0,7702	5,4574	5,3782408
11	6,56	5,5100	1,0910	1,0475	5,2752	5,3836223

Table 9 For Stiff Spring Check Valve

Number of Analysis	INLET PRESSURE (bar)	FLOW RATE (m^3/h)	EXPERIMENTAL Differential Pressure (bar)	ANSYS Fully Open Differential Pressure (bar)	EXPERIMENTAL KV (m^3/h)	ANSYS Fully Open KV (m^3/h)
1	0,84	0,91	0,0512	0,0301	4,0216	5,2451528
2	1,45	1,33	0,1075	0,0633	4,0564	5,2862754
3	1,97	1,57	0,1513	0,0877	4,0362	5,3015133
4	2,63	1,82	0,2031	0,1171	4,0384	5,3185463
5	3,31	2,06	0,2574	0,1495	4,0603	5,3277842
6	3,9	2,23	0,3027	0,1741	4,0532	5,3444803
7	4,49	2,41	0,3503	0,2036	4,0718	5,3410686
8	2,85	2,59	0,4022	0,2344	4,0839	5,3495957
9	3,61	2,91	0,5094	0,2919	4,0772	5,386119
10	5,25	3,53	0,7514	0,4321	4,0722	5,3701025
11	5,5	4,07	1	0,5742	4,0685	5,3710948

As a result of the comparisons, the results of the soft spring numerical analysis and the experimental results are very close to each other. This is due to the fact that the disc openings calculated in the established mathematical model are fully open for almost every value. From this, it is concluded that the soft spring almost always behaves as if it is fully open in the face of the given boundary conditions, since the spring constant is low. The difference is thought to be due to the neglected dynamic motion and the mesh quality (numerical error) designed while performing the analysis. However, when the calculations were repeated for the stiff spring, it was observed that the K_v values of the spring with high spring constant deviated from the test results. This amount of deviation is 32%, which is a larger value than expected. The reason for this is thought to be due to the fact that the dynamic movement of the spring is more effective than the other spring, since the spring does not behave as if it is fully open. According to this result, it can be said that the spring effect is too large to be neglected. As it is known, the spring force increases in proportion to the compression. Therefore, it is necessary to know the opening of the disc, the amount of compression of the spring. The developed mathematical model includes the effects of the dynamic behavior of the spring (spring and damping force). With the effect of these forces, which have a negative effect on the fluid pressure, the disc opens from its fully closed state and makes an oscillating motion and settles to a certain value. The disc openings (mm and percent) and analysis results obtained with the created model are presented in Table 3.

Table 10 Disc Openings

Number of Analysis	Disc Openings (mm)	Disc Openings (%)
1	1,508	20,106
2	2,604	34,72
3	3,537	47,16
4	4,722	62,96
5	5,943	79,24
6	7,003	93,373
7	8,065	100
8	5,117	68,226
9	6,481	86,413
10	9,426	100
11	9,872	100

Analyzes were repeated with new geometries created according to these openings. In Table 4, the experimental data and the analysis results for the new geometry obtained as a result of adding the hard spring check valve disc openings to the calculation are given comparatively,

Table 11 Comparasıon of stıff sprıng and experıment

INLET PRESSURE (bar)	FLOW RATE (m³/h)	EXPERIMENTAL Differential Pressure (bar)	New ANSYS Differential Pressure (bar)	EXPERIMENTAL KV (m³/h)	New KV (m³/h)
0,84	0,91	0,0512	0,0483	4,0216	4,1406
1,45	1,33	0,1075	0,0725	4,0564	4,9394
1,97	1,57	0,1513	0,0917	4,0362	5,1845
2,63	1,82	0,2031	0,1154	4,0384	5,3575
3,31	2,06	0,2574	0,1448	4,0603	5,4135
3,9	2,23	0,3027	0,1696	4,0532	5,4149
4,49	2,41	0,3503	0,2036	4,0718	5,3410
2,85	2,59	0,4022	0,2286	4,0839	5,4170
3,61	2,91	0,5094	0,2872	4,0772	5,4300
5,25	3,53	0,7514	0,4321	4,0722	5,3701
5,5	4,07	1	0,5742	4,0685	5,3710

It is an expected result that the pressure difference will decrease as the disc opening increases. Accordingly, the K_v value will also increase. However, since the flow rate increases at the same rate, the K_v number should give close results for each boundary condition. The relationship between the disc opening and the flow coefficient is shown below,

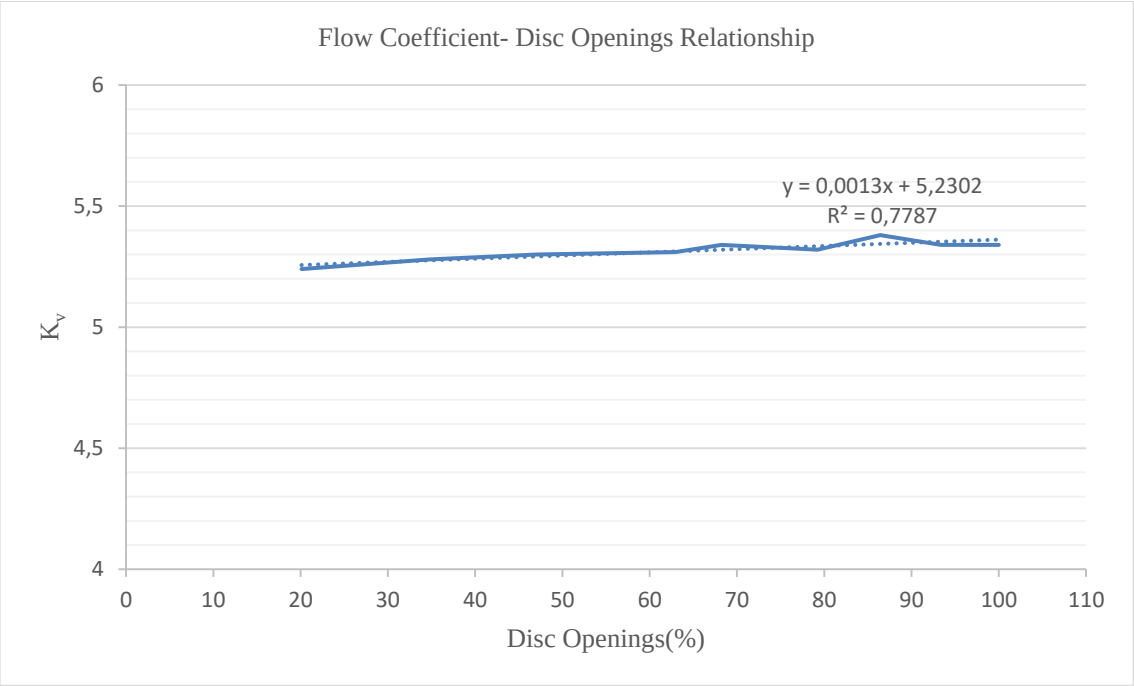


Figure 9 Relationship between flow coefficient and disc openings

The relationship between the numerical analysis results, where the disc is fully open and has different opening values, and the test data is as in Figure 5. When the graph is examined, the model developed under low flow and differential pressure conditions agrees with the experimental data. However, as these values increase, the model gets closer to the static analysis results and deviates from the experimental results. This amount of deviation is presented in Figure 6 for both the static and semi-dynamic model.

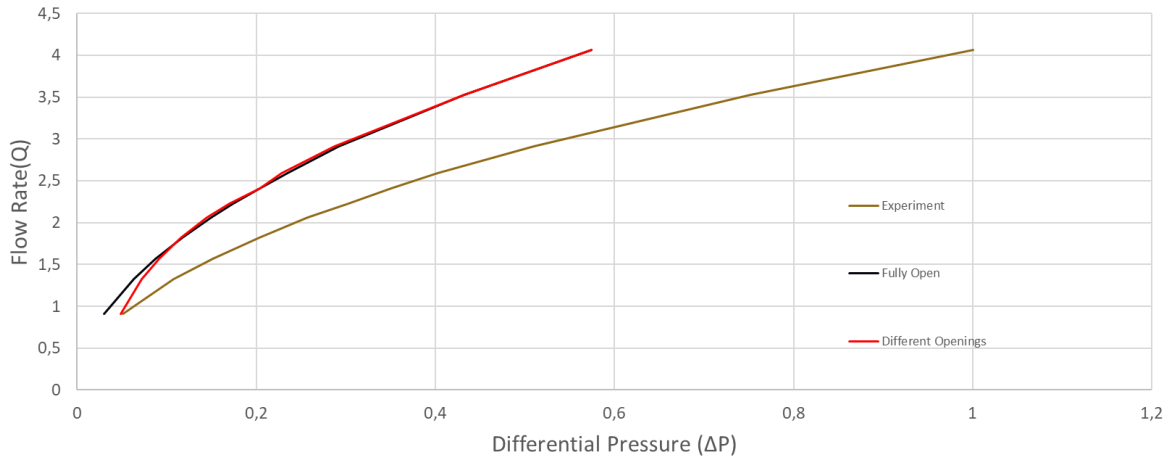


Figure 10 Flow rate-differential pressure relationshio for stiff spring

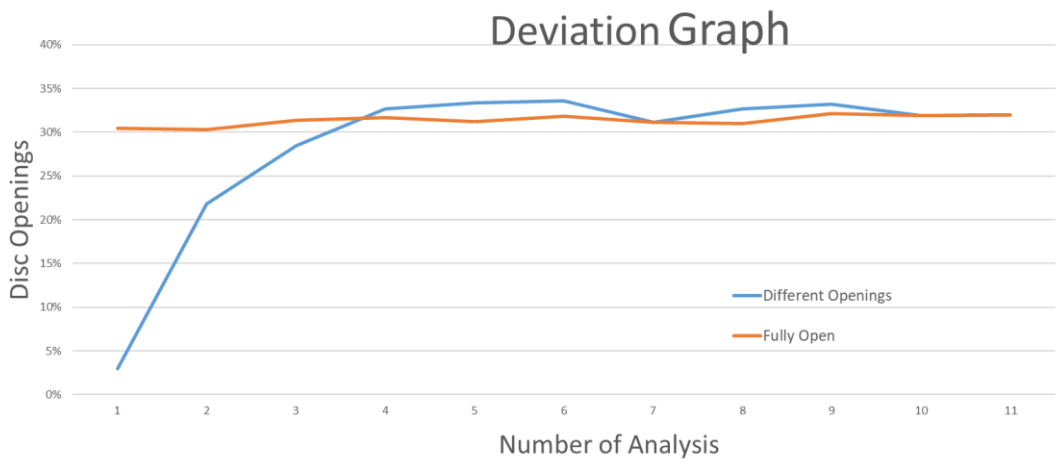


Figure 11 Percent deviation of numerical analysis results from experimental data for stIff spring

The amount of deviation between the experimental results and the numerical results is relatively high. The model developed for use in important application areas where the dynamic characteristics of valves need to be analyzed well is not suitable for use.

CONCLUSION

The deviation rate of the values obtained as a result of the analyzes made according to different opening values from the experimental results was calculated as the lowest 3%. However, for flows with high flow values, the result was not as expected and continued to show a deviation of 32%. Although the spring force, which changes depending on its compression, is taken into account in the numerical analysis, the actual behavior of the spring cannot be modeled exactly. It can be said that the reason for this is that the spring force is also affected by other dynamic factors. Other reasons for the difference are the dynamic effect, as well as the fact that the mathematical model defined for the problem has emerged as a result of hypothetical or idealization, the fact that water does not always come from the pump at the same ideal pressure as assumed in the experiments, and the difference in mesh quality in the analyzes can be counted. It is only possible to predict the dynamic behavior of the valve if the valve cover movement is slow.

Before moving on to the experimental method, it is thought that the results obtained by using the moving mesh structure for the numerical analysis to be performed will give results closer to the empirical data. As another suggestion, processing all the forces acting on the disc while creating the mathematical model in the MATLAB/Simulink application will also give a small amount of deviation. The effect of hydraulic forces can be examined by modeling the flow with MATLAB/Simscape rather than mechanical modeling of the disc, which is not examined in the scope of the thesis but can be used in future studies.

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KÜRESELLEŞME KAVRAMININ KOVİD-19 SALGINI ÇERÇEVESİNDE İNCELENMESİ

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Özet

Son dönemlerde uluslararası ilişkiler literatüründe geçmişe kıyasla çok daha fazla kullanılan bir kavram olan küreselleşme, insan ve insana dair neredeyse bütün etmenlerin, ülkelerin sahip olduğu ulusal sınırları aşarak uluslararası niteliğe bürünmesi ve paylaşılması olarak tanımlanabilir. Küreselleşme genel olarak ticaret, hizmet, kültür, eğitim gibi temel hususlara bağlı olarak devamlı bir şekilde literatürde kendine yer bulmaktadır. Değişimin sürekli olduğu bir uluslararası sistemde küreselleşme olgusunun da bu değişimin bir ögesi olduğu bilinmektedir. Özellikle Soğuk Savaş döneminin sonlarına doğru Barry Buzan ve Ole Weaver önderliğinde oluşturulan Kopenhag Okulu güvenliğin klasik söylemine alternatif bir düşünce geliştirmiştir. Toplumsal güvenlik ve çevresel güvenlik başlıkları altında incelenebilecek COVID-19 salgının uluslararası bir güvenlik sorunu haline bürünmesi küreselleşmenin güvenlik ile olan ilişkisini açıklamada çalışmanın temel argümanlarından birini oluşturmaktadır. Nihayetinde 2020 yılı başında ilk olarak Çin'in Wuhan Eyaletinde tespit edilen ve ilerleyen süreçte neredeyse dünyanın tamamına yayılan COVID-19 salgını, düşünülenin aksine küreselleşmenin çok daha fazla faktörü içerisinde barındırdığını göstermektedir. Bu doğrultuda, çalışmada COVID-19 salgınının bütün sınırları aşarak uluslararası bir sorun haline dönüşmesi ve bu çerçevede devletlerin gerek bu küresel salgına karşı geliştirmiş oldukları ortak bilimsel aşı çalışmaları, gerekse de geliştirilen aşıların küresel boyuta ulaşan ticareti beraberinde getirmesi incelenmektedir.

Salgının ulaştığı boyut, devletleri ilk olarak ulusal çıkarlarını ön planda tutma ve kendi ulusunu koruma gibi temel politikalar benimsemeye ve bunun bir sonucu olarak da devletleri; turizmin, uluslararası seyahatlerin yasaklanması gibi hamleler yapmaya itmiştir. İlerleyen süreçte ise bunun küresel bir sorun olduğu ve kolektif bir mücadeleyle aşılacağı hem karar verici mekanizmalar hem de bireyler tarafından kanıksanmıştır. Bu bağlamda devletler salgını kontrol altına alabilmek amacıyla ortak bir çabaya girişmişlerdir. Uluslararası nitelik barındıran söz konusu salgın özelinde, küreselleşme kavramının ileride nasıl bir yönde şekilleneceği ortaya konmaya çalışılmıştır.

Anahtar Kelimeler: Küreselleşme, COVID-19, Uluslararası İlişkiler, Ulusal Güvenlik

INVESTIGATIVE STUDY ON GLOBALIZATION WITHIN THE FRAMEWORK OF THE COVID-19 EPIDEMIC

Abstract:

Globalization, which is a concept that has been used much more in the international relations literature in recent times compared to the past, it can be defined as the internationalization and sharing of almost all human-related factors beyond the national borders of the countries. Globalization is constantly finding its place in the literature, depending on basic issues such as trade, service, culture and education in general.It is known

that the phenomenon of globalization is an element of this change in an international system where change is continuous.Especially towards the end of the Cold War period, the Copenhagen School, which was formed under the leadership of Barry Buzan and Ole Weaver, developed an alternative thought to the classical discourse of security.The fact that the COVID-19 epidemic, which can be examined under the headings of social security and environmental security has become an international security problem, it constitutes one of the main arguments of the study in explaining the relationship between globalization and security.Ultimately, at the beginning of 2020 and the COVID-19 epidemic, which was first detected in the Wuhan Province of China and spread to almost the whole world, shows that, contrary to what is thought, globalization contains many more factors.In this direction, the study examines the fact that the COVID-19 epidemic has crossed all borders and turned into an international problem, this context, the joint scientific vaccine studies developed by the states against this global epidemic and the fact that the developed vaccines bring about the global trade.

The extent of the epidemic has led the states to adopt basic policies such as prioritizing their national interests and protecting their own nation, as a resultmaking moves such as banning tourism and international travel. In the following process, it has been taken for granted by both decision-makers and individuals that this is a global problem and that it will be overcome with a collective struggle.In this context, states have made a joint effort to control the epidemic.**This has been an attempt**to reveal how the concept of globalization will be shaped in the future in the context of the epidemic in question, which has an international character.

Keywords:.Globalization, COVID-19, International Relations, National Security

1.GİRİŞ

Devletler ulusal sınırlarını koruma politikasını her zaman uygulamaya özen gösterse de, modern çağda küreselleşmenin etkisiyle bu durum değişkenlik göstermektedir. Bireyler eğitim görme, turistik faaliyetlere katılma, daha iyi bir iş ve bunun sonucunda daha refah yaşam standartlarına sahip olmak için başka devletlere geçici veya kalıcı şekilde göç etmektedir. Bireylerin bu hareketliliği beraberinde küreselleşme faktörünün de hızla önem kazanmasını sağlamıştır. Artık devletler ve şirketler uluslararası ticareti önceliklendiren politikalar benimsemeye başlamıştır. Bu olumlu faktörlerin dışında küreselleşmenin bir diğer boyutu COVID-19 süreciyle beraber daha görünür olmuştur. Tıpkı insanların rahatça ulusal sınırları geçebildiği gibi koronavirüs salgını da ilk ortaya çıktığı Çin'in ulusal sınırlarını çok hızlı bir şekilde aşarak küresel bir boyuta ulaşmıştır.

Tarih boyunca insanlar hastalıklarla ve salgınlarla mücadele içerisinde olmuştur. Günümüzde küreselleşmenin doğal bir sonucu olarak salgınlar da küresel boyutlara ulaşmış ve beraberinde olumsuz sonuçları da getirmiştir. Bu bağlamda koronavirüs salgını da neredeyse bütün dünyayı etkileyerek çok fazla can kaybına neden olmuştur. Devletler bu sorunu çözebilmek için çeşitli politikaları hayata geçirmiş olsa da bunlar salgını tam anlamıyla bitirmek için yeterli olmamıştır. Bu durum bizlere küresel salgınlara karşı verilen mücadelenin de küresel olması gerektiğini göstermiştir. Bu bağlamda çalışmada küreselleşme kavramı değerlendirilmiş ve bu kavram COVID-19 salgını çerçevesinde ele alınmıştır. Aynı zamanda devletlerin küresel soruna karşın öncelikle kendi ulusal mücadelelerini verdiği de bir gerçektir. Çünkü salgının başında devletler kolektif bir çabaya girişmektense ülke sınırları içinde virüsle mücadele metotları geliştirmişlerdir.

2.KÜRESELLEŞME KAVRAMI

Soğuk Savaş'ın bitimiyle beraber üzerine en çok tartışılan ancak ortak bir tanımı yapılamayan bir kavram olan küreselleşme, kısaca ulusal sınırların sahip olduğu eski önemi yitirmesi, insanın ve insana ait olan her şeyin uluslararası boyutlarda hareket edebilme gücü olarak tanımlanabilir. Küreselleşmenin ortak bir tanımının yapılamamasının temel nedeni, içerisinde birçok değişken barındırıyor olmasından kaynaklanmaktadır. Küreselleşme, coğrafi, siyasal ve ekonomik yapılara göre çeşitlilik göstermektedir. Örneğin, malların serbest dolaşımı ilkesi gereği ekonomik bağlamda güçlü olan devletler neredeyse tüm ticari mallarını farklı devletlere kolay bir şekilde satabilmektedir. Ancak kimi ülkeler ürünlerini gelişmiş ülkelere satmaya çabalarken büyük güçlüklerle karşılaşabilmektedir. Bu noktadan bakıldığında küreselleşmenin olumsuz yapısı da olduğuna dair çıkarımlarda bulunulabilir (Tağraf, 2002:35). Dolayısıyla küreselleşme olgusu aktörlerin ekonomik gücünden, ticari faaliyetlerinin niteliğine kadar birçok faktörden etkilenebilmektedir.

Sovyetler Birliği'nin yıkılması ve bu neticede Soğuk Savaşın bitimiyle beraber küreselleşme olgusu önem kazandı. İnsan hakları, demokratik gelişim ve ekonomik bütünleşme gibi başlıklarda neredeyse bütün devletler etkilenmiştir. Ancak küresellik ve ulusallık eş zamanlı olarak varlığını sürdürdüğü bilinmektedir (Akdemir, 2004:44). Gümrük girişlerinin kontrolünü devletlerin yapması ve yabancı sermayenin zaman zaman sınırlandırılması, terör olaylarında ulus devletlerin inisiyatif alarak uluslararası örgütleri ikinci plana atarak kendi politikalarını hayata geçirmesi ulus devletlerin küreselleşme faktörüne rağmen güçlerini muhafaza ettiğini gösterir niteliktedir (Yılmaz, 2020:2229). Devletler, ulusal sınırlarını her daim koruma amacıyla hareket eden bir mekanizma olarak kabul gördüğünden ve buna yönelik politikalar benimsediğinden dolayı küreselleşme olgusunu çoğunlukla kendi ulusal çıkarlarını tehdit eden bir yapı olarak görmüşlerdir. Ancak özellikle son yıllarda uluslararası ekonomik ticaretin artması, bireylerin gerek eğitim gerekse de daha iyi bir yaşam standardına erişebilmek için farklı ülkelere göç etme isteği küreselleşme kavramının önemini bir kez daha göstermiştir. Küreselleşme olgusunun özellikle yakın dönemde gerçekleşen iki önemli olay tarafından biçimlendirildiği söylenebilir. İlki, Sovyetler Birliği ve Doğu Avrupa ülkelerinin ekonomik bağlamda serbest piyasaları benimsemeleri, politik alanda Batı dünyası gibi çoğulcu demokrasiye geçme çabaları, ikincisi gelişmiş ülkelerin bilgi toplumunu ön plana çıkarmalarıyla birey faktörünü eskiye nazaran daha ön planda tutmaları olmuştur (Kutlu, 1998:368).

Uluslararası sistemdeki aktörlerin küreselleşme kavramını algılama ve tanımlama biçimi her zaman birbirinden farklı olmuştur. Çünkü devletlerin üzerine kuruldukları coğrafya, sahip oldukları yönetim biçimleri, ekonomik gücü, demografik yapıları gibi birçok faktör küreselleşme kavramının farklı şekillerde algılanmasını sağlayan faktörlerdir. Söz konusu farklılıklara rağmen son dönemlerde devletlerin ve bireylerin birbirleriyle olan ilişkileri artış göstermiş ve bunun doğal bir sonucu olarak küreselleşme olgusu da önem kazanmıştır.

Küreselleşmenin olumlu ve olumsuz birçok etkisi bulunmaktadır. İnsanlar daha az zaman harcayarak çok daha uzak coğrafyalara erişebilme gücünü ele geçirmiştir. Teknolojinin de küreselleşmeyle eş zamanlı olarak gelişmesiyle beraber bireyler çok rahat bir şekilde uluslararası haberlere erişebilmekte yabancı ülkelerdeki insanlarla iletişim kurabilmektedir. İnsan ve insana dair ortak değerlerin paylaşımı küreselleşme vesilesiyle artış göstermiştir. Nitekim insanı var eden temel unsurlardan biri olan kültürün ortak paylaşımıyla beraber medeniyet anlamında olumlu bir gelişme sağlanmıştır. Bunların yanında adalet, özgürlük, bireylerin haklarının korunması gibi hususlar kendine daha fazla yer edinmiş ve bu hakların korunmasına yönelik ortak çabada bulunulmuştur. Çalışmanın üzerinde durduğu COVID-19 salgınına bağlı olarak gözetilmesi gereken bir diğer nokta da küreselleşmenin içerisinde birçok faktör barındırdığı ve koronavirüs salgınına karşı gerçekleştirilen küresel mücadelenin ne kadar önemli olduğunu göstermektedir.

Küreselleşmenin beraberinde getirdiği olumlu gelişmelerin yanında olumsuz olarak değerlendirilebilecek eleştiriler de yapılabilir. En önemli eleştiri özellikle ekonomik bağlamda gelişmiş ülkelerin bunu kendi çıkarlarını korumak ve nispeten gelişmemiş ya da gelişmekte olan ülke olarak kabul edilen devletleri kontrol altında tutmak için kullandığına dair yapılmıştır. Özellikle ABD önderliğindeki Batı dünyasının bu kavramı emperyal amaca hizmet için kullandığı yönünde eleştiriler mevcuttur. Bir diğer eleştiri ise gelişmiş ülkelerin toplumları ile gelişmemiş ülkelerdeki toplumların beslenme, eğitim gibi temel haklardan dahi eşit şekilde faydalanamayışı üzerine yapılmıştır. Bir tarafta zenginlik ve refah oranı artarken diğer tarafta ise ekonomik yoksulluk ve açlık ön plana çıkmıştır. Bu bilgilerden yola çıkarak küreselleşmenin sosyal, ekonomik ve kültürel konularda olumlu ve olumsuz faktörleri içerisinde barındırdığı görülmektedir. İnsanlar, ulusal sınırları dışındaki bireylerle kültürel, ticari, eğitim gibi birçok alanda etkileşim kurabilmektedir. Ancak gelişmiş ülkelerin daha fazla çıkar elde edeceği ve gelişmemiş ülkelerin daha da zayıflayacağına dair endişeler varlığını muhafaza etmektedir (Balay, 2004:65). Küreselleşme olgusuna benzer şekilde küresel sorunlar da herkesi eşit etkileyen bir yapıda değildir. Örneğin göçmenlerin dahil olduğu gruplar, neredeyse bütün önlem ve koruma mekanizmasının dışında tutuluyor ve tehlikelere açık kalabiliyorlar. Erişilemeyen hizmetler, kimi devlette sosyal yardımlar kimisinde ise sağlık veya eğitim hizmetleri olabiliyor (Sirkeci v.d., 2020:3). Küreselleşmeye dair söz konusu eleştirilerin son bulması ve ortak kabul görmesi adına özellikle ekonomik bağlamda gelişmiş ülkelerin bu sorunların çözümüne dair somut politikalar geliştirmesi gerçeği ortadadır.

Uluslararası sistemde birbirinden farklı beklentilerin var olduğu bilinmektedir. Esas olarak bunların adil bir biçimde kendine bir zemin bulması ve bu taleplerin uluslararası sistemdeki bütün paydaşların çıkarına olacak şekilde düzenlenmesi, küresel düzenin sağlanması hususunda önem arz etmektedir (Ateş, 2006:37). Bu durumun ihmal edilmesi halinde küreselleşmeye dair eleştirilerin de varlığını koruyacağı tahmin edilmektedir. Devletlerin sahip olduğu imkanlar arasındaki dengesizlik yapılan eleştirilerin yerinde olduğu çıkarımını uyandırmaktadır. Nihayetinde küreselleşme, gelişmiş devletler ile, gelişmemiş devletler arasında bir entegrasyona dair yaklaşımı içinde barındırsa da kendi sınırları dışında kalan farklı bölgelerini dışlama yaklaşımını da içeren bir kavram olarak değerlendirilmektedir (Demir, 2001:102). Bu hususların dışında küreselleşme olgusu içerisinde sağlık alanıyla ilgili de birçok faktörü barındırmaktadır. Çalışmanın üzerinde durduğu COVID-19 küresel salgını bunun son dönemlerde en somut örneği olarak kabul edilmektedir. Devletler bu salgınla mücadele edebilmek adına ortak mücadele çabasına girmişlerdir.

3.COVID-19 SALGINI

İlk olarak Çin'in Wuhan kentinde 2019 yılının sonlarına doğru ortaya çıkan koronavirüs salgını zamanla Çin sınırlarını aşarak küresel bir salgın halini almıştır. Dünya Sağlık Örgütü ise 11 Mart 2020 tarihinde koronavirüsü, pandemi olarak duyurmuş ve bunu takiben devletler, temel hakları dahi sınırlayan bazı önlemleri hayata geçirmeyi tercih etmişlerdir (Yürekli, 2020:35). Devletler salgının ortaya çıkmasıyla beraber salgınla mücadeleye dair birçok politika benimsemiştir. Bunlar uluslararası seyahatlerin kısıtlanması, şehirlerarası ulaşımın yasaklanması, sokağa çıkma yasağı, eğitim öğretim faaliyetlerinin online yapılması ve spor müsabakalarının seyircisiz oynanması şeklinde sıralanabilir. Bütün bu kısıtlamalar COVID-19 salgınının bireylerin yaşam biçimini, faaliyetlerini derinden etkilediğini bizlere göstermektedir.

Çin'in sahip olduğu nüfus ve fazlasıyla gelişen ticari faaliyetleri ve sahip olduğu nüfus virüsün hızlı bir şekilde yayılmasını kolaylaştıran bir faktördür. Küreselleşmeyle beraber devletlerin birbirleriyle yapmış oldukları ticaretin de yaygınlaşmasıyla virüsün hızlı bir şekilde yayılması da kolaylaşmıştır. Bu durum bizlere ulusal nitelikteki bir sorunun çok kısa

bir sürede küresel bir yapıya bürünebileceğini ve devletlerden bireylere kadar herkesi derinden etkileyeceğini göstermektedir. Bu salgın gelişmiş devletlerin kamu ve toplumsal bakımdan bulaşıcı hastalıklara ve öngörülemeyen salgınlara karşı yeterli önlemi almadığını bizlere göstermiştir. Koronavirüs, özellikle ABD, İtalya, İngiltere, Fransa ve İspanya gibi ülkelerin ulusal güvenliğine ve uluslararası düzenin işleyişine karşı ciddi bir tehdit olmuştur (Afacan v.d., 2020:3). Nitekim salgın öncesinde bireyler karşılıklı etkileşimin çok fazla olduğu bir dünya düzeninde yaşıyorlardı. Bireyler uluslararası seyahatler yoluyla sınırları rahatça geçebiliyor ve farklı devletlere gidebiliyor ve insanlarla yakın ilişkiler kurabiliyordu. Ayrıca küreselleşen dünyada koronavirüsün insanlar üzerinde oluşturduğu telaş çok daha hızlı bir şekilde yayılabilmektedir. Bu bağlamda salgın yönetiminde dikkat edilmesi gereken önemli bir husus bulunmaktadır. Küresel bir salgında nüfusun kaygı durumu çoğunlukla yüksektir. Koronavirüs salgını esnasında kaosun önlenmesi için hem toplum, hem de sağlık çalışanları için profesyonel destek vermek oldukça önemlidir (Kutlu, 2020:331).

Koronavirüsün tespiti ve salgınla mücadelede gerekli önlemlerinin alınması zaruridir. Bunun için öncelikle, hasta ile temastakilerin izlenmesi ve taranmasına ilişkin uygulamaların hayata geçirilmesi de önem taşımaktadır (Alp v.d., 2020:7). Nitekim virüsün bulaş etkisi göz önünde bulundurulduğunda gerekli önlemlerin alınması ve mücadelenin daha da etkin sürdürülebilmesi için kişilerin hasta olup olmadığına dair tespitlerin yapılması önemlidir.

Koronavirüs olumsuz neticeler yaratan önemli bir tehdit haline bürünmüştür. Söz konusu tehdit beraberinde birçok zararı da getirmiştir. Bunlar; kamu güvenliği, finansal kayıp ve itibar kaybı olarak sıralanabilir (Gül v.d., 2020:1705). Bu üç faktör birbiriyle bağlantılı olarak değerlendirilebilir. Devletler salgının çözümünü hızlı bir şekilde neticelendirememiştir ve koronavirüs salgını zamanla daha büyük boyutlara ulaşmıştır. Bu bağlamda can kayıpları artmıştır ve bireyin can güvenliğini tehdit eden en önemli sorunlardan biri haline gelmiştir. Finansal kayıplar bazında bakıldığında ise devletler ve bireyler salgın döneminde çok büyük sorunlarla karşı karşıya kalmıştır. Uluslararası ticaretin zayıflaması, bunun bir sonucu olarak da bireylerin işsiz kalması, turizm faaliyetlerinin virüsten dolayı engellenmesi gibi birçok problem hem devletleri hem de bireyleri derinden etkilemiştir. Özellikle gelişmiş devletler bireyin temel haklarından biri olan sağlık hakkını önemseyen politikaları bu salgın döneminde pozitif bir şekilde uygulamaya çalışarak koronavirüsün beraberinde getireceği itibar kaybı faktörünü bertaraf etmeye çalışmışlardır. Sağlık hakkı, uluslararası hukuk çerçevesinde koruma altına alınan önemli bir haktır. Bu hak bireylerin ve toplumun her türlü sağlık imkanına erişiminin sağlanması ve bu yolda politikalar üretilmesini kapsar. Sağlık hakkı, hükümetlere çeşitli sorumluluklar da yükler: saygı duyma, koruma ve yerine getirme (Zengin, 2010:44). Devlet öncelikle bireyin haklarına saygı duyarak bireyin lehine uygulamalar geliştirmelidir. Bunu da bireyi koruma çerçevesinde yerine getirmelidir.

Genel olarak COVID-19 olarak nitelendirilen ancak alfa, beta, gama, delta gibi çeşitli isimlerle adlandırılan bu salgınla mücadele, küresel sorunların çözümünde verilen mücadelenin ulusaldan ziyade küresel olması gerektiği ve sorunun çözümünde başarıya ulaşmanın en temel yolunun bu olduğunu bizlere göstermektedir.

3.1.COVID-19 Virüsünün Küreselleşme ve Güvenlik Bağlamında Değerlendirilmesi

Koronavirüs salgınının küreselleşme ve güvenlik ekseninde ele alınması gerekmektedir. Çünkü söz konusu salgın neredeyse bütün devletleri tehdit eden bir boyuta ulaşarak küresel bir yapıya bürünmüştür. Barındırdığı bu nitelikle beraber küreselleşme kavramını da derinden etkilemiştir. Devletler COVID-19 salgını sürecinde ilk olarak kendi ulusal mücadelelerini verme yolunu tercih etmiştir. Nitekim her devlet öncelikle sahip olduğu nüfusu koruma

arayışı içine girmiştir. Bu bağlamda devletler ulusal sınırlarını kapatma, uluslararası uçuşları ve seyahati engelleyen politikaları hayata geçirmiştir. Küreselleşmenin bu denli önem kazandığı dönemde dahi sağlık sorunu nedeniyle devletler bir anda ulusal bağlamda hareket ederek sınırlarını kapatma yolunu tercih etmiştir. Bu durum bizlere küreselleşmenin birçok faktörden etkilendiğini ve sürekli bir değişim içerisinde olduğunu göstermektedir.

Salgının ikinci boyutu ise güvenlik bağlamında ele alınmaktadır. Güvenlik hem devletlerin hem de bireylerin tarih boyunca üzerinde en fazla durduğu hususlardan biri olarak dikkat çekmektedir. Klasik bağlamda güvenlik insanın emniyette olma hali olma hali olarak tanımlanabilir. Ancak subjektif bir kavram olan güvenliğin uluslararası sisteme entegre olan aktörler tarafından algılanış biçimi de farklılıklar göstermektedir. Örneğin bir devletin bulunduğu coğrafya, sınır komşularının niteliği ve askeri gücü, söz konusu devletin uygulamış olduğu iç ve dış politikanın biçimi gibi birçok faktör güvenliğin algılanış biçiminde değişikliklerin oluşmasına neden olmaktadır. Bu nedenle güvenliğin herkes için geçerli net bir tanımının yapılması mümkün olmamaktadır. Ayrıca güvenlik olgusu küreselleşmeyle beraber şekil değiştirerek farklı alanları da kapsayacak şekilde bir derinleşme sürecine girmiştir. Nitekim günümüzde çevre, sağlık gibi birçok başlık güvenlik olgusunun içinde değerlendirilmektedir.

Üzerinde durulması gereken husus, küreselleşmeyle beraber uluslararası sistemdeki aktörlerin güvenliği algılayış biçiminin de değişiklik gösterdiği gerçeğidir. Devletler özellikle Soğuk Savaş'ın bitimine kadar güvenliği klasik bağlamda değerlendirmiştir. Yani devletlerin güvenlik algılamasında askeri faktörler ön planda olmuştur. Ancak küreselleşmenin ivme kazanmasıyla beraber güvenliğin sadece askeri boyutta incelenemeyeceği gerçeği daha belirgin bir yapıya bürünmüştür. Bireysel, sosyal, ekonomik, çevre askeri güvenlik olmak üzere tamamen farklı konuların birine odaklanıldığında konunun diğer başlıkların ihmal edilmemesi gerekmektedir. Zira askeri güvenliğe dair bir hususta sosyoloji, ekonomi, psikoloji ve tarih gibi diğer alanların etkisi göz ardı edilemez. Dolayısıyla güvenlik birbirinden farklı birimlerin, üzerine ortak çalışma gerçekleştirmesi gereken bir konudur (Birdişli, 2021:30). Özellikle küreselleşmeyle birlikte daha da görünür olan, orantısız ekonomik, siyasi ve toplumsal eşitsizlikler çok farklı sorunları da beraberinde getirmektedir. Örneğin uluslararası sistemi tehdit eden en büyük faktörlerden biri olan küresel terör, şimdilerde güvenlik kavramı ve yeni tehditlerin tanımlanmasında en önde gelen başlıklardan biridir (Aksu v.d., 2012:71).

Çalışmanın üzerinde durduğu COVID-19 küresel salgınıyla mücadelede de benzer sorunlar yaşanmıştır. Küresel bir salgın niteliğindeki koronavirüsle mücadelede özellikle üçüncü dünya ülkelerinin ihmal edilmesi ve gelişmiş ülkelerin öncelikle kendi sınırlarını koruyarak sorunun çözümünde yerel politikalar benimsemeleri küreselleşmeye dair bir eleştiri noktasıdır. Çünkü küreselleşmenin geliştiği bu dönemde gelişmiş devletlerin salgına karşı ilk başlarda yerel mücadele etme yöntemini seçmesi aslında küreselleşme ve ulusallık arasındaki çekişmenin sürdüğünü bizlere göstermektedir.

Koronavirüsün tespitinde çok önemli yer tutan testlere üçüncü dünya ülkeleri tarafından erişilememesi ciddi bir sorun olarak durmaktadır. Çünkü sınırların dahi anlamını yitirdiği küreselleşme döneminde uluslararası boyuttaki bir salgında gelişmemiş ülkelerin dışlanması olumsuz bir durumdur. Küresel salgınla mücadelenin de küresel olması gerektiği varsayımı esas alınırsa bu tutumun virüsle mücadelede negatif etki yaratacağı görülmektedir. Ayrıca bireyin haklarının güvence altına alınması ilkesine bağlı olarak kendine yer edinen küreselleşme olgusu gösterilen bu tutumla beraber olumsuz bir sürece doğru ilerlemektedir. Küreselleşme olgusu bireyin bütün haklarını gözetmeyi içerirken, temel haklardan biri olan yaşama hakkının herkes için sağlanması gerektiği ilkesi COVID-19 sürecinde tam olarak sağlanamamıştır. Zira üçüncü dünya ülkeleri ne koronavirüsün tespitini sağlayan testlere ne

de aşıya ulaşamamıştır. Bu açıdan bakıldığında küreselleşme olgusunun bireylere eşit fayda ve imkan sağlamadığı görülmektedir.

Koronavirüs süreci ulus devletlere, bireylere, uluslararası şirketlere küreselleşme faktörünün yekpare düşünülemeyeceğini göstermiştir. Özellikle sürecin sonunda küreselleşmenin ivme kazanarak gelişmesi için COVID-19 salgınında ihmal edilen üçüncü dünya ülkeleri gibi diğer aktörler sisteme entegre edilmelidir. Eşitlik olgusunun sağlanamadığı ve ekonomik anlamda gelişmiş ülkelerin lehine gelişen bir küreselleşme olgusu diğer aktörler tarafından her zaman eleştirilebilir ve buna şüpheyle yaklaşılabilir.

4.SONUÇ

Küreselleşmenin kendine daha fazla yer edindiği ve büyük bir gelişme gösterdiği son dönemde koronavirüs salgınının belirmesi aslında devletlerin ulusallığa vermiş oldukları önemin geçerliliğini koruduğunu göstermiştir. Birçok devlet salgının ortaya çıkışı ve pandemi olarak kabul edilmesiyle beraber öncelikle uluslararası seyahat yasağını uygulamıştır. Bu bağlamda öncelikle ulusal sınırların korunması ve bunun sonucunda güvenliğin sağlanması amaçlanmıştır. Bu durum, küreselleşmeyle ulusal güvenliğin çatışması durumunda devletlerin temel tercihinin ulusal bağlamda hareket etme olduğunu bizlere göstermiştir.

Koronavirüs salgınında dikkat çeken bir diğer nokta özellikle gelişmiş ülkelerin salgınla mücadelede üçüncü dünya ülkeleri olarak adlandırılan gelişmemiş ülkeleri ihmal ettiği gerçeğidir. Bu statüde bulunan ülkelerin çoğu, hem virüsün tespitini sağlayan testlere hem de virüsle mücadelede en önemli faktör olan aşıya erişememiştir. Bu durumu küreselleşme bağlamında değerlendirecek olursak bireyin temel haklarını ön planda tutmasına karşın küresel salgında özellikle gelişmiş olan ülkeler bu bireylerin haklarını ihmal etmiştir. Bu eşitsiz tutum göz önünde bulundurulduğunda küreselleşmeye dair eleştirilerin de varlığını sürdüreceği görülmektedir. Özellikle bireyin haklarının gözetilmesi ve iyileştirilmesi, bireylerin sınırsız özgürlüğü elde etmesi iddiasını dahi içinde barındıran küreselleşme olgusu salgın döneminde bunları gerçekleştirmede başarılı olamamıştır. Bireyin en temel hakkı olan yaşama hakkı dahi COVID-19 sürecinde birçok insanın aşıya erişememesiyle ihmal edilmiştir. Bu tür salgınlarda aşının en temel çözüm olduğu bilinmekle beraber özellikle gelişmiş ülkelerin, ekonomik bağlamda gelişmemiş ülkelerin halklarına bu hususta yardımcı olmalıdır.

Sonuç olarak neredeyse bütün dünyaya yayılan ve bireylerden devletlere kadar uluslararası sistemin bütün aktörlerini derinden etkileyen koronavirüs salgını ve ulaştığı boyut küreselleşmenin durağan bir yapıda olmadığını göstermiştir. Çünkü salgının ilerlemesiyle beraber küreselleşme kavramı ikinci planda tutulmuş ve öncelikle sorunun çözümüne odaklanılmıştır. Ancak dinamik yapıda olan küreselleşmenin salgının bitimiyle beraber tekrar ivme kazanacağı ve gelişme göstereceği çıkarımı olası görülmektedir.

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OSMANLIDA BATIDAN YAPILAN İLK TARİH FELSEFESİ TERCÜMESİ: "TÂRÎH-İ TERAKKİ"

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Özet

Osmanlıda Batıdan Yapılan İlk Tarih Felsefesi Tercümesi: "Târîh-i Terakki" başlıklı bu makalede, Kasım 1879-Şubat 1880 arasında yedi sayı olarak yayınlanan Mecmua-i Ulûm adlı derginin beşinci sayısında "Târîh-i Terâkki" adıyla yayınlanan yazı tanıtılıp değerlendirilecektir. Mecmua-i Ulûm, Cemiyet-i İlmiye adlı bir topluluk tarafından çıkarılmıştır. Topluluğun, ne zaman ve kimler tarafından kurulduğu tam olarak belirlenememekle birlikte, Osmanlı modernleşmesinin önemli isimlerinden Hoca Tahsin Efendi (1813-1881) çevresine toplanmış bir grup tarafından kurulduğu tahmin edilmektedir. Hoca Tahsin'in Mecmua-i Ulum'un çeşitli sayılarında, bilim, bilim tarihi, felsefe tarihi, tarih felsefesi, astronomi tarihi gibi alanlarla ilgili bazılarında adı açıkça belirtilen bazılarında belirtilmeyen birçok makale ve yazı dizisi yer almaktadır. Bunlardan biri de "Tarih-i Terakki" adlı yazıdır. Tarih felsefesi ile ilgili olan söz konusu makalede, sırasıyla Eski Çin, Hint, Yunan, Roma ve semavî dinlerdeki "ilerleme" düşüncesi açıklanmakta ardından birçok 18 ve 19. yüzyıl filozofunun bu konudaki görüş ve tartışmalarına yer verilmektedir.

Bilindiği gibi 19. yüzyıl, felsefe tarihçilerince "tarih yüzyılı" olarak nitelendirilmiştir. Bildiriye konu olan makalede, insanlık tarihinin "tekâmülü" üzerine Batıda gelişen çeşitli tarih felsefesi tezleri Osmanlı kültürüne tanıtılmaktadır. İslam ve Osmanlı dünyasındaki hiçbir tarihçiden söz edilmeden sadece 19. yüzyıl Batılı filozoflar ve görüşlerinden bahseden bu makalenin Batıdan tercüme olduğu anlaşılmaktadır. Kültürümüzde henüz geleneksel tarih ve felsefe anlayışının hüküm sürdüğü bir dönemde mütercimi belirtilmeden yapılan bu çeviri, Batıda ortaya çıkan yeni tarih felsefesi tezlerini tanıtması bakımından olduğu kadar Osmanlıda bu yöndeki ilk tercüme yazı olması açısından da çok önemlidir.

Anahtar Kelimeler: Tarih Felsefesi, Osmanlı, Mecmua-i Ulûm, Hoca Tahsin.

THE FIRST TRANSLATION ABOUT THE PHILOSOPHY OF HISTORY FROM THE WEST IN THE OTTOMAN EMPIRE: "TÂRÎH-I TERAKKI"

ABSTRACT

In this paper titled "The First Translation about the Philosophy of History from the West in the Ottoman Empire: "Târîh-i Terakki"", the article published under the name "Târîh-i Terakki" in the fifth issue of the journal Mecmua-i Ulum, which was published in seven issues between November 1879 and February 1880, will be introduced and evaluated. In the article, which is about the philosophy of history, the idea of "progress" in Ancient Chinese, Indian, Greek, Roman and heavenly religions is explained, and then the views and discussions of many 18th and 19th century philosophers are included.

As it is known, the 19th century has been described as the "century of history" by philosophy historians. In the article, which is the subject of the paper, various historical philosophy theses developed in the West on the "progress" of human history are introduced to Ottoman culture. It is understood that this article, which only mentions 19th century Western philosophers and their views, without mentioning any historian in the Islamic and Ottoman world, is a translation from the West. This translation, which was published without a translator being told at a time when the traditional understanding of history and philosophy was still dominant in our culture, is very important in terms of introducing the new philosophy of history theses that emerged in the West, as well as being the first translated article on the philosophy of history made in the Ottoman Empire from the West. In our paper, we will introduce this the first and the interesting article and try to identify its translator.

Key Words: Philosophy of History, Ottoman Culture, Mecmua-i Ulûm, Hodja Tahsin.

GİRİŞ

Osmanlı kültür hayatı üç döneme ayrılabilir. Bunlar, bilim ve düşünce başta olmak üzere kültür hayatının bütünüyle ortaçağ İslâm kültür geleneğinin çerçevesi içinde kaldığı klasik dönem, Batı kültürünün etkisinin girilmeye başlanan ve bu etkinin gittikçe arttığı geçiş dönemi ve siyasi üstünlüğünün yanı sıra kültürel üstünlüğü de resmen kabul edilen Batının büyük ölçüde model alınarak modernleşme çaba ve mücadeleleriyle geçen yenileşme dönemidir. Klasik dönemi kuruluştan yani on dördüncü yüzyıldan on altıncı yüzyılın sonuna kadar geçen süre, geçiş dönemini ise on yedi ve on sekizinci yüzyıllar arası olarak tarihlendirebiliriz. Gerçekte on sekizinci yüzyılın ikinci yarısına doğru başlayıp bu yüzyılın sonuna doğru ilk uygulamalarının görüldüğünü akılda tutarak yenileşme döneminin de on dokuzuncu yüzyıldan yıkılışa yani yirminci yüzyılın ilk çeyreğine kadar sürdüğünü söyleyebiliriz.[19]

Osmanlıda on sekizinci yüzyılın son çeyreğinde, devlet tarafından açılan askeri mühendislik okulları ve özellikle Mühendishane-i Berrî-i Hümâyûn (1795) ile on dokuzuncu yüzyılın ilk yarısında Tıbbiye, Mülkiye, Harbiye gibi medrese dışı eğitim kurumlarında yetişen kadrolar sayesinde modern bilimler Batıdan Türkiye'ye dolayısıyla İslam Dünyası'na aktarılmaya başlamıştır.[20] On dokuzuncu yüzyılın ikinci yarısına gelindiğinde Osmanlı geleneksel bilim ve felsefe anlayışı tamamen aşılmıştır. Bu tarihten itibaren Batının modern doğa bilimlerinin yanı sıra psikoloji, sosyoloji, antropoloji, psikoloji gibi yeni insan ve toplum bilimleri ile hukuk felsefesi, tarih felsefesi, bilim felsefesi gibi çeşitli alanları, evolüsyonizm ve materyalizm gibi akımları ve Schopenhauer, Nietzsche ve Bergson gibi düşünürleriyle çağdaş Batı felsefesinin de Türkiye gitgide tanınmaya başladığı görülmektedir.[21]

On dokuzuncu yüzyılın ikinci yarısından itibaren Osmanlıda, Batılı tarzda bilimsel topluluklar kurulmaya başlanmış ve bu topluluklar başta bilimsel dergiler olmak üzere çeşitli yayınlar ve faaliyetlerle Batının modern bilim, düşünce ve kültürünü Osmanlı toplumuna

[19] Osmanlı düşünce hayatını, söz konusu periodizasyon içinde, özellikleri, figürleri, sorunları vb. yönlerden belirleyip ilgili metinleri okuyucuya sunarak açıklamak bakımından önemli hatta öncü bir çalışma Demir tarafından yapılıp *Philosohia Ottomanica Osmanlı İmparatorluğu Döneminde Türk Felsefesi* adıyla üç cilt olarak yayınlanmıştır. Klasik dönem Osmanlı düşünce hayatını kitabın birinci cildinden (bkz., Remzi Demir, *Philosohia Ottomanica Osmanlı İmparatorluğu Döneminde Türk Felsefesi Eski Felsefe*, I, Ankara 2005, Lotus Yayınevi), geçiş dönemi Osmanlı düşüncesini eserin ikinci cildinden (bkz., Remzi Demir, *Philosohia Ottomanica Osmanlı İmparatorluğu Döneminde Türk Felsefesi Eski İle Yeni Felsefe Arasında*, II, Ankara 2005, Lotus Yayınevi), son yani yenileşme dönemi Osmanlı felsefe yaşamını da yapıtın üçüncü cildinden (bkz., Remzi Demir, *Philosohia Ottomanica Osmanlı İmparatorluğu Döneminde Türk Felsefesi Yeni Felsefe*, III, Ankara 2007, Lotus Yayınevi) öğrenmek mümkündür.

[20] Remzi Demir, *Philosohia Ottomanica*, II, s. 227.

[21] Remzi Demir, *Philosohia Ottomanica*, III, s. 31-32.

tanıtmayı amaçlamışlardır. Bu topluluklar genellikle devletten bağımsız olarak bir araya gelen kişilerce kurulmakla birlikte üyeleri aralarında yer alan dönemin önemli bürokratları aracılığıyla devletin faaliyetlerini desteklemesini sağlamaya çalışmaktan da geri durmamışlardır. Osmanlıda Türk aydınlarının Batı bilim ve kültürünü yaymak için kendi aralarında kurdukları ilk dernek Petesburg elçisi Halil Bey'in başkanlığını ve Münif Efendi'nin (daha sonra Paşa) liderliğini yaptığı Cemiyet-i İlmiye-i Osmaniye'dir.[22] Batıyı güçlü ve üstün kılan bilimsel bilgiyi telif ve tercüme kitaplar, halka açık dersler gibi çeşitli araçlarla imparatorluğun her köşesine yaymayı amaçlayan derneğin resmi kuruluş tarihi Mayıs 1861'dir.[23] 1865 yılı Ocak ayında maddi sıkıntılar nedeniyle çalışmalarına ara veren topluluk, devletin mali desteği ile 1865 yılı Şubat ayında yeniden çalışmalarına başlamışsa da 1867 yılı Haziran'ında faaliyetine tamamen son vermiş ve üyeleri dağılmıştır.[24]

Derneğin en önemli başarısı, Türk okuyucusunun henüz yabancısı olduğu Batıdaki fizik, kimya, jeoloji, biyoloji gibi pozitif bilimlerle tarih, coğrafya, felsefe, mantık, pedagoji, ekonomi, politika, maliye gibi sosyal bilimler alanındaki incelemelere yer veren bilimsel bir dergi olan Mecmûa-i Fünûn'u yayınlamış olmasıdır.[25] Aylık olarak çıkarılan derginin, Haziran 1862'den Haziran 1867'ye kadar geçen beş yıl boyunca toplam kırk yedi sayısı yayınlanabilmiştir.[26] Derginin Avrupa'da da ilgi uyandırdığı, sözgelimi 1863'te Avusturya'da basılan bir dergide Cemiyet-i İlmiye-i Osmaniye'nin ve Mecmua-i Fünûn'un o zamana kadar çıkmış ilk on sayısı üzerinden değerlendirildiği görülmektedir. Bu değerlendirmelerde, 1863 yılı itibarıyla İstanbul'da yayınlanmakta olan üç bilimsel dergi bulunduğunun, bunlardan Mecmua-i Fünûn'un yazı tipi, sayfa düzeni gibi baskı özellikleri bakımından Fransızca bir derginin izlerini taşıdığının, ayrıca ilk on sayı itibarıyla dergideki yazıların tamamının Avrupa ders kitaplarından alınan temel konulardan oluştuğunun vurgulanması dikkat çekicidir.[27] Dergi, Cemiyet-i İlmiye-i Osmaniye derneğinin eseri olarak yayınlanmış olmakla birlikte hem dernek hem de dergi adeta Münif Paşa'nın (1830-1910) adıyla özdeşlemiştir. Gerçekten hem derneği örgütleyip yıllarca yöneten hem de derginin yöneticiliğini yapıp birinci sayıdan son sayıya kadar en çok yazı veren kişi Münif Paşa'dır.[28] Osmanlıda yayınlanan ilk popüler bilimsel dergi olmak açısından Cumhuriyet Türkiye'sinde çok ilgi çeken ve pek çok bilimsel araştırmaya konu edilen[29] Mecmua-i Fünûn kapanışından uzun süre sonra 1883 yılında Münif Paşa tarafından tekrar çıkarılmak istenmişse de sadece bir sayı yayınlanabilmiştir.

Osmanlı dönemi Türkiye'sinde çıkarılan ikinci bilimsel dergi, Mecmua-i İber-i İntibah'tır. Dergi, Cemiyet-i Kitabet adında hakkında fazla bilgi verilmeyen/bulunmayan bir topluluk tarafından Aralık-Ocak 1862/3 (Receb 1279) tarihinden itibaren yayınlanmaya

[22] Ekmeleddin İhsanoğlu, "Modernleşme Sürecinde Osmanlı İlmi ve Mesleki Cemiyetleşme Hareketlerine Genel Bir Bakış", *Osmanlı İlmi ve Mesleki Cemiyetleri*, İstanbul 1987, s. 8.
[23] Ali Budak, *Münif Paşa*, İstanbul 2001, İmge Kitabevi, s. 173-175.
[24] Ekmeleddin İhsanoğlu, "Cemiyet-i İlmiye-i Osmaniye'nin Kuruluş ve Faaliyetleri", *Osmanlı İlmi ve Mesleki Cemiyetleri*, İstanbul 1987, s. 197-230.
[25] Abdullah Uçman, "Mecmûa-i Fünûn", *Türkiye Diyanet Vakfı İslâm Ansiklopedisi*, Cilt 28, Ankara 2003, s. 271-271.
[26] Ekmeleddin İhsanoğlu, "Cemiyet-i İlmiye-i Osmaniye'nin Kuruluş ve Faaliyetleri", s. 212-213-.
[27] Gaye Şahinbaş Erginöz, "Aylık Türkçe Bilim Dergisi Mecmua-i Fünûn", *Osmanlı Bilimi Araştırmaları*, Cilt X, Sayı 1, İstanbul 2008, s. 186-192.
[28] Ali Budak, *Münif Paşa*, s. XVI.
[29] *Mecmua-i Fünun*'da yer alan doğa bilim yazılarına ilişkin bazı inceleme ve değerlendirmeler için bkz., Bilal Yurtoğlu, "Mecmua-i Fünun'da Modern Doğa Bilimleri", *Kutadgubilig*, İstanbul 2016, Sayı 29, s. 241-278.; Bilal Yurtoğlu, "İbrahim Edhem Paşa'nın Medhal-i İlm-i Jeoloji Başlıklı Makalesi", *Osmanlı Bilimi Araştırmaları*, Cilt 21, Sayı 1, İstanbul 2020, s. 101-149. İbrahim Edhem Paşa'nın *Mecmua-i Fünun*'da yer alan jeolojiyle ilgili uzun tefrikası ayrıca latinize edilip sadeleştirilerek kitaplaştırılmıştır. Bkz., İbrahim Edhem Paşa, *Jeolojiye Giriş* (*Medhal-i İlm-i Jeoloji*), Sadeleştirip Yayına Hazırlayan: Bilal Yurtoğlu, İstanbul 2019, Hiperlink.

başlamıştır. İki ayda bir çıkarılacağı söylenen ancak beşinci sayıdan sonra aylık olarak çıkarılan dergi Haziran-Temmuz 1864'teki (Muharrem 1280) sekizinci sayısından sonra yayınına ara vermiştir. Yaklaşık bir buçuk yıl sonra Ekim-Kasım 1865'te (Cemaziyelahir 1282) derginin adının Mecmua-i İbretnüma olarak değiştirilip dokuzuncu sayıdan devamla ve aylık olarak düzenli biçimde çıkarılmaya başlandığı görülmektedir. Derginin on altıncı ve son sayısı Mayıs-Haziran 1866 (Muharrem 1283) tarihlidir. Açıkça belirtilmemekle birlikte derginin ilk dönemindeki sorumlusunun "Meclis-i Vâla" mütercimlerinden Ali Haydar Bey, ikinci dönem sorumlusunun ise "ser-kâtib-i Meclis-i Vâla" Mahmûd Celâl Bey olduğu anlaşılıyor.[30]

Osmanlıda çıkarılan üçüncü bilimsel dergi Mecmua-i İber-i İntibah'ın yayına başlamasından bir ay sonra Şubat-Mart 1863'te (Ramazan 1279) Tercüman-ı Ahval yazarlarından Mustafa Refik Bey (1842-1865) tarafından aylık olarak çıkarılıp sadece üç sayı neşredilebilen Mirat'tır. Mirat'ın en önemli özelliği Osmanlıda yayınlanan ilk resimli Türkçe dergi olmasıdır. Bunlar Avrupa ülkelerinde geliştirilen ziraat, sanayi ve ulaşım araçlarına ilişkin makine, alet ve cihazların çizimlerinden ibarettir. Tercüman-i Ahval Matbaası'nda basılan derginin üç sayısı toplam yetmiş altı sayfadır. Montesquieu'nun (1689-1755) Romalıların Yükselişi ve Çöküşünün Nedenleri Üzerine Düşünceler adlı eserinde yaptığı tercümelerin burada yayınlanmasıyla Namık Kemal gazeteciliğe Mirat dergisinde başlamıştır. Dergide kullanılan dil önceki ikisinden daha sade bir Türkçe'dir. Şubat-Mart 1863'te açılan Sergi-yi Umumi-i Osmaniye'ye dair haber ve çizimlerin de yer aldığı dergide gazete ve dergilerde fotoğraf kullanımının yanı sıra Ay ve Güneş tutulmasına dair bir makale ve çizimler de yer almaktadır. Daha çok ekonomik kalkınma ve eğitimin gerekliliği üzerinde durulan dergide az da olsa felsefî ve edebî konulara da yer verilmiştir.[31]

Osmanlıda, 1726'da bin bir güçlükle başlayan matbaa faaliyetlerinin on dokuzuncu yüzyılın ikinci yarısına kadar atıl ve adeta yok denecek düzeydeki seyrine paralel olarak, gazete ve dergicilik gibi süreli yayın neşrinin de üç beş yayınla sınırlı şekilde sürdürülmeye çalışıldığı bilinmektedir. Gerçekten Türk dergiciliği 1862'deki Mecmua-i Fünûn'dan biraz önce fakat matbaanın kurulmasından bir asırdan fazla bir süre sonra 1849'da çıkarılan Vakayi-i Tıbbiye ile başlamıştı. Yaklaşık on beş yıllık bir sessizliğin ardından sözünü ettiğimiz üç derginin yayınlandığı 1860lı yıllarda Osmanlı dergicilik faaliyetleri canlanıp 1870'lı yıllarda gelişimini sürdürmüştür. II. Abdülhamit dönemiyle birlikte 1878'de oluşturulan Sansür Heyeti'yle basının özellikle gazetelerin kontrol altına alınması nedeniyle 1879'dan sonra gazetelere oranla dergi sayılarında büyük artış görülmüştür.[32] Bu dergilerden biri de ilk sayısı 16 Kasım 1879'da (1 Zilhicce 1296) yayınlanmaya Mecmua-i Ulum dergisidir. Şimdi makalenin konusuna geçmeden önce, bu konunun yer aldığı söz konusu dergi ve dergiyi yayınlanan topluluk bazı açıklamalarda bulunalım.

MECMUA-İ ULUM VE CEMİYET-İ İLMİYE

Mecmua-i Ulum, Kasım 1879-Şubat 1880 (1 Zihicce 1296-1 Rebiülevel 1297) tarihleri arasındaki dört ay boyunca, İstanbul'da, her ayın biri ve on beşinde olmak üzere ayda iki kez yayınlanmış Birinci Meşrutiyet Dönemi Osmanlı dergilerinden biridir. Kapak sayfalarındaki "eser-i Cemiyet-i İlmiye" ibarelerinden Mecmua-i Ulum'un Cemiyet-i İlmiye adındaki topluluğun yayın organı olduğu anlaşılmaktadır. Sözü edilen topluluğun, ne zaman

[30] Dergi içeriğinin bilimsel ve felsefî önemine dair bir çalışmamız yayın aşamasındadır.

[31] Belkıs Ulusoy Nalcıoğlu , "Türkçe Dergiciliğinin Sancılı Başlangıcı", *Dergicilik Üzerine*, İstanbul 2013, s. 18-23.

[32] Zafer Toprak, "Fikir Dergiciliğinin Yüz Yılı", *Türkiye'de Dergiler Ansiklopediler (1849-1983)*, s. 13-16.

ve kimler tarafından kurulduğu tam olarak belirlenememiştir.[33] Ancak çeşitli sayılarındaki "Tahsin" imzalı yazılara ve dönemindeki etkisine bakılarak Hoca Tahsin Efendi (1813-1881) çevresine toplanmış bir grup tarafından kurulduğu tahmin edilmektedir.[34] Osmanlı modernleşmesinin önemli isimleri arasında yer alan Esad Efendi (ölümü 1731), Hoca İshak Efendi (1774-1834) ve Şemseddin Sami (1850-1904) gibi Yanyalı olan[35] Hoca Tahsin Efendi, ilki 1857-1861 yılları arasında matematik ve doğa bilimlerinde yetiştirilmek üzere, ikincisi ise 1862-1869 yılları arasında sefaret imamı olarak Osmanlı Devleti tarafından iki kez Paris'e gönderildi. İkinci gidişinde Paris'teki felsefe ve bilim çevreleri ile tanışıp 1867 ilkbaharında Paris'e gelen Namık Kemal ve Genç Osmanlılarla ilişki kuran Hoca Tahsin, Tanzimat döneminin üç önemli sadrazamından biri olup Nice'te ölen Keçecizade Fuad Paşa'nın (1815-1869) cenazesiyle İstanbul'a dönmüştür. Aynı yılın Kasım ayında Darülfünun'un kuruluş aşamasında müdür olarak görevlendirilen Hoca Tahsin, Aralık 1870'te yaptığı "Terakkiyât-ı Ulum" başlıklı konuşma İslam dinine uygun görülmeyince görevden uzaklaştırılmıştır. Devam eden saldırıları, kendisini Darülfünun müdürlüğüne atayan Maarif Nazırı Saffet Paşa'nın (1815-1883) himayesiyle atlatan Hoca Tahsin, yukarıda ismi geçen Münif Paşa'nın Maarif Nazırlığı zamanında da kütüphaneler müfettişliği ve Darülmuallimin hocalığı gibi görevlere getirilmiş, tutulduğu verem hastalığının ilerlemesi nedeniyle 1881'de ölmüştür. Hoca Tahsin'in sözü edilen Cemiyet-i İlmiye'nin yanı sıra yine Münif Paşa'nın yardımıyla 1870lerde Memalik-i İslamiye-i Coğrafya Cemiyeti'ni kurduğu bilinmektedir.[36] Hoca Tahsin'in ayrıca Mecmua-i Fünun'da Eylül 1879 tarihli yirmi beş maddelik tüzüğü yayınlanan Cemiyet-i İlmiye-i Arnavudiye'nin[37] de kurucu üyelerinden olduğu anlaşılmaktadır.

Mecmua-i Fünun'un içeriğinden söz etmek gerekirse, doğal olarak derginin asıl bölümlerini bilimsel, felsefî, edebî vb. türde makaleler oluşturmaktadır. Dergide bunun dışında pek çok konu ile ilgili yazılar da bulunmaktadır. Makaleler dışındaki bu yazıları biyografiler, yerli ve yabancı yöneticilere ait nutuklar ve raporlar, yurt dışından ve içinden kültür haberleri, abonelere duyurular ve okuyucu mektupları ve nihayet ilmiye salnamesi adıyla beş başlık altında toplayabiliriz. Dergide 1851 yılındaki Londra Sergisi'ne Osmanlı Devleti'ni temsilen gönderilen heyetin başında bulunduğu söylenen Said Ağa (1814-1867)[38], elli yıl boyunca vezirlik dâhil pek çok devlet görevinde bulunduğu halde öldüğünde hiçbir malı mülkü bulunmadığı söylenen Seyyid Hacı Ali Paşa (1804-1279)[39] ve Mekteb-i Fünûn-ı Mülkiye-i Şahane coğrafya ve istatististik hoca ünlü Andre David Mortman'a (1811-1880)[40] ait üç biyografi yer almaktadır. Derginin çeşitli sayılarında yerli ve yabancı yöneticilere ait nutuklar, açıklamalar ve raporların yer aldığı sekiz yazı bulunmaktadır. Bunlardan Osmanlıdaki alfabe sorununu dile getiren birinci yazı Münif Paşa'nın vaktiyle 12 Mayıs 1862'de üyesi olduğu Cemiyet-i İlmiye-i Osmaniye derneğinde yaptığı konuşmadır. Konuşma aşağı yukarı bir yıl sonra adı geçen paşanın dergisi Mecmua-i Fünun'un Temmuz 1863 tarihli on dördüncü sayısında da yayınlanmıştı. Aynı nutkun bu kez otuz dört yıl sonra Cemiyet-i İlmiye'nin dergisi Mecmua-i Ulum'un üçüncü sayısında tekrar yayınlandığı görülmektedir.[41]

[33] Ekmeleddin İhsanoğlu, "Cemiyet-i İlmiye ve Mecmua-i Ulum", *Osmanlı İlmi ve Mesleki Cemiyetleri*, İstanbul 1987, s. 222.
[34] Adem Akın, *Münif Paşa ve Türk Kültür Tarihindeki Yeri*, Ankara 1999, s. 132.
[35] Remiz Demir, *Philosohia Ottomanica*, III, s. 72.
[36] Ömer Faruk Akün, "Hoca Tahsin", *Türkiye Diyanet Vakfı İslâm Ansiklopedisi*, Cilt 18, İstanbul 1998, s. 198-206.
[37] *Mecmua-i Ulum*, nr. 3, s. 217-219.
[38] *Aynı sayı*, s. 230-234.
[39] *Aynı sayı*, s. 234-236.
[40] *Mecmua-i Ulum*, nr. 6, s. 412-414.
[41] *Mecmua-i Ulum*, nr. 3, s. 219-222.

Fas Sultanı Hasan'a ait olduğu söylenen iki konuşmanın ilkinde[42] Sultan, Avrupa devletlerin ülkeyi sömürgeleştirme girişimlerine karşı topluma birlik olma tavsiyesinden söz ederken ikinci konuşmada Batılılara bazı ekonomik çıkarlar sağlayarak bu tehlikeyi kabul edilebilir bir şekle soktuğunu, bu yolla medenileşip ilerleyeceğini iddia ettiği Fas toplumunun Batılılarla birlikte yaşamaya özen göstermesinden söz etmektedir.[43] Bir başka konuşmada, dönemin ismi belirtilmeyen Sırbistan Eğitim Bakanı'nın eğitimin önemine ilişkin düşüncelerinden ve bakanlıkta düşündüklerini gerçekleştirememek yüzünden istifa ettiğinden söz edilmektedir.[44] Dört kez Fransa başbakanı olmuş Charles de Freycinet'ye (1828-1923) ait iki[45] ve dönemin adı açıklanmayan Fransız demiryolları müfettişine ait olduğu söylenen bir rapora[46] ilişkin üç yazıda ise, Fransa'nın özellikle Afrika'da girişeceği büyük demiryolu projelerinin önemi ve nasıl uygulanması gerektiğinden söz edilmektedir. Bu kategorideki son yazı ise Çar II. Aleksandr'ın (1818-1881) Moskova'daki geçit töreninde yaptığı konuşmanın metnidir.[47]

Yurt dışından ve içinden kültürel haberler kategorisi altındaysa, okuyucuya dönemin Vakit gazetesinden alındığı anlaşılan Rusya, Avusturya, Almanya, İngiltere, Fransa ve Amerika gibi ülkelerdeki çeşitli bilimsel faaliyetler, yayınlar ve kütüphane uygulamalar bildirilmektedir. Derginin üçüncü sayıdan itibaren abonelerini adlarını ve görevlerini bildiren listeler yayınladığı da görülmektedir. Bu listelerde abonelerin sosyal konumları ve derginin takip edildiği bölgeler hakkında fikir edinmek mümkündür. Okuyucuların dergiye gönderdikleri mektuplarda Ahmed Vefik Paşa'nın (1823-1891) Lehçe-i Osmanî'sinde Balıkesir ilinin kuruluşuna dair bilgilerin doğru olup olmadığı[48], hayatın birçok alanına yönelik dinsel referanslı kanunlar külliyatı olup Osmanlıda 1868-1876 yılları arasında hazırlanarak Cumhuriyet döneminde 1926'ya kadar yürürlükte kalan Mecelle ile bir şerhinin bir kanun maddesi üzerindeki çelişkisi[49], Keşkekoğlu Hacı Nuri adındaki birinin Karesi'de yapıp durduğu bir "vakıf hırsızlığı"[50], Sakız gençlerinin Cemiyet-i İlmiye'nin bir şubesini ve kızlar için bir okul açma teşebbüsleri fakat bunun için adanın "gizli ellerdeki" vakıf gelirlerinin derneğe aktarılması girişimleri[51] gibi dönemin sosyal yaşamını yansıtan ilginç durumlardan söz edilmektedir. Derginin üçüncü sayısı tümüyle Darü'l-Hilafeti'l-Aliye'deki eski ve yeni şeyhülislamların, kazaskerlerin, kadıların, müderrislerin adları göreve başlama bitiş tarihleri, mevleviyet ve arpalıkları bildiren bir salnamedir.[52] Bunun Osmanlıda yayınlanan ilk ilmiye salname olduğu söylenmiştir.[53]

Mecmua-i Ulum'daki makalelere gelince, dergide "Reisü'l-Üdebâ Hazretleri", "Kemal Bey Efendi Hazretleri", "Edîb-i Asr Kemal Bey Efendi Hazretleri" gibi büyük saygı ve övgü içeren ifadelerle son dönem Osmanlı edebiyat, düşünce ve siyaset hayatının en önemli figürlerinden Namık Kemal'in daha önce çeşitli yerlerde yayınlanmış "Terakki"[54], "Kıraat"[55], "İmla"[56], "Görenek"[57], "Ahlak-ı İslâmiye"[58], Medeniyet"[59] ve "Aile"[60] başlıklarını taşıyan

[42] *Mecmua-i Ulum*, nr. 2, s. 152-153.
[43] *Mecmua-i Ulum*, nr.4, s. 307-308.
[44] *Aynı sayı*, s. 308-309.
[45] *Mecmua-i Ulum*, nr.1, s. 76-77; nr. 6, s. 414-417.
[46] *Mecmua-i Ulum*, nr. 6, s. 417-418.
[47] *Mecmua-i Ulum*, nr. 5, s. 378-379.
[48] *Mecmua-i Ulum*, nr. 4, s. 305-306.
[49] *Mecmua-i Ulum*, nr.6, s. 431-432.
[50] *Mecmua-i Ulum*, nr. 5, s. 377-378.
[51] *Mecmua-i Ulum*, nr. 6, s. 429-431.
[52] *Mecmua-i Ulum*, nr.3, s. 161-217.
[53] Ekmeleddin İhsanoğlu, "Cemiyet-i İlmiye ve Mecmua-i Ulum", s. 241.
[54] *Mecmua-i Ulum*, nr. 2, s. 153-160.
[55] *Mecmua-i Ulum*, nr. 3, s. 223-228.
[56] Aynı sayı, s. 228-230.

toplam yedi yazısına yer verilmektedir. "Mektebsizlikten Görülen Bela ve Mekteblerin Vücûb-ı Islâhı" adlı yazı[61] Yeni Osmanlılar Cemiyeti'nin üyesi olup kurduğu matbaada bastığı eserler ve çıkardığı dergilerle Osmanlı son dönem edebiyat, düşünce ve kültür hayatının önemli kişilerinden Ebuzziya Tevfik Bey'e (1843-1913) aittir. "Fazilet ve Şeref-i İlm"[62] başlıklı makale o sırada Trabzon Valisi olduğu söylenen son dönem Osmanlı bürokratlarından Sırrı Paşa'nındır (1844-1895). Dergide " Meşveret"[63] başlıklı yazının altında "Muhsin" imzası bulunup hakkında bilgi verilmezken "Müzekkiyu's-Sıbyân"[64] adlı makalenin Adana "hakimu'ş-şer"i Haydar Bey'in olduğu söylenmektedir. Dergideki ilginç yazılardan biri de Tanzimat dönemi Türk edebiyatının önemli isimlerinden filozof meşrepli Ahmet Midhat Efendi'nin (1844-1912) Yeryüzünde Bir Melek (1870) adlı romanın beşinci bölümüne ilişkin edebi eleştiri tefrikasıdır.[65] Derginin "İlme Dair Bir İki Söz" başlıklı ilk makalesi, "ilm" sözcüğü hakkında İslam Dünyası'nda ortaya çıkan anlayışları, ilgili kavramlar, tanımlar, sınıflamalar, ilmin şeref ve fazileti gibi başlıklar altında sunmakta olup kaynakçası "kütüb-i İslâmiyeden müstenbatdır" ifadesiyle açıklanmaktadır.[66] Dergide on yedinci yüzyılın en önemli bilginlerinden Katip Çelebi'nin dönemin Osmanlı toplum hayatını meşgul eden güncel sorun ve polemikleri yirmi bir alt bölümde anlattığı "Mîzânu'l-Hakk fî İhtiyâri'l-Ahakk" adlı eserinin de makale olarak yayınlandığı görülmektedir. İkinci sayısının ilk yazısını oluşturan makalenin sonundaki açıklamalarına göre dergi, bu yayında büyük bölümü Katip Çelebi'nin el yazısıyla yazılmış nüshaya dayanmıştır. Yayın ayrıca, hem yazarın on yedi hem de müellif nüshasına adı belirtilmeyen biri tarafından yazılmış sekiz eleştirel dipnotu içermesi açısından önemlidir. Öte yandan Mecmua-i Ulum'un, on dokuzuncu yüzyılın son çeyreğinde gelindiği halde Osmanlı toplumunda bu sorun ve tartışmaların hala devam ettiğini, bu nedenle Mizânu'l-Hakk'ı en azından "Hatime" kısmına kadar okumanın önemli ve gerekli olduğunu belirtmekle birlikte kendilerini ilgilendirenin asıl noktanın "risalenin imlası" olduğunu vurgulaması dikkat çekicidir.[67]

HOCA TAHSİN'İN MECMUA-İ ULUM'DAKİ MAKALELERİ

Mecmua-i Ulum'daki en kapsamlı, uzun ve daha da önemlisi tümüyle Batı modern bilim ve düşüncesini yansıtan makaleler, Tahsin Efendi'ye aittir. Bu makalelerin bazılarında Hoca Tahsin'nin adı açıkça belirtilirken bazılarının altında imza yoktur. Hova Tahsin'in dergide adı açıkça belirtilen üç makalesi vardır. "Aklâmu'l-Akvâm" adıyla ve "Tahsîn" imzasıyla yayınlanan ilk yazıda Avrupa'daki modern dilbilim çalışmalarından ve konuyla ilgili görüşlerden söz edilmektedir. Makalede "lunguistik", hiyeroglif", "ideografik" gibi yabancı terimler, konuyla ilgilenen birçok Batılı bilginin adı, eserleri, hatta bunların yazılış tarihlerinin yansıra Avrupa ve Amerika'daki kitabeler vs. hakkında bilgi verilmektedir.[68] Beşinci sayıdaki "Süd" başlıklı makalenin "mütercimi Tahsîn" ibaresiyle yayınlandığı görülmektedir. İngiltere'deki bir ziraat okulunda görevli doktor Dolfer adında bir kimyagerin konuyla ilgili bir makalesinden özetleme şeklinde yapıldığı söylenen tercüme yazıda süt, süt

[57] Aynı sayı, s.238-240.
[58] *Mecmua-i Ulum*, nr. 4, s.310-318.
[59] *Mecmua-i Ulum*, nr.5, s. 382-384.
[60] *Mecmua-i Ulum*, nr. 6, s. 425-429.
[61] *Mecmua-i Ulum*, , nr.1, s. 77-80.
[62] *Mecmua-i Ulum*, nr. 6, s. 405-408.
[63] *Mecmua-i Ulum*, nr. 2, s. 127-133.
[64] *Mecmua-i Ulum*, nr. 6, s. 408-410.
[65] *Mecmua-i Ulum*, nr.4, s.244-305; nr.5, s. 335-352; nr. 6, s. 385-405.
[66] *Mecmua-i Ulum*, nr.1, s. 22-45.
[67] *Mecmua-i Ulum*, nr. 2, s. 80-127.
[68] *Mecmua-i Ulum*, nr.1, s. 45-76.

ürünleri, ve tanin, kazein, albümin gibi muhtemelen okuyucunun ilk kez işittiği bazı terimler eşliğinde çeşitli sütlerin kimyasal analizleri hakkında bilgi verilip bilimsel bir anlayışla süt hayvanlarının yediği besinler, ortamlarının temizliği, yetiştirildikleri ortam, süt taşımanın kuralları ve sütün kalitesi arasındaki ilişki vurgulanmaktadır.[69]

Yaklaşık ellişer sayfalık son iki sayısı hariç, her sayısı seksen sayfa olan ve bu kurala titizlikte uyulan Mecmua-i Ulum'un bazı sayılarında okuyucularına dergiyle birlikte on altışar sayfalık iki kitapçık verdiği görülmektedir. Bunlardan biri son sayıdaki Târîh-i Tabîî Kısm-ı Evvel Kuşlar adlı kitapçıktır.[70] "Müstakil Risale" olarak verilen risalenin yazarının Ahmed Hamdi olduğu belirtilmektedir. İkincisi ise, beşinci sayıda "Hasan Tahsîn" tarafından yazıldığı söylenen ve yine "Müstakil Risale" olarak verilen Heyet-i Alem adlı kitapçıktır.[71] Buradaki "Hasan Tahsin ", Hoca Tahsin'dir. Bu eser, ölümünden sonra öğrencisi Nadiri Fevzi, hemşerisi Şemseddin Sami ve muhtemelen Abdülhak Hamit tarafından kaleme alınıp Hoca Tahsin'ini tanıtan giriş mahiyetindeki iki yazı ve mersiyeyle birlikte 1894 yılında İstanbul'da Esâs-ı İlm-i Hey'et adıyla basılmıştır. Hoca Tahsin'in bu eserde, Eski Yunan'dan on dokuzuncu yüzyıla kadar astronomi tarihini anlatırken Kopernik, Tycho Brahe, Kepler, Galilei, Huygens, Cassini, Halley, Newton, Herchel'in gibi bilim tarihinin önemli isimlerinin yanı sıra bazı on dokuzuncu yüzyıl astronomlarının çalışmalarından da kısaca söz ettiği görülmektedir. Eserde tamamen Kopernik yanlısı bir yorumla Kepler'in üç yasasıyla birlikte Newton'un evrensel çekim kanunu da örneklerle açıklamaktadır. Özlü bir biçimde yalın ifadelerle kaleme alınan bu eserle Hoca Tahsin'in, ülkemizde modern astronomi ve kozmografyanın popülerleşmesinde önemli bir rol oynadığı söylenebilir.[72]

Bunların dışında Mecmua-i Ulum'da yazarları açıkça belirtilmemiş olsa da Hoca Tahsin'e ait olduğu hemen anlaşılan üç makale daha vardır. Birincisi derginin iki, beş ve altıncı sayılarında tefrika edilen "Terakki-i Maârif Târîh ve Taksîm ve Semerât-ı Ulûm" başlıklı makaledir. Altıncı sayının sonundaki bölümün sonunda "devamı var" ifadesi yer almakla birlikte yedinci ve son sayıda bu makaleye ilişkin bir bölüm görülememektedir. Bu yazıda on dokuzuncu yüzyılın ünlü "ilerleme" eşliğinde felsefe ve özellikle bilim tarihindeki gelişmelerden ve ana hatlarıyla modern bilimlerin doğuş serüveninden söz edilmektedir. Eski Yunan'da Sokrates (MÖ. 460-399), Platon (MÖ. 427-347) ve Aristo'nun (MÖ. 384-322) temsil ettiği bilim dışı metafizikçi geleneğe karşı Demokritos (Mö. 469-370), Epiküros (MÖ. 341-270) ve Lukretius'un (MÖ. 95-55) bilimsel atomcu geleneğinin bulunduğunu vurgulayan makalede Yunan'da bilimin gelişmesini engel olan bir başka özelliğin de kölelik düzeni olduğunu dile getirmektedir. Bilim ve felsefenin gelişimde İskenderiye Okulu, Ortaçağ İslam Uygarlığı dönemlerinden de kısaca söz edildikten sonra matbaa ve milli dillerin ortaya çıktığı Rönesans dönemindeki gelişmelerden, bilimde yöntemin ve nedensellik anlayışının önemine vurgu yapılarak bir dipnotla modern kimyanın doğuş sürecindeki gelişmelerden ve bu süreçte rol oynayan önemli kimyacılardan bahsedilmektedir. Bilimlerin matematikseli fiziksel ve biyolojik bilimler olarak üç büyük gruba ayrıldığını ileri süren makalede on dokuzuncu yüzyılın son çeyreğinde yirmi yeni bilim dalının doğduğu belirtilmektedir. Makalenin sonuna doğru konu İslâm Dünyası'na getirilerek Müslümanların bu arada Osmanlıların Batıya göre

[69] *Mecmua-i Ulum*, nr.5, s. 370-377.
[70] *Mecmua-i Ulum*, nr 7.
[71] *Mecmua-i Ulum*, nr 5.
[72] Yavuz Unat, "Çağdaş Astronominin Türkiye'ye Girişinde Hoca Tahsin'in Rolü", *Osmanlılarda Bilim ve Teknoloji*, Ankara 2010, s. 509-532. *Esâs-ı İlm-i Hey'et*, aynı yazar tarafından günümüz Türkçesine uyarlanmıştır. Bkz., Yavuz Unat, "Astronominin Esasları Hoca Tahsin Efendi", *Osmanlılarda Bilim ve Teknoloji*, Ankara 2010, s. 533-583.

bilimsel ve düşünsel olarak neden geri planda kaldıklarının sebepleri belirlenmeye çalışılmakta ve çözüm önerileri sunulmaktadır.

"Esrâr-ı Âb u Havâ" adlı makale ikinci makale derginin yedinci ve son sayısında yayınlanmıştır. Hoca Tahsin'in bu makalesi daha sonra 1892 yılında aynı adla ayrı bir kitap olarak da neşredilmiştir.[73] Tanrı'nın bir kimyagere, dünyanın bir kimya laboratuvarına benzetildiği bu yazıda, yine kimya tarihindeki gelişmeler temelinde akarsular, denizler, okyanuslarda bulunan suyun katı, sıvı gaz formlarıyla dünya ve yaşam için ne kadar önemli olduğu oldukça etkileyici bir biçimde anlatılmaktadır. Makalede Hoca Tahsin'in "üstadımız mösyö (Reno) isimli râsıd" ve "muallimimiz Parisli mösyö (Reno)" diyerek Paris'te ders aldığı ve görüşlerine değer verdiği Fransız hocalarından birinin adını zikretmesi hem biyografisi hem de bilim tarihimiz açısından oldukça önemli görülmelidir. "Târîh-i Terakkî" adlı yazıya gelince, tarih felsefesiyle ilgili bu makale derginin beşinci sayısında yer alıp sayı ile gösterilmiş üç bölümden oluşmaktadır. Sonunda herhangi bir isim yer almayan makale birdenbire sonra ermekte ve dergi başka bir yazıyla devam etmektedir.[74] Şimdi bu makalede ortaya atılan görüşler ve makaleye dair değerlendirmelerimize geçelim.

"TÂRÎH-İ TERAKKÎ" YA DA "İLERLEMENİN TARİHİ"

Yayınlandığı dönem yani on dokuzuncu yüzyıl itibarıyla, ilerlemenin bütün dünyada çokça kullanılan ve dillere dolanmış bir kavram olduğu saptamasıyla başlayan makalede, bununla birlikte bu kavramın anlamının açık olmadığı, sözgelimi bazılarının hemen ilerlemekten söz ederken bazılarının da ilerlemekten geçmiş bir döneme geri dönmek gibi birbirine zıt görüşleri anladıkları dile getirilmektedir. Ardından makalenin amacının, sorunun bilimsel bir açıdan değerlendirilmesi için "ilerlemenin bir kanunu var mıdır?, şartları nelerdir?, insani ve toplumsal sonuçları nedir?, erdem mi mutluluk mu?" gibi soruları çözmek değilse de ele almak olduğu vurgulanmaktadır.

Makalenin ilk bölümünde ilerleme idesinin Eski Hint, Çin, İran, Yahudi, Müslüman, Yunan, Roma ve Ortaçağ Hıristiyan kültüründeki görünümüne ve bu konudaki anlayışlara ana hatlarıyla değinildikten sonra kalan iki bölümde on sekizinci ve on dokuzuncu yüzyıl Avrupalı bazı düşünürlerin konuya ilişkin olarak ortaya attıkları görüşler dile getirilip tartışıldığı görülmektedir.

Buna göre, ilerleme eğer insan türünü sahip olduğu bir ide olsaydı insanların bunun hakkında bir bilinci olması gerekirdi. Oysa son derece miskin, atıl ve teorik konuları anlamaktan uzak olan Çinlilerde bu ide yoktur. Aynı şekilde halkı sürekli olarak fakirlik içinde olup geçim sıkıntısı altında bedensel ve ruhsal eziyetlere alışmış Hint'te de ilerleme düşüncesi yoktur. Ancak Mecusîlerde, aydınlık ve karanlık tanrıları olan Hürmüz ve Ehrimen'in mücadelesinde aydınlığın karanlığa üstün geleceği fikri anlamında bir ilerleme düşünce görülmektedir. Dünyayı düşkünlük ve sıkıntı evi sayan Yahudiler Mesih'in gökten ineceği, Müslümanlar ise Mehdi'nin görüneceği düşüncesiyle gelecekteki mutluluk anlamında bir ilerleme düşüncesine sahiptirler.

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[73] Ekmeleddin İhsanoğlu, Ramazan Şeşen, vd., *Osmanlı Tabiî ve Tatbiki Bilimler Tarihi Literatürü,* İstanbul 2006, s. 206.

[74] *Mecmua-i Ulum*'daki "Terakki-i Maârif Târîh ve Taksîm ve Semerât-ı Ulûm", "Esrâr-ı Âb u Havâ", "Süd" ve "Târih-i Terakki" adlı yazıların çevriyazı ve sadeleştirmelerinin yanı sıra derginin içeriğine ilişkin ayrıntılı bir tanıtım ve değerlendirme için bkz., Bilal Yurtoğlu, *Osmanlı Modern Bilim ve Felsefe Metinleri Mecmua-i Ulum Örneği*, Kastamonu 2014.

Yunanlılar tarihin ilerlemesini göksel cisimlerin dairevi veya geri dönüşlü hareketine benzetmişlerdir. İlk söylencelerinden Promethe efsanesinde ilerleme düşüncesinin açıkça dile getirildiği görülmektedir. Makaleye göre, Promethe'nin mağaralarda zamanın geçtiğinin hatta insan olduklarının bile farkında olmadan bilinçsiz bir şekilde balık istifi gibi üst üste yaşayanlara, akıl verip her tür bilgi, bilim ve değerin yanı sıra Tanrı'ya tapınmayı da öğrettiğini söyleyen bu efsanesi, akıl gücünün doğa üzerinde tam olarak egemen olmasıyla insanın mutluluğa ulaşabileceği ileri sürmekle adeta ilerlemenin tarihini göstermektedir. Yine insanın vaktiyle tamamen suyla kaplı olan yeryüzünde balıklara benzer canlıların karaya çıkıp karada yaşamaya başlamasıyla türediğini söyleyen Anaximandros'un (MÖ. 610-547) doğa felsefesi sadece ilerleme düşüncesini açıkça ortaya koymamakta aynı zamanda Darwin'e (1809-1882) atfedilen evrim kuramının zannedildiği kadar yeni olmadığını göstermektedir.

Şair ve hatipleriyle ünlü Roma'da yazılan çirkin ve ayıplarla dolu eserler, insanlığın göçebelikten medeniliğe geçiş sürecinde pek çok hanedanlık yok olurken kendi atalarının egemenliklerini sürdürmelerinin abartılı anlatımlarıyla doludur. Bununla birlikte Horatius'un (MÖ. 65-8) şiirleri, Vergilius'un (MÖ. 70-19) Dördüncü Kasidesi'nin yanı sıra Cicero'nun (MÖ. 106-43) bilimin yeniliğine vurgu yapan, Seneca'nın (MÖ. 4-MS. 65) astronomideki ilerlemeleri ayrıntılı şekilde anlatan nesirleri putperest Romalıların ilerleme ve gelecekteki mutluluk düşüncesinden uzak olmadıklarını göstermektedir.

Politeist Yunan ve Roma döneminde ilerleme idesi daha güçlü şekilde görünmekle birlikte bu kavramın anlamına ve özelliklerine yönelik incelemeler yapılmamıştır. Hıristiyan ortaçağına gelince, cehalet ve rahiplerin zulmünün hâkim olduğu bu dönemde koşullar ilerleme düşüncesinin gelişimine uygun olmamakla birlikte bu fikir tamamen sönmemişti. Makale bu dönemde ilerleme fikrinin görüldüğünü ve ancak bu düşüncenin, İsrail halkından bu yana bilinen Mesih fikrine dayalı İncilî bir tarih felsefesi şeklinde ortaya koyulduğunu belirtmektedir. Bu düşüncenin öncelikle Saint Augustinus (354-430) ve aslında bir modern dönem Katolik düşünür olan Bossuet (1627-1704) tarafından ortaya konulduğu ifade edilmektedir. Görüşün sonraki temsilcileri olarak Hugh of Saint Victor (1096-1141), Saint Thomas Aquinas (1225-1274) ve Roger Bacon'ın (1214-1292) adları zikredilirken sonuncusunun konunun eksiklerini kavrayıp deney ve bilimsel araştırma sayesinde insanın gelecekte ulaşacağı mükemmelliği hiç kimsenin boy ölçüşemeyeceği biçimde önceden gördüğü dile getirilmektedir. Daha sonra, Hıristiyan rahipleri tarafından teslise bağlı olarak ilkinde Baba, ikincisinde Oğul, üçüncüsünde ise Kutsal Ruh yani İncil'in egemen olduğu üç dönemli bir tarih ortaya konulan tarih felsefesinin ortaya konulduğu söylenmektedir. Buna göre ilk dönemde Tanrı, insanlara, korkutma ve cezalandırma kanunu ile hükmederken, ikincisinde onlara olan sevgisi nedeniyle enkarne olup çarmıha gerilerek insanın günahının bedelini ödemiştir. Sonuncusundaysa günahtan kurtulan insan istencinin kendi yasasını koyarak aklın gerçeği her türlü sembollerden arınmış olarak görebileceği Ruh'un egemenliğiyle geçmekte olan İncilî dönemdir. Bunun, aslında Hıristiyanlığa ait genel tarih tezi olmayıp Thomas Aquinas tarafından karşı çıkılıp iptal edilmiş olan, Florisli Joachim olarak bilinen İtalyan Gioacchino da Fiore'nin (1135-1202) görüşü olduğu bilinmektedir.

Makalenin ilk bölümü ortaçağdan gelen ilerleme anlayışının Rönesans ve on yedinci yüzyılda bazı düşünürlerce değiştirilerek ilerleme idesinin bilimsel araştırmalara rehber yapıldığı, on sekizinci yüzyılda ilerleme evren tarihinin tümel ilkesi olarak görülürken on dokuzuncu yüzyılda doğa araştırmalarının ilkesi yapıldığı değerlendirmeleriyle sona

ermektedir. Sözü edilen Rönesans ve on yedinci yüzyıl filozofları Jean Bodin (1530-1596), Francis Bacon (1561-1626), Descartes (1596-1650), Blais Pascal'dır (1623-1662).[75]

Makalenin ikinci ve üçüncü bölümünde esas olarak on dokuzuncu yüzyıl Avrupalı düşünürlerin ilerleme teorilerinden genellikle eleştirel bir tarzda söz edilmektedir. İkinci bölüme Felin, Nicola Marcelli (1822-1899) ve Rujmule adıyla, ikincisi dışındakilerin kimliğini belirleyemediğimiz, üç yazardan söz edilerek başlanmakta ve ardından döneminde çok ünlü olan Fransız eklektik filozofu Victor Cousin'in (1792-1867) ilerleme kuramının eleştirisine geçilmektedir. Buna göre Cousin, insanlık tarihini sonlu, sonsuz ve bu ikisi arasındaki ilişkilere indirgeyen bir görüş ortaya atmıştır. İlkinin örneği Eski Doğu, ikincisinin örneği Yunan ve Roma, sonuncusunun örneğini ise sonraki dönemler oluşturmaktadır. Teorinin sözel etkileyiciliği çok yüksek olmakla birlikte savları belirsizdir. Ayrıca irade, arzu, istek vs. gibi önemli özellikleri varken sadece aklın insanın temel özelliği olarak ileri sürülmesine itiraz edilebilir. Daha önemlisi ne zaman başlayıp ne zaman bittiği belirtilmeyen sonsuz ve sonlu gibi dönemler anlamsız deyimlerdir. Ayrıca Eski Doğu'nun Hint ve Çin uygarlıkları sanıldığı gibi tam olarak sonsuzluk düşüncesiyle meşgul olan kültürler değildir. Sözgelimi Hint'teki Ari kavimler ve Zerdüştîler güçlü bir gerçeği öğrenme arzusu taşıyorlardı ve sömürgeleri olan yerliler vahşilik, barbarlık ve ilkellik içindeyken ilerleme için gerekli düzgün bir zevk ve ahlaki olgunluğa sahiptiler. Yine Çinliler sonsuz varlık incelemeleriyle uğraşmayan dünya nimetleri ve en aşağı duyusal zevklere önem veren ateist maddecilerdir.

Cousin'in teorisindeki bir başka ilke de insanlığın, tıpkı bir bireyin gelişmesi veya bir insanı organının büyümesi gibi geliştiğidir. On sekizinci yüzyıl Avrupa'sında insanlığın bu tür ilerlemesini canlılardan çok Saint Simon (1760-1825), Charles Fourier (1772-1837) ve Pierre Azais (1766-1845) gibi cansız doğanın yasalarıyla açıklamak isteyen düşünürler olmuştur. İlki ilerlemenin, yerin ağırlığının gücünden kaynaklığını ortaya atmış, ikincisi çekim kanununa bağlamış, üçüncüsü ise maddenin yayılma gücünden doğduğunu ileri sürmüştür. Bunlar insanları aldatmak için ortaya atılmış bir takım anlamsız sözlerdir. İlerlemeyi organik gelişmeye benzetmek doğru değildir. Çünkü organizma "mecburen" büyüyüp gelişir. Özgürlük ve sorumluluk sahibi gibi görünen insanlığın ilerlemesi "mecburen" değildir ve birbiriyle kesişen çok yönlü gelişmedir. Bu tür benzetme ve kıyaslamalarda aşırıya kaçmamak gerekir. Sofist Protogoras'ın (MÖ. 482-411) belirttiği gibi insanın kendisini her şeyin ölçüsü gören doğuştan eğiliminden kaynaklanan bu organizmaca görüş, yanlış olmakla birlikte ilerlemeyi genellikle, gençlik, olgunluk, yaşlılık, çöküş şeklindeki dört dönemle açıklamaktadır. Bu görüşün sözgelimi Yunan dönemini çocukluk, Cermen Hıristiyanlık dönemini gençlik, sanayileşmeyi başlatan İngiliz kültürünü yaşlılık dönemi kabul edip gelişmeyi Almanya ile bitiren örnekleri vardır. Gelecekteki ilerlemelerin Fransa, İngiltere ve Almanya ile gerçekleştirileceğini öne süren T. Simon Jouffroy (1796-1842) bu görüşün başka bir örneğini vermiştir. Makalede kimliğini tespit edemediğimiz Fluberus adlı yazardan beri çok artarak savunulduğu belirtilen bu görüşün bir başka örneğine, milletlerin çocukluk çağında silah kullanmaya, olgunluk çağında bilim ve felsefe yapmaya, çöküş dönemindeyse sanayi ve ticarete düşkün olduklarını söyleyen F. Bacon'da da rastlandığı ifade edilmektedir.

Metinde bu görüş çerçevesinde görüşleri açıklanan iki kişi, biri ismi "Arnest", "Ernest" ve "Ernst Lasolkes" şeklinde üç, diğeri de "Nuden" ve "Naden" şeklinde iki kez farklı farklı yazılan düşünürlerdir. Buna göre Naden, her türde, türün bireylerinin sayısı artıkça bölünmeden dolayı azalan bir hayat gücü farz etmiş ve canlı grubun ortadan kalkmasını dışsal ve kozmolojik nedenlerden çok bu hayat gücünün azalıp yok olmasından

[75] *Mecmua-i Ulum*, nr 5, s. 353-357.

kaynaklanan doğal ayıklanmaya bağlamıştır. İlerleme hakkında en ayrıntılı ve dikkat çekici araştırmaları yapan Lasolkes, Naden'in bu görüşlerini kavimler ve uluslara uygulamaya gayret göstermiş, Yunan ve Roma'da olduğu gibi, hayat enerjilerini kaybeden toplumların köhne toplumsal yapılarını canlandıramayıp ortadan kalktıklarını söylemiştir. Bu görüş çok incelikli tezler içerse de tarih felsefesine uygulanamaz. Çünkü toplumların değişik biçimlerde ortaya çıkmasını sağlayan ahlaksal ve kavrayışsal etkiler göz ardı edilmektedir. Nitekim Yunanlılar iç çekişmelerle perişan olmazdan önce asıl ahlaksızlıklarına yenilmişlerdi. Ayrıca yeni kuşakların ortaya çıkması ve eski nesillerin tecrübelerinin sonrakilere aktarmasıyla toplumların enerjisi yenilenir.[76]

Makalenin üçüncü ve son bölümüne coğrafi determinizm denilen görüşün eleştirisiyle başlanmakta ve ilerlemenin insan olmanın özüne hiç uygun olmayan coğrafi özelliklere bağlanmaması gerektiği söylenmektedir. Bu görüş çerçevesinde ilerlemenin etkilerini dünyanın Güneş etrafındaki dönüşüne ya da kutup kutba giden mıknatıs akıntılarına veya doğudan batıya doğru gerçekleştiği gibi görüşler ortaya atılmıştır. Coğrafi şartlar dolaylı etkiler olarak göz önünde bulundurulmalıdır. Ancak ilerlemede öncelikli olanın, özgürlük ve hukuku işin içine sokan insanın aklî ve iradî özellikleri olduğu unutulmamalıdır. Yazıya göre, bu anlayışı başlatan ünlü Montesquieu (1689-1755) olmuştur. Henry Thomas Buckle (1821-1862) bu çığırı tamamlamak istemişse de başarılı olamamıştır. Makalede coğrafi determinizme dayanan ilerleme anlayışının ardından evrim teorisine dayanan ilerleme teorisinin eleştirisine geçilmektedir. Burada Walter Bagehot'un (1826-1877) uygarlığının mükemmelleşmesini ana nedenlerini bu anlayışta bulduğu belirtildikten sonra evrim kuramcı ilerleme teorisinin seleksiyon ve kalıtım kavramları üzerlerinden değerlendirildiği görülmektedir. Buna göre, seleksiyon savaş ve istila demektir. Hâlbuki savaş özü bakımından ilerletici değil yıkıcıdır. Savaşların sağladığı ileri sürülen toplumsal etkileşimin çok daha fazlası yapıcı bir yolla ticaret ve bilginin yayılmasıyla sağlanabilir. Edgar Quine (1803-1875) adlı yazar bu özelliği çok fazla etki gücü yüklerse de kalıtımla getirilen özelliklerin ise eğitim, eğilim ve seçme şekillerine göre zararlı ya da zararlı olmaları mümkündür.

Makalenin son tartışma konusu, şimdiye kadar sözü edilen görüşlerin ilerlemenin bir kanununu ortaya koyamadıklarından hareketle ilerleme ve kanun kavramlarının yan yana gelip gelemeyeceği hakkındadır. Çünkü kanun iki olay arasındaki zorunlu ilişki demektir. Oysa ilerleme özgürlük demektir. Özgürlük ve bireysel irade gerçek olduğuna göre ilerlemenin böyle zorunlu bir kanunu olmamalıdır. Makalede bu görüşte olanlardan birinin "nadir zekâlardan biri" şeklinde nitelediği Charles-Bernard Renouvier (1815-1903) olduğu söylenmektedir. Buna göre bireysel irade özgürdür ve bu özgürlüğü içinde ilerlemenin gereklerini yerine getirir ya da getirmez. İradenin kanuna uymaması kanunu kanun olmaktan çıkarmaz. Nitekim tarih boyunca pek çok ulus ilerleyerek bilim, adalet ve mükemmellik yönünde giderken birçok ulus da milli hayatlarını kendi ayaklarıyla çiğneyerek yok etmişlerdir. Ulusların bu tercihleri bireylerin iyiyi kötüyü tercihleri gibidir. Bu görüş de olanlardan biri de Francisque Bouillier'dir (1813-1880). Makale bu düşünürün görüşlerine özel bir önem atfedilmiş ve yazının son sözü olarak kabul edilmiş izlenimi uyandırmaktadır. Bouillier'in yakınlarda yazıp yayınladığı bir eserinde açıkladığı üzere iradenin bilimi ahlaktır. Bireyin güçlerini nasıl kullanabileceği yalnız ahlak bilimi tarafından öğretilebilir. Bu sayede erdemli kılınan bireylerden oluşan toplum özgür ve bağımsız olur. Özgürlük olmadan ne sanat ne bilim ne de teknik olur. Dolayısıyla ilerlemenin kanunu varsa ahlak kanununa uygun olmalıdır. Yazı kim olduğu belirlenemeyen Selnek adındaki bir düşünürün konuyla ilgili determinist görüşünün reddedilmesinin ardından ilerlemenin sadece toplumların değil

[76] *Mecmua-i Ulum*, nr 5, s. 357-363.

bireylerin de görevleri olduğu ve bunun yerine getirilmesi için de kişilerin akıl ve irade güçlerini geliştirmelerinin onların sorumluluğu olduğu şeklindeki görüşlerle sona ermektedir.[77]

SONUÇ

"Târîh-i Terakkî" adındaki bu yazıda, konunun sunumu sırasında bazı Arapça deyimler kullanılsa da, İslâm kültüründeki hiçbir düşünür veya görüşten söz edilmemektedir. Yazıda tümüyle Batı uygarlığında yer alan filozofların ilerleme teorileri çek genel ve eleştirel bir tarzda anlatılmaktadır. Konu, ilkçağ, ortaçağ Hıristiyanlık ve modern çağın sadece adları zikredilen bazı düşünürleri dışında çoğunlukla on dokuzuncu yüzyıldaki bilimsel gelişmeler ve felsefî görüşler çerçevesinde ele alınmaktadır. Adı geçen on dokuzuncu yüzyıl filozoflarının çoğunun da klasik anlamda sistem kurmuş kişiler değil kurulmuş bir felsefî sistemin izleyicileri ve dönemlerinin popüler düşünürleri olduğu dikkati çekmektedir. Bu kadar çk sayıda ve bir çoğu da çağdaş olan Batılı düşünürün ilerleme gibi oldukça özel bir konudaki görüşlerini ele alan bu makalenin "yazarının ancak bir Batılı olabileceği düşünülebilir. Bundan başka adı geçen Victor Cousin için önce "hala hayatta olan" daha sonra da "bu genç filozof" ifadeleri kullanılmaktadır. Cousin'in ölüm tarihi 1867'dir. Bu durumda makale bu tarihten çok önce yazılmış olmalıdır. Bu makalenin Mecmua-i Ulum'da yayınlanma tarihi ise 1880'dir. Bütün bunlar ve ayrıca üslubu da göz önüne alındığında makalenin Batı dillerinden biriyle yazılmış bir metnin tercümesi olduğuna hükmedilebilir. Ancak metinde makalenin yazarı ya da mütercimi hakkında bir bilgi bulunmamaktadır.

Öte yandan metindeki bir dipnotta, evrim kuramının ulusların yaşamına uygulanmasındaki görüşlerin dolayısıyla Darwinizmin Almanya'daki radikal savunucularından Ernst Haeckel'e (1834-1919) bir atıf yapıldığı görülmektedir. Bu notta Haeckel'in Kainat-ı Uzviyenin Târîh-i Tekvîni adıyla yeni bir eser yazdığı söylenmektedir. Bilindiği üzere bu Haeckel'in Natürliche Schöpfungsgeschichte adlı eseridir. Eser önce Almanca olarak 1868'de Berlin'de basılmış ardından da 1876'da The History of Creation adıyla İngilizceye çevrilmiştir. Bu bilgi 1867'de ölen Cousin için söylenen "hala hayatta" ve "bu genç filozof" ifadeleriyle birleştirildiğinde makalenin yazım tarihinin, söz konusu filozofun ölüm tarihi olan 1867'den önce olması gerekir. Öte yandan 1867'den önce yazılmış bir makalede Haeckel'in 1868'de yazılan eserinden söz edilemeyeceği açık olduğuna göre, Haeckel'den söz eden dipnotun metne onun eserlerini ve görüşlerini çok iyi bilen mütercim tarafından konulduğu anlaşılır. Bu seçenek doğrultusunda düşünüldüğünde makalenin mütercimin de Hoca Tahsin olduğu ortaya çıkar. Zira Haeckel'in Kainat-ı Uzviyenin Târîh-i Tekvîni adlı kitabına benzer şekilde Mecmua-i Ulum yazarı Hoca Tahsin'in de Târîh-i Tekvîn yâhûd Hilkat adlı bir eser yazdığı bilinmektedir. Haeckelci Evrimciliğin Türkiye'ye girişinde öncü rolü oynamış bu eser ölümünün ardından öğrencisi Nâdirî Fevzî tarafından 1893 yılında İstanbul'da yayınlanmıştır.[78]

Son olarak, Osmanlı kültürüne Batı felsefesinin Batı modern biliminden çok daha geç bir dönemde girdiği bilinmektedir.[79] Bu durumun, Osmanlı dönemi dergiciliğine de yansıdığı görülmektedir. Bu dergilerde, çeşitli bilimlere ilişkin pek çok yazı yer alırken, felsefeye ilişkin makalelerin oldukça sınırlı hatta yok denecek kadar az olduğu görülmektedir. Nitekim Mecmua-i Fünûn ve Mecmua-i İber-i İntibâh ya da sonraki adıyla Mecmua-i İbretnümâ adlı

[77] *Mecmua-i Ulum*, nr 5, s. 363-370.
[78] Eserin latinizasyonu ve sadeleştirmesi için bkz., Hoca Tahsin, *Târîh-i Tekvîn Yâhûd Hilkat*, Sadeleştirenler: Remzi Demir-Bilal Yurtoğlu-Ali Utku, Konya 2011.
[79] Remzi Demir, *Philosophia Ottomanica III*, s. 20-21.

ilk iki Osmanlı dergisinde çok sayıdaki bilimsel makaleye karşı Batı felsefesiyle ilgili bir iki yazı veya tefrika vardır. Bunlar da Batı felsefe tarihi ile ilgili daha çok biyografik türde yazılardır. Bu nedenle, Hoca Tahsin tarafından tercüme edilip, Osmanlının ilk dönem bilim-felsefe dergilerinden 1879-80 tarihli Mecmua-i Ulum'un beşinci sayısında yayınlanan ve tarih felsefesi gibi özel bir alanla ilgili olarak, on dokuzuncu yüzyılın başat idelerinden ilerleme kavramına ilişkin olarak Batıda ortaya atılan felsefi teorileri tartışan bu makalenin, Osmanlıda Batıdan yapılan ilk tarih felsefesi çevirisi olduğu rahatlıkla söylenebilir.

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PUBLIC SECTOR FINANCIAL FRAGILITY INDEX: A RESEARCH ON TURKEY

Pınar KOÇ

Abstract

Incremental financial uncertainties and bottlenecks due to the 2008 Global Crisis brought up financial stability and expansionary policies implemented in developed countries caused to increase financial fragility by rising exchange rate volatilities. In this context, A large number of studies on the measure of financial fragility entered the literature. Similarly, it is expected to increase financial fragilities dramatically in the years to come. The aim of this study, covering the period of 2007-2020, is to create a public sector financial fragility index for Turkey in the framework financial instability hypothesis developed by Minsky and analyze how public sector financial fragility has changed during COVID-19. Total public revenues, primary public expenditures and interest expenses are variables used in the study. According to the results of the study, As of the period of 2007-2018 the index values range from 0 to 1 whereas the index values are negative during the pandemic. In this context, the Turkish public sector was based on speculative financing over 2007-2018. However, Ponzi financing is valid for the period after the pandemic. This finding shows that the public revenues can't afford the public expenditures, but, they are enough to cover the interest expenses. The production and income loss during the pandemic caused to decrease the public revenues while increases in health expenditures due to the pandemic, support payments and the growing uncertainty have also considerably increased the public health expenditures. Although the production and income losses stemming from the pandemic are temporary, it is expected that increases in debt burden and the public deficit disturb macroeconomic stability. Income inequality will increase worldwide.

Key words: Financial Instability Hypothesis, Public Sector Financial Fragility Index, COVID-19.

1.Introduction

Covid 19, which was first seen in Wuhan, China, caused the death of many people, and the restrictions imposed to reduce the spread of the disease caused significant production and income losses. The first Covid 19 case in Turkey was observed on 11 March 2020. According to World Health Organization, As of 18.07.2021, the number of people who lost their lives due to covid 19 in Turkey is 50.324 and the total number of cases is 5.493.244. The

restrictions imposed due to the reduction in the rate of spread of the disease caused significant production and income losses. Table 1 indicates the change in growth rates since the quarter of 2019. When Table 1 is examined, while the Turkish economy grew by 4.6% in the first quarter of 2020 compared to the same quarter of the previous year, it shrank by 8.7% in the second quarter of 2020. Because of the increase in normalization efforts in the third quarter of 2020, the economy has again caught a positive growth trend.

Table 1. Growth Rates in Turkey During Covid 19

Country	2019:q4	2020:q1	2020:q2	2020:q3	2020:q4	2021:q1
Turkey	6.3	4.6	-8.7	5.4	5.0	6.7

Source: Quarterly National Accounts : Quarterly Growth Rates of real GDP, change over the previous quarter (oecd.org).

Table 2 shows the change in unemployment rates after the Covid 19 process. The second quarter of 2020 is the period when the most economic contraction is seen in Turkey during the Covid 19 process. In this context, the unemployment rate increased by 0.05 %. Despite the economic contraction, the limited increase in unemployment is largely due to the support of employment and the bans on laying off workers.

Table 2. Unemployment Rates in Turkey in the Covid Process

Ülke	2019:q4	2020:q1	2020:q2	2020:q3	2020:q4	2021:q1
Türkiye	13.23	12.86	13.56	13.33	12.76	12.86

Kaynak: Short-Term Labour Market Statistics : Monthly Unemployment Rates (oecd.org)

According to ILO (2021), the estimated loss of working hours in Eastern Europe and Central Asian countries, including Turkey, varies between 8.5 % and 14.7 %. Many monetary and fiscal policy measures have been taken to minimize production and income losses due to Covid 19. Short-time working pays were introduced, tax payments were deferred, measures were taken to ensure the liquidity flexibility of banks and to regulate the liquidity of government domestic debt securities. Credit support was provided to the real sector and exporting companies were supported. In addition to the measures taken, increases in health expenditures during the Covid-19 process are also expected to increase public expenditures. Table 3 tabulates actual budget expenses in 2019 and 2020.

According to Table 3, while central government renevues are 875 Million TL in 2019, it is over 1 billion TL in 2021. Tax revenues are about 674 milllion TL in 2019 and rose to 833 million TL. Delays in tax payments caused a decrease of approximately 50% in tax revenues, especially in March 2021. Delays in tax payments caused a decrease of approximately 50% in tax revenues, especially in March 2021. Tax revenues fluctuate by depending on the restrictions imposed in 2020.

Table 3. Central Government Budget Realization and Financing

Million ₺	2019	2020												
	Jan-Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Central Government Revenues	**875,280**	**122,170**	**86,136**	**47,443**	**65,243**	**68,143**	**66,272**	**86,529**	**108,566**	**78,916**	**92,766**	**109,746**	**97,559**	**1,029,493**
Tax Revenues	**673,860**	**67,416**	**71,729**	**36,954**	**49,125**	**55,281**	**55,443**	**76,014**	**98,456**	**68,311**	**76,615**	**99,248**	**78,469**	**833,062**
-Direct Taxes	257,140	23,117	37,001	11,107	13,319	28,937	11,942	21,640	43,228	13,410	17,187	41,323	18,928	281,139
-Indirect Taxes	416,720	44,300	34,727	25,847	35,806	26,345	43,500	54,373	55,228	54,902	59,428	57,926	59,542	551,924
Nontax Revenues	**201,420**	**54,754**	**14,407**	**10,488**	**16,120**	**12,864**	**10,830**	**10,515**	**10,109**	**10,604**	**16,151**	**10,498**	**19,090**	**196,431**
Central Government Expenditures	**1,000,027**	**100,669**	**93,499**	**91,162**	**108,443**	**85,446**	**85,643**	**116,225**	**80,345**	**108,580**	**97,658**	**96,316**	**138,250**	**1,202,236**
Personnel Expenditure	249,892	29,222	22,920	23,671	23,915	23,303	22,913	25,771	23,035	25,697	24,345	24,903	18,073	287,769
Social Security Contributions	43,045	4,918	3,891	3,962	3,829	3,875	3,786	4,065	3,879	4,104	3,982	4,107	3,887	48,286
Purchase of Goods and Services	84,363	4,078	7,532	6,733	6,650	5,227	5,368	6,293	5,561	7,575	8,555	11,108	21,720	96,399
Interest Payments	99,940	12,745	14,162	11,340	17,048	9,664	6,297	8,456	11,901	16,209	11,758	9,492	4,889	133,962
Current Transfers	400,316	37,078	37,193	39,466	51,485	35,422	38,485	58,865	30,659	44,605	38,089	34,110	52,533	497,989
Capital Expenditure	80,717	9,183	3,094	3,838	3,659	5,090	7,778	7,817	4,054	6,875	7,529	8,089	25,907	92,911
Capital Transfers	16,316	20	336	438	523	562	407	2,248	317	654	1,269	2,448	5,947	15,171
Lending	25,438	3,424	4,370	1,715	1,333	2,304	608	2,710	939	2,862	2,132	2,060	5,293	29,750
Contingencies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Government Primary Balance	**-24,808**	**34,247**	**6,800**	**-32,379**	**-26,151**	**-7,637**	**-13,073**	**-21,240**	**40,122**	**-13,455**	**6,866**	**22,922**	**-35,801**	**-38,781**
Central Government Balance	**-124,747**	**21,501**	**-7,363**	**-43,719**	**-43,198**	**-17,301**	**-19,370**	**-29,696**	**28,220**	**-29,665**	**-4,892**	**13,430**	**-40,691**	**-172,743**
Deferred Payments	2,062	-3,030	8,558	-3,544	-4,781	1,205	-3,449	-7,122	306	1,411	1,386	711	10,621	2,271
Other Deferred Payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advances	-2,925	8,356	159	-128	206	122	71	-253	285	121	-39	-253	-10,973	-2,326
Central Government Cash Balance	**-125,610**	**26,827**	**1,354**	**-47,392**	**-47,774**	**-15,974**	**-22,749**	**-37,071**	**28,811**	**-28,133**	**-3,544**	**13,889**	**-41,043**	**-172,798**
Central Government Budget Financing	**125,610**	**-26,827**	**-1,354**	**47,392**	**47,774**	**15,974**	**22,749**	**37,071**	**-28,811**	**28,133**	**3,544**	**-13,889**	**41,043**	**172,798**
Borrowing (Net)	**156,951**	**5,880**	**43,550**	**16,965**	**53,515**	**46,335**	**-187**	**50,376**	**39,451**	**-7,612**	**3,023**	**-18,076**	**15,842**	**249,063**
Foreign Borrowing (Net)	31,723	-393	23,963	-688	-491	-16,106	-14,786	128	436	-978	18,343	-4,102	19,605	24,932
-Receipts	66,344	0	24,276	204	29	88	40	507	1,257	41	19,740	1,318	20,397	67,895
-Payments	-34,621	-393	-312	-892	-520	-16,194	-14,825	-379	-820	-1,019	-1,397	-5,420	-792	-42,963
Domestic Borrowing (Net)	125,228	6,272	19,586	17,653	54,007	62,441	14,599	50,248	39,015	-6,634	-15,320	-13,974	-3,763	224,131
-TL Denominated T-Bills	5,705	-1,875	-4,394	0	10,267	7,192	306	0	0	0	-20,086	-5,354	-4,318	-18,261
Receipts	11,201	1,999	0	0	12,266	7,192	2,480	0	0	0	0	0	0	23,937
Payments	-5,495	-3,873	-4,394	0	-1,999	0	-2,174	0	0	0	-20,086	-5,354	-4,318	-42,197
-FX Denominated T-Bills	-113	0	0	0	0	0	0	0	0	0	0	0	0	0
Receipts	1,122	0	0	0	0	0	0	0	0	0	0	0	0	0
Payments	-1,235	0	0	0	0	0	0	0	0	0	0	0	0	0
-TL Denominated G-Bonds	68,667	8,147	7,927	6,250	38,286	35,931	14,293	6,359	-4,895	-6,358	8,957	-8,620	5,930	112,207
Receipts	146,327	27,960	23,901	19,041	42,754	41,852	19,994	21,248	14,683	8,970	12,218	9,233	13,255	255,109
Payments	-77,661	-19,813	-15,974	-12,791	-4,468	-5,921	-5,702	-14,889	-19,578	-15,328	-3,260	-17,853	-7,325	-142,902
-FX Denominated G-Bonds	50,968	0	16,053	11,403	5,453	19,319	0	43,889	43,909	-276	-4,191	0	-5,375	130,184
Receipts	53,189	0	16,053	17,842	5,906	26,821	0	43,889	43,909	0	8,823	0	0	163,244
Payments	-2,220	0	0	-6,439	-453	-7,502	0	0	0	-276	-13,015	0	-5,375	-33,060
Net Lending (-)	**-876**	**0**	**-60**	**-121**	**-18**	**-21**	**0**	**-216**	**-23**	**-118**	**-22**	**-86**	**-410**	**-1,094**
Lending	0	0	0	0	0	0	0	0	0	0	48	0	0	48
Repayment (-)	876	0	60	121	18	21	0	216	23	118	70	86	410	1,142

Source: Republic of Turkey Ministry of Treasury and Finance (2021) Public Debt Management Report January 2021, pp. 2.

Non-tax revenues have reduced 196.4 million TL in 2020 from 201.4 million TL in 2019 and the budget deficit has reached 173 million TL in 2020 from about 125 million TL in 2019. Interest payments and current transfers have the highest share of central government expenditures. Interest payments increased about 30 % in 2020. It is estimated that the increase in current transfers is due to the increase in support payments. As seen in table 3, Net debt

rose to about 40 % in 2020. Increase in net debt stock results from a rise in external domestic debt stock significantly.

Table 4. Public Net Debt Stock

Million ₺	2013	2014	2015	2016	2017	2018	2019	2020 Q1	2020 Q2	2020 Q3
Total Public Sector Net Debt (I-II-III-IV)	**195,784**	**182,940**	**156,965**	**214,003**	**255,114**	**507,134**	**699,977**	**783,671**	**925,704**	**941,073**
I- Total Public Sector Debt Stock (Gross)	**621,428**	**646,065**	**718,060**	**814,605**	**947,451**	**1,170,082**	**1,448,823**	**1,576,316**	**1,757,109**	**1,995,840**
A-Domestic Debt	428,787	439,485	470,224	509,522	589,430	664,985	846,083	890,258	1,064,314	1,196,880
Central Government	403,007	414,649	440,124	468,644	535,448	586,142	755,052	808,768	983,903	1,105,747
Rest of the Public Sector	25,780	24,837	30,100	40,878	53,983	78,843	91,031	81,490	80,411	91,133
B- External Debt	192,641	206,579	247,836	305,082	358,020	505,097	602,740	686,058	692,794	798,961
Central Government	183,186	197,869	238,122	291,307	341,047	480,973	574,002	653,611	657,414	757,154
Rest of the Public Sector	9,455	8,711	9,715	13,775	16,973	24,125	28,738	32,447	35,380	41,807
II- Central Bank Net Assets	**271,110**	**304,360**	**376,246**	**397,053**	**445,479**	**426,300**	**460,677**	**446,211**	**498,445**	**632,653**
Net Foreign Assets	267,400	288,642	315,955	371,076	408,018	478,895	613,427	584,157	575,153	595,266
Other Asset and Obligations (Net)	3,710	15,719	60,292	25,977	37,461	-52,595	-152,750	-137,947	-76,708	37,387
III- Public Sector Deposits	**84,182**	**77,372**	**91,775**	**100,346**	**130,137**	**109,004**	**156,627**	**214,461**	**215,324**	**312,558**
Central Government	45,691	50,592	48,074	48,380	79,823	69,378	105,464	155,292	148,995	248,832
Rest of the Public Sector	38,491	26,779	43,701	51,966	50,314	39,625	51,163	59,169	66,329	63,726
IV-Unemployment Insurance Fund Net Assets	**70,352**	**81,393**	**93,074**	**103,202**	**116,721**	**127,644**	**131,542**	**131,973**	**117,636**	**109,557**
Net External Debt Stock	**-74,759**	**-82,062**	**-68,118**	**-65,994**	**-49,998**	**26,203**	**-10,687**	**101,901**	**117,641**	**203,695**
Net Domestic Debt Stock	**270,543**	**265,002**	**225,083**	**279,997**	**305,111**	**480,932**	**710,664**	**681,771**	**808,063**	**737,378**
Public Net Debt Stock/GDP (%) (2)	**10.7**	**8.9**	**6.7**	**8.1**	**8.1**	**13.5**	**16.2**	**17.5**	**20.7**	**19.8**
GDP	**1,823,427**	**2,054,898**	**2,350,941**	**2,626,560**	**3,133,704**	**3,758,316**	**4,320,191**	**4,468,647**	**4,481,517**	**4,742,939**

Source: Republic of Turkey Ministry of Treasury and Finance (2021) Public Debt Management Report January 2021, pp.18

The share of public net debt stock in GDP has reached 20.7 % in the first quarter of 2020 from 17.5 % in 2019. This share is 19.8 % in the second quarter of 2020. Net external debt stock has increased 40 % in the third quarter of 2020 and reached about 204 million TL from its level of about 102 million TL in the second quarter. An rise in net debt stock stemmed from an increase in high exchange rates significantly. It is expected that the losses of income and production due to Covid 19 increase the financial fragility of public sector. The increase in financial fragility of the public sector disturbs also macroeconomic stability. In this context, in this study, a public sector financial fragility index developed by Terra and Ferrari-Filho (2020) for Brazil based on Minsky's financial instability hypothesis is developed for Turkey and investigates whether the fragility increase during the pandemics. In the available literature, there is no a study investigating the financial fragility of public sector. In this context, it is expected that the study contributes to the literature.

2. Financial Fragility Index

Macroeconomic instabilities and the rate of transmission of crises between countries increased worldwide due to the financial liberalization that took place after the 1990s. (Feijen and Perotti, 2005). Especially after the 2008 global crisis, increasing financial uncertainties and the economic recession in European countries caused the concept of financial stability to

be prioritized. The fact that the losses of income and production due to Covid 19 are higher than economic recession due to 2008 Global Crisis caused the concept of financial fragility to come to the fore again. Minsky (1977) analyzes external factors triggering financial fragilities by emphasizing that the capitalist economic system is inherently unstable. The main factors internal factors that cause instability in a capitalist economy are profits, investment level, the form of the funding of investments and solvency of debts. Minsky (1982) identified as financial fragility as processes caused by sudden decreases in financial assets and capital asset prices compared to current product prices. According to Minsky (1977), profit motive contributes to investments and they are financed by cash flow and borrowing. Increases in investments also rises the profits. The success of firms in financing investments has a decisive importance in the formation of financial vulnerabilities. A firm that fails to finance its investments uses different financial instruments to finance its investments and may choose to sell its assets to maintain the current situation. This situation is the beginning of the financial crisis. The fact that the firm cannot pay its debts causes other creditor firms to experience financial difficulties and have to sell their assets. Restriction of credits due to liquidity shortage affects causes the financial crises adversely affect the real sector and the economic depression begins. According to the financial instability hypothesis, the investments are financed in the framework three different the relationship of debt-income as hedge, speculative and ponzi. Hedge financing means that incomes exceed expenditures. Increases in interest rates do not have negative effects on companies. Speculative financing means that incomes do not cover expenditures. But; the company can to meet its obligations. Ponzi financing means that incomes do not cover expenditures as well the firms cannot to meet their liabilities.

Terra and Ferrari-Filho (2020) estimated the public sector financial fragility index for Brazil based on Minsky's financial instability index hypothesis. Public sector financial fragility index is calculated as follows.

$$\text{Public Sector Financial Fragility Index (PSFFI)} = \frac{\textbf{primary budget balance (PBB)}}{\text{Interest Payments (IP)}} \qquad (1)$$

The form of the financing is determined by depending on ındex value.

PSFFI > 1: hedge financing

0<PSFFI<1: speculative financing

PSFFI < 0: ise ponzi financing

In case of hedge financing, public revenues exceed public expenditures and the government can meet its obligations. In case of speculative financing, central government primary balance are positive. But, the government cannot afford interest payments and needs to be debt financed in the short-term. In case of ponzi financing, public revenues do not cover public expenditures and the government cannot afford interest payments. The government fails to finance its expenditures. It is not possible to control the public debt burden and to implement a successful budget policy unless affordable interest rates and cheap loans are provided (Terra & Ferrari-Filho, 2020: 9-10).

While the production and income losses due to Covid 19 increase the financial fragility at the national level, expansionary policies applied especially in developed countries will cause an increase in exchange rate volatility and financial fragility in developing countries through capital movements. It is expected that the support packages prepared during the pandemic and the reductions in tax revenues increase the budget deficits and the increases in financial uncertainty leads to a liquidity squeeze, increasing the borrowing costs and thus the debt burden of the governments. In this context, the aim of this study covering the period of 2007-2020 is to develop public sector financial fragility index for Turkey and to analyze the impact of Covid 19 on public sector financial fragility index. Sustainability and financing of budget deficits is important for macroeconomic stability. In the available literature, there is no a study analyzing the change in the financial fragility of the Turkish public sector during the pandemic. In this context, it is expected that this study contributes the literature.

3. Literature Review

Falato et al. (2021) analyze the reasons of the financial fragility during Covid 19. Clark et al. (2021) investigate the impacts of the factors such as financial literacy, education, race, age and income shocks on financial fragility.

Chhatwani and Mishra (2021) examine whether financial literacy decreases financial fragility. According to the results of the study, an increase in financial literacy decrease financial fragility.

Dalen and Henkens (2020) investigated the change in the financial fragility of old societies. Demertzis et al. (2020) and Schneider et al. (2020) analyzed the effects of Covid 19 on household financial fragility in EU countries. The results emphasized that income inequality will increase and the utility of unemployment insurance will decrease after pandemics.

Burlamaqui and Filho (2020) analyzed the changes in financial fragility during Covid 19.in the framework of Minsky's financial stability hypothesis. Lusardi et al. (2020) examined the impact of Covid 19 on financial literacy and financial durability. According to the results, there is a strong relationship between financial literacy and financial durability.

4. Methodology and Data Set

In the study covering the period of 2007-2020, a public sector financial fragility index was developed for Turkey and analyzed whether the financial fragility of the public sector increases during Covid 19. In this context, the variables used in the study are given in Table 5. The variables used to calculate the index are primary public expenditures, public revenues and public expenditures. Datasets are annual and compiled from Ministry of Treasury and Finance.

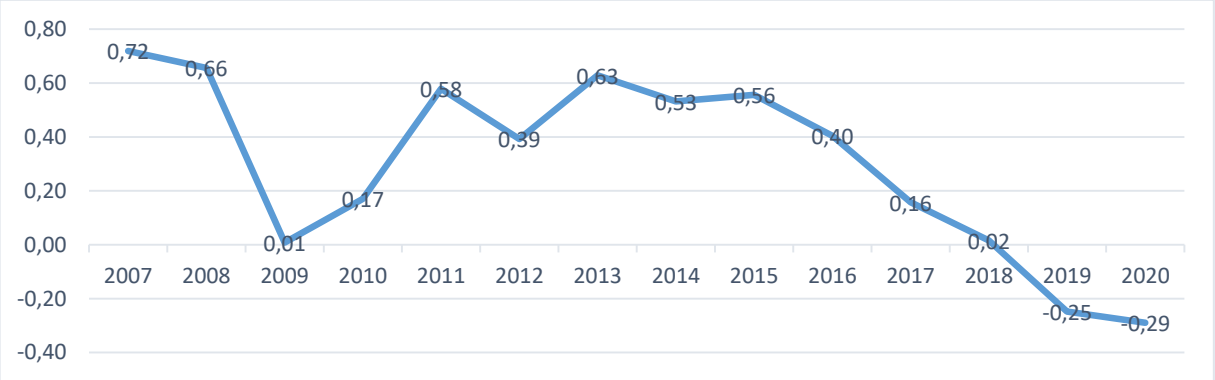
Table 5: Variables and Data Set

Variables	Database	Frequency
Primary Public Expenditures	Ministry of Treasury and Finance	Annual
Public Revenues		
Interest Payment		

Estimation Results

The changes in financial fragility of the public sector for the period of 2007-2020 are given in Graph 1. Public sector financial fragility index values varies from 0 to 1 for the period of 2007-2018. This finding indicates that Turkish public sector is based on speculative financing during the period of between 2007and 2018. Index values are negative during the process of Covid 19. The financial fragility of the Turkish public sector has increased during the pandemics. Ponzi financing is valid for the process of Covid 19.

Graph 1: Turkish Public Sector Financial Fragility Index



Source: Created by author.

5. Conclusion

As of 18.07.2021, the number of people who lost their lives due to covid 19 in Turkey is 50.324 and the total number of cases is 5.493.244. The restrictions due to Covid 19 affected adversely also Turkish Economy. The second quarter of 2020 is period observed the highest economic contraction. While Turkish economy grew 4.6 % in the first quarter of 2020 in comparison with the same quarter of the previous year, fell 8.7 % in the second quarter of 2020.

In this context, unemployment rate increased by 0.05 %. In spite of economic constraction, increase in unemplyment rate is limited because employment is supported and dismissal is prohibited. For all that, estimated working-hour losses due to Covid 19 in Eastern Europe and Central Asian countries, including Turkey varies from 8.5 % to 14.7 %. It is expected that incremental uncertainties in the Covid 19 process increase borrowing costs and financial fragilities in developing countries by causing liquidity squeeze. In this context, in this study, Turkish public sector financial fragility index was calculated for the period of 2007-2020 and whether the financial fragility of public sector increase during Covid 19. The findings indicates that speculative financing is valid for the period of 2007-2018. The financial fragility of Turkish public sector increased significantly due to 2008 global crisis in 2009 and coup attempt in 2017. Ponzi financing is valid after pandemic. Interest payments rised due to incremental uncertainties after the pandemic. In this context, it can be conluded that liquidity squeeze must be solved without turn into a economic crisis. There is need for high-efficiency investments and financing instruments.

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WHO Coronavirus (COVID-19) Dashboard | WHO Coronavirus (COVID-19) Dashboard With Vaccination Data

RY SYMMETRIC ENCRYPTION ALGORITHM

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Abstract

In this study, symmetric coding was developed. Sender and switches in symmetrical lights like imagination. With the movement used in two places on elliptic curves, starting from the rule of finding this point, this rule was used in a way that it would not be used correctly in interceptors either way. as provided in the line equations in the rules. It is also approved to plan to complete two completions. With this skill, symmetric encryption was possible. In our encryption, the ASCII character code of each character to be encrypted is written in the character method of 10 numbers. Random keys of 10 numbers versus those 10 numbers. It will not be the same as two in a 10-number key with 10 representing the ASCII Character Code. In this way, an undefined or peak of the slope is prevented. The important thing here is that two points will be taken as the basis for the process of determining the point and the ASCII Character should be written in the form of the number of pieces. This is simple in use, the ASC Code of the character is written in a numeric form of 10. If the software is writable time book, it can be formed in the form of volumes of an infinite number and different ready-made ones to be paid accordingly. This user departs from their symmetric parsing. In this selection, 10 numbers in the key and 10 numbers representing the character will be chosen from the binary selection from the beginning, so the selection will be applied, so it includes 5 different equations. "A person who finds it encrypted will neither be. Nor will the process of deciphering from its slopes be very complex. The software can be used in the field of symmetric compressions."

Keywords: Slope, Equations of the line, Key, Encryption, Algorithm.

1. Introduction

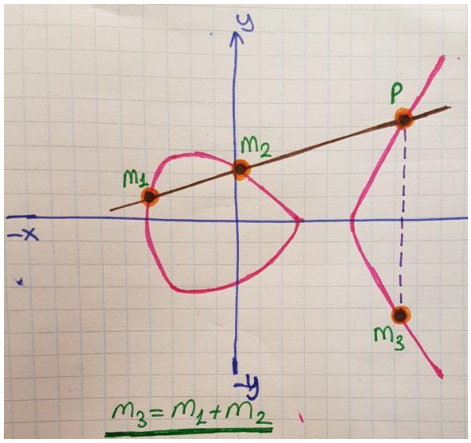


Figure-1: Elliptic Curves

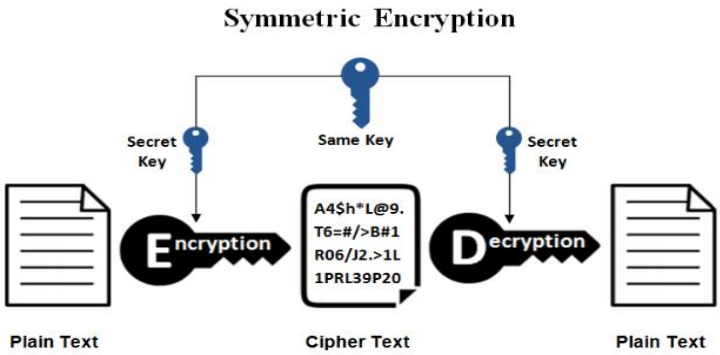
Elliptic Curves, general equation a, b being a real number;

$y^2 = x^3 + a.x + b$. As seen in Figure-1, the coordinates of the $P(x_3, y_3)$ point for the $m_1(x_1, y_1)$ and $m_2(x_2, y_2)$ points taken over the elliptic curves are as follows; Let s be the slope of the line passing through the points m_1 and m_2.

$x_3 = s^2 - x_2 - x_1$ and

$y_3 = s.(x_1 - x_3) - y_1$ are the coordinates of the P point. The $m_3(x_3, -y_3)$ point, which is symmetrical with respect to the x-axis of the P point, is also a point on the elliptic curve (Yücelen, M. 2017)

Then computer coding types were investigated. BCD (Binary Coded Decimal), Octal BCO Binary, Hexadecimal BCH Binary, Decimal BCD, 3 redundancy and Gray encodings are some (Kodaz, H. 2010).



As seen in Figure-2, the same key is used in symmetric encryption algorithms. Algorithms developed so far are DES, AES, Blowfish, Twofish, IRON. Developed by IBM, DES is one of the most widely used symmetric encryption algorithms in the world. Using block cipher, DES encrypts 64-bit data using a 56-bit key during the process. Due to the short length of the key, it was broken in the early 2000s. On top of that, it was developed as Triple-DES, that is, 3DES. 3DES is the use of DES 3 times in a row. In other words, it is 3 times slower than normal DES, but nowadays it is used in applications like SSH. With the introduction of AES, DES lost its popularity. It is already 6 times slower than AES. After DES was broken, a new search was started and AES symmetric encryption algorithm was created in 2001. The weaknesses of DES are fortified and use the block cipher algorithm. It is 6 times faster than AES. It supports keys of 128, 192 and 256 bits in length. It is one of the most popular algorithms today and is thought to be resistant to brute force attacks. Instantly popular for being free, the Blowfish algorithm is one of the fastest encryptions on the market, making it difficult to crack using a complex key schedule. Blowfish has key lengths from 23 to 448 bits. It needs at least 4 kb of RAM to run, which makes it unusable in embedded systems. As fast as AES, Twofish algorithm uses Feistal structure like DES but unlike DES it has S-boxes via key. It processes the texts by breaking them into 32-bit pieces and works as a block algorithm. The different encryption and decryption algorithms slowed down the applications by 5% and increased the cost. Using the Feistel structure, IRON encrypts 64-bit data blocks with a 128-bit key and operates in 16 to 32 cycles. The advantage of this algorithm is that it is used in base 16 numbers instead of bits, and the disadvantage is that it is designed for software (Levi, A. & Özcan, M. 2010). In this encryption algorithm, if desired, bits can be worked according to the Binary system, as in the symmetric encryption algorithms described above.

2. Method

2.1. Providing the Rule of Elliptic Curves in Equations of Lines Intersecting Two Axes

Elliptic Curves, being the general equation, b being a real number; $y^2 = x^3 + a.x + b$

For the points $m_1(x_1, y_1)$ and $m_2(x_2, y_2)$ whose elliptic curves are taken, the coordinates of the $P(x_3, y_3)$ target are as follows;

s, m_1 and m_2 let be the slope of the line passing through the points.

(x_3, y_3) are the coordinates of point P such that $x_3 = s^2 - x_2 - x_1$ and $y_3 = s.(x_1 - x_3) - y_1$

The point $m_3(x_3, -y_3)$, which is symmetrical to the x-axis of the P point, is again on the elliptic curve. Let's prove whether this method satisfies the correct equation.

Let $y = s.x + b$ be our correct equation. ……(1)

If $m_2(x_2, y_2)$ is above the line, it must provide the line.

$y_2 = s.\ x_2 + b$ is $b = y_2 - s.x_2$ ……..(2)

$x_3 = s^2 - x_2 - x_1$

$y_3 = s.(x_1 - x_3) - y_1$ ……(3)

When written instead of x_3 in y_3;

$y_3 = s.(x_1 - s^2 + x_2 + x_1) - y_1 = 2.s.x_1 - s^3 + s.x_2 - y_1$ ……(4)

Let's assume that for the point $P(x_3, y_3)$ the point $P'(x_3, -y_3)$ satisfies the line equation. In this case, let's substitute this point in (1).

$-(2.s.x_1 - s^3 + s.x_2) + y_1 = s.(s^2 - x_2 - x_1) + b$ ……(5)

When (2) is substituted in (5)

$-2.s.x_1 + s^3 - s.x_2 = s.(s^2 - x_2 - x_1) + y_2 - s.\ x_2$ ……(6)

$-2.s.x_1 + s^3 - s.x_2 + y_1 = s^3 - s.x_2 - s.x_1 + y_2 - s.\ x_2$

$-2.s.x_1 - s.x_2 + y_1 = -2.s.x_2 - s.x_1 + y_2$

$s.x_2 - s.x_1 = y_2 - y_1$ ise $s.(x_2 - x_1) = y_2 - y_1$

$s = \frac{y2-y1}{x2-x1}$ equality out.

2.2. Properties of the Rule for Finding the Third Point in Lines Intersecting Axes

As shown in 2.1, the rule used in elliptic curves is valid for lines that cut axes.

Let the third point be $C(x_3, -y_3)$ from the point $A(x_1, y_1)$ with respect to the point $B(x_2, y_2)$. Now let's find the third point from point $B(x_2, y_2)$ to point $C(s^2 - x_1 - x_2 , -s.(x_1 - x_3) + y_1))$. Let this point be $D(x_4, y_4)$. Since points B and C are on the same line, the slope is the same and is "s".

$x_4 = s^2 - x_2 - (s^2 - x_1 - x_2) = x_1$

$y_4 = -s.(x_2 - x_1) + y_2 = -\frac{y2-y1}{x2-x1} . (x_2 - x_1) + y_2 \quad s = \frac{y2-y1}{x2-x1}$

Subtract $y_4 = y_1$. As can be seen, the third point is $A(x_1, y_1)$. In this way, when the third point finding rule is applied, respectively;

It continues as A – B – C – A – B - C-…….. When we examined elliptic curves, we could not find such a feature.

3. Results

3.1. Finding the Third Point from Two Points on a Line

The rule for finding the third point used in Elliptic Curves is also provided in the line equations. In the examinations made, unlike elliptic curves, when the rule of finding the third point for two consecutive points is applied, line equations rewind at three points.

Example 1: When the rule of finding the 3rd point is applied for the line passing through the points A(0,6) and B(-3.0), respectively,

$s = \frac{(6-0)}{(0-(-3))} = 2$

$m_1(x_1, y_1) = m_1(0, 6)$, $m_2(x_2, y_2) = m_2(-3, 0)$

$x_3 = 22\text{-}0\text{-}(-3) = 7$

$y_3 = 2.(0\text{-}7)\text{-}6 = -20$

P (7,-20). The point C(7,20), which is symmetrical with respect to the x-axis, is also on the line.

Now let's find the 3rd point with respect to B(-3,0) and C(7.20).

$s=2$, $m_1(x_1, y_1) = m_1(-3, 0)$, $m_2(x_2, y_2) = m_2(7, 20)$

$x_3 = 22\text{-}(-3)\text{-}7 = 0$

$y_3 = 2.(-3\text{-}0)\text{-}0 = -6$

P(0,-6). The point that is symmetric about the x-axis becomes the point A(0,6). When the third point finding rule is applied to points C and A, respectively, point B comes out.

3.2. Writing ASCII Character Codes as 10 Numbers

The codes of ASCII Characters will be written as the sum of 10 numbers. Here we can behave as we choose when choosing numbers. Choosing the numbers too large makes it difficult to crack the password in encryption and decryption processes. So we can create ASCII Character Codes in infinitely different ways, consisting of 10 numbers.

Example 2: Let's write the letter "A", which is the ASCII Character Code 65, as 10 numbers.

1741, -1917, 511, 112648, -5099, -75896, 199, 48611, -90159, 9426

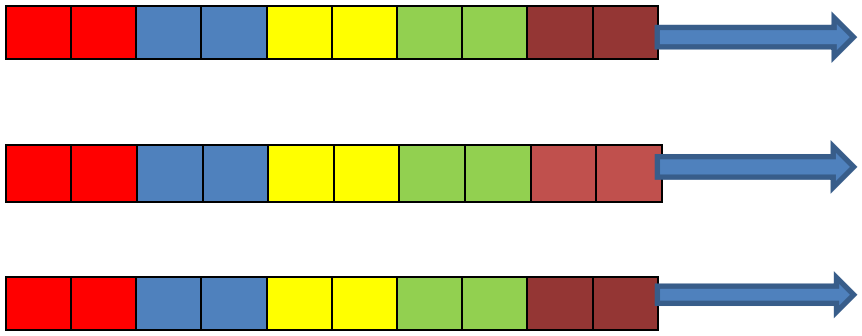
We can choose these numbers ourselves as we like. The sum of these numbers is 65, which is the code for the letter A. When choosing numbers, they can also be selected as fractions or radical numbers. In short, any type can be selected to be different from zero. It can actually be used from scratch. However, the use of two consecutive zeros is not requested because it will mean a straight line passing through the origin, as it is not easy.

3.3. Specifying Numbers for the Key

While generating the key, 10 numbers are randomly selected according to the 10 numbers corresponding to the ASCII Character code. While choosing these numbers, the reciprocal numbers should not be the same. Because if the same numbers happen, the slope for the selected pairs will be zero or undefined. In case of undefined encryption cannot be performed. Encryption becomes very simple if the slope is zero. Other than that, there is no limitation in key generation. Infinitely different keys can be created.

3.4. Encryption Process

In the encryption process, the numbers of the key will be taken as binary and the first points will be. The binary forms of the 10 numbers giving the Code of the Character will be the second dots. When the third points are found according to the points of the key and the points of the character code, the encrypted version of the character is obtained.



The key consisting of 10 numbers is determined as

The 10-digit version of the character code. It will be taken in pairs from the

The 10-digit password that comes out when the third point finding rule is applied according to the character code pairs of the key pairs.

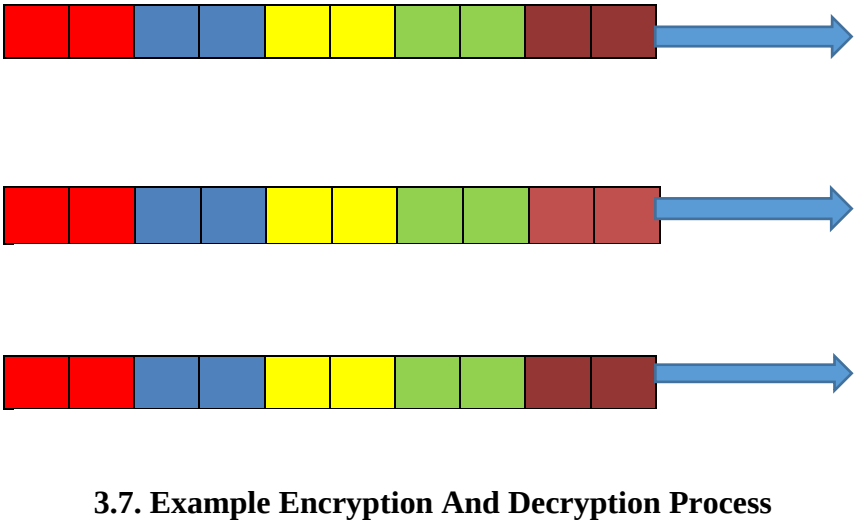
3.5. ASCII Character Code Table

KOD	CHAR	KOD	CHAR	KOD	CHAR	KOD	CHAR	KOD	CHAR	KOD	CHAR

| | | |

3.6. Deciphering Process

When we apply the rule of finding the third point according to the pairs of the key, the 10 digit code of the character will be the 10-number version of the code of a character. When these 10 numbers are collected, the ASCII Character Code of the character will be output and the encryption process will be done.



3.7. Example Encryption And Decryption Process

3.7.1 Sample Encryption

1-) The character to be encrypted is "%". Let's first look at the value of this character in the ASCII Character Code Table. % = 37.

2-) Let's write the version of this character, which will consist of 10 numbers and will be used in encryption. We can randomly pick 10 numbers so that their sum is 37.

Let's have the numbers 11, 3, 1.7, 2, 3, -4, -11, 12, 13.

3-) Let's set 10 numbers that we will use in encryption. While determining these numbers, infinite selection can be made so that the corresponding numbers are not the same by looking at the 10-number character code. The reason why we do not take the reciprocal numbers the same is so that the slope does not come out as zero or undefined. Our numbers on the key;

Let it be 5, 21, 4, 13, 3, 7, 3, 3, 9, 7.

4-) Let's do the encryption by applying the rule of finding the third point by accepting the binary forms of the numbers in the key from the beginning as the first points, and the binary states of the 10 numbers in the character code from the beginning as the second points.

Ordered binaries of sender's key	Ordered pairs of character code
(5, 21)	(11, 3)
(4, 13)	(1, 7)
(3, 7)	(2, 3)
(3, 3)	(-4, -11)
(9, 7)	(12, 13)

s = (21-3)/(5-11) = -3

$m_1(x_1, y_1) = m_1(5, 21)$, $m_2(x_2, y_2) = m_2(11, 3)$

$x_3 = (-3)^2 - 5 - 11 = -7$

$y_3 = -3.(5 - (-7)) - 21 = 1,$

P(-7, -57),

P'(-7, 57)

s = (13-7)/(4-1) = 2

$m_1(x_1, y_1) = m_1(4, 13)$, $m_2(x_2, y_2) = m_2(1, 7)$

$x_3 = 2^2-4-1 = -1$
$y_3 = 2.(4 - (-1)) - 13 = -3$
P (-1, -3)
P'(-1, 3)

s = (7-3)/(3-2) = 4
$m_1(x_1, y_1) = m_1(3, 7)$, $m_2(x_2, y_2) = m_2(2, 3)$
$x_3 = 4^2 – 3 – 2 = 11$
$y_3 = 4.(3 – 11) -7 = -39$
P(11, -39)
P'(11, 39)

s = (3-(-11))/(3-(-4)) = 2
$m_1(x_1, y_1) = m_1(3, 3)$, $m_2(x_2, y_2) = m_2(-4,- 11)$
$x_3 = 2^2 - 3 - (-4) = 5$
$y_3 = 2.(3 - 5) -3 = -7$
P(5, -7)
P'(5, 7)

s = (7-13)/(9-12) = 2
$m_1(x_1, y_1) = m_1(9, 7)$, $m_2(x_2, y_2) = m_2(12, 13)$
$x_3 = 2^2-9-12 = -17$
$y_3 = 2.(9-(-17))-7 = 45$
P (-17,45)
P'(-17,-45)

Now, when we write the found pairs in order, -7, 57, -1, 3, 11, 39, 5, 7, -17, -45, that is, the encrypted form consisting of 10 numbers comes out.

3.7.2. Example Decipher

Let's take the password of the encrypted character consisting of 10 numbers again as binary and apply the third point finding rule with the receiver's key. The important thing here is that the first point of the encrypted binaries is the second point of the binary version of the receiver's key. The third point formed in this way will again be the 10-point version of the character.

Binary version of the encrypted character's password	**Binary state of the receiver's key**
(-7, -57)	(5, 21)
(-1, 3)	(4, 13)
(11, 39)	(3, 7)
(5, 7)	(3, 3)
(-17,- 45)	(9, 7)

s = (57-21)/(-7-5) = -3
$m_1(x_1, y_1) = m_1(-7, 57)$, $m_2(x_2, y_2) = m_2(5, 21)$
$x_3 = (-3)^2 – 5 – (-7) = 11$
$y_3 = -3.(-7 -11) – 57 = -3$
P (11, -3)
P'(11, 3)

s = (3-13)/(-1-4) = 2
$m_1(x_1, y_1) = m_1(-1,3)$, $m_2(x_2, y_2) = m_2(4, 13)$
$x_3 = 2^2 - (-1) - 4 = 1$
$y_3 = 2.(-1 -1) – 3 = -7$

P (1, -7)

P'(1, 7)

s = (39-7)/(11-3) = 4

$m_1(x_1, y_1) = m_1(11, 39)$, $m_2(x_2, y_2) = m_2(3, 7)$

$x_3 = 4^2 - 11 - 3 = 2$

$y_3 = 4.(11 - 2) - 39 = -3$

P (2, -3)

P'(2, 3)

s = (7-3)/(5-3) = 2

$m_1(x_1, y_1) = m_1(5, 7)$, $m_2(x_2, y_2) = m_2(3, 3)$

$x_3 = 2^2 – 5 – 3 = -4$

$y_3 = 2.(5 - (-4)) -7 = 11$ olur.

P(-4,11)

P'(-4, -11)

s = (-45-7)/(-17-9) = 2

$m_1(x_1, y_1) = m_1(-17, -45)$, $m_2(x_2, y_2) = m_2(9, 7)$

$x_3 = 2^2 – 9 - (-17) = 12$

$y_3 = 2.(-17 -12) - (-45) = -13$

P(12, -13)

P'(12,13)

When we write the found pairs in order, the 10-number version of the character code;

11, 3, 1, 7, 2, 3, -4, -11, 12, 13. When we add these numbers together;

11+ 3+ 1+ 7+ 2+ 3 + (-4) + (-11) + 12 + 13 = 37 subtracts ASCII character in this number is the code of the character "%" in the Code table. In this way, the characters of all text can be encrypted and decrypted.

4. Conclusion and Discussion

The following results were obtained from this study.

• The rule for finding the third point from two points in elliptic curves is provided for lines that intersect both axes. Also, unlike elliptic curves, it rewinds at three points. Due to this feature, key generation is provided.

• The reason for using ASCII Character Code Table in this encryption algorithm is that it can be used worldwide when the software is made.

• The ASCII Character Code of each character to be encrypted can be found as the sum of 10 numbers. This feature allows a character code to be written in infinitely different ways. These 10 numbers can be written as fractions or as irrational numbers if desired. In the end, it is sufficient to give the totals character code.

• If you want to write the character code with Binary system digits instead of 10 numbers, 256 digits or more must be used. Because ASCII Character Code is maximum 255. Therefore, if only 1 is used, 255 digits are required. When it is done in this way, the number of zeros will be high for small codes, and the encryption can be decrypted because the lines from the origin will be more when the key is used. In order to overcome this problem, if two consecutive numbers are written as 01, 10, 11 instead of 00, the problem will be overcome. It is recommended not to use the digits of the Binary system.

• When the numbers to be selected when creating the key are matched with the numbers coming from the character code, it provides endless selection rights, provided that they are not the same. The numbers in the key can be either fractional or irrational.

• The most important rule in this encryption is that the key of the message sender finds the third point according to the character code. It won't work if it's reversed. If this is explained as follows, let the key of the message sender be point A and the code of the

character to be sent be point B. Let C be the third point of point A relative to point B. Point C will be the ciphertext. The point from the rule of finding the third point of point C with respect to point A will be point B. The point to be encrypted was already point B. We created this by making use of the three-point rewind feature in the line equations.

A → B → C →A → B

As you can see, it wraps around at three points.

• If the point B to be encrypted in encryption was encrypted according to the key point A;

It would be B → A → C → B → A. In this case, the essential point B could not be obtained.

• One of the most important features of this algorithm is that the character code to be encrypted can be written as the sum of as many numbers as desired. It can also be encrypted by creating 250 numbers if desired, provided that the total is given the character code. This number can be adjusted to infinity, thus making it difficult to break the encryption and decryption process as the length of the key will increase.

• One of the most important features of this algorithm that makes it safe is that since the line equation formed in each pair will be different, the slope will be different. Therefore, a person who wants to analyze has only one point in his hand. Since it will be an infinite line passing through a point, it will have to process forever. If the key consists of 3000 numbers, it will be tried to find the equation of 1500 lines.

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"EXAMINATION OF MULTIPLE ANTIBIOTIC RESISTANT STAPHYLOCOCCUS AUREUS AND STREPTOCOCCUS PNEUMONIAE ISOLATED FROM PHARYNGITIS PATIENTS"

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Abstract

Multiple antibiotic resistance (MDR) is a growing problem, this study emphasis the rate of antibiotic resistance of Staphylococcus aureus and Streptococcus pneumonae isolated from throat region of 200 pharyngitis patients. S. aureus was identified 130 (65%) cases and S. pneumonae in 185 (92.5%) of cases with higher rate of MDR status 100% for each of them. Furthermore, S. aureus was resistant to Ampicillin (92.5%), oxacillin and clindamycin (87.05%) while, S. pneumonae was resistant to Amoxicillin (79.6%), and to Clindamycin (67.3). These results showed the higher state of antibiotic resistance for bacterial communities isolated from throat region reflecting a higher need for more selective treatment with antimicrobial drugs.

Keywords: antibiotic resistance, Streptococcus pneumoniae, Staphylococcus aureus

Introduction

Resistant Staphylococcus aureus and Streptococcus pneumoniae can lead to serious diseases. Pharyngitis is an inflammation of the throat region. It is considered as one of the most common reasons for physician's consultation (1). As a result of upper respiratory tract infection, pharyngeal infection may occur primary or secondary usually preceded by viral infection. Among many infectious causes for pharyngitis Staphylococcus aureus and Streptococcus pneumonae were the most common isolated bacteria. The clinical management is still difficult and the treatment is still controversial. The clinical diagnosis is not specific, laboratory diagnosis could be misleading (2). Some patients failed to achieve complete response (clinical and/or microbiological) for treatment with antimicrobial drugs. It is possibly due to low concentration of antibiotics in tonsillar tissue and less diffusion of antibiotics (3,4).

Recurrent pharyngitis refractory to penicillin therapy considered as a major medical problem. This has been suggest due to the penicillin resistant among the pharyngeal flora.

Aims & Objective: To determine the antimicrobial sensitivity pattern of the common bacterial isolates in the pharyngitis patients

.

Materials and methods

Study setting and study period

Hospital based cross sectional study conducted on adult with pharyngitis

attending ENT consultant clinic of Medical City during the period between (20th November 2017 to 30th May 2018). The study population was 200 patients who had suspected throat infection in ENT clinic.The mean age of patients was 17.42 ± 15.55years. 120 (60%) were males and 80 (40%) were females. Sociodemographic, age, sex, previous infection and previous treatment history are considering as independent variables while growth of staphylococcus aureus, Streptococcus pneumonae isolates and antimicrobial susceptibility pattern (susceptible, resistance, intermediate) are considering dependent variables in this study.

Sample collection

Throat swab samples were collected using a sterile swab stick from patients with pharynges infections. The ear swab sample was sent to the laboratory. Upon receipt sample was inoculated on Blood agar and Manitol Salt agar (Oxoid Company) plates and incubated at 37 °C aerobically. The swab was smeared on slide and then gram stained and examined microscopically Characterization of isolated bacteria after 24 hours incubation, bacteria isolates were characterized based on colonial appearance on Manitol salt agar and blood agar media. Gram stain was done to determine Gram reaction and bacterial morphology. After gram staining those colonies shown to be gram positive cocci were subjected to further biochemical tests. Then the grown colony on primary culture media was sub-cultured on to nutrient agar to get pure colony which is suitable for biochemical test. Biochemical tests carried out were catalase and coagulase tests. Those catalase enzyme negative were considered as coagulase negative Staphylococci and coagulase test positive were considered as S. aureus and gram positive encapsulated diplococci were considered as S.pneumoniae.

Antibiotic discs:

Antimicrobial sensitivity testing Antibacterial susceptibility testing was

performed for all isolates according to the criteria of the Clinical Laboratory Standard Institute (CLSI) by disc diffusion method (5). From a pure culture 3–5 selected colonies of bacteria were taken and transferred to a tube containing 5 ml nutrient broth and mixed gently until a homogenous suspension was formed and incubated at 37 °C until the turbidity of the suspension became adjusted to a McFarnald 0.5. A sterile cotton swab was used and the excess suspension was removed by gentile rotation of the swab against the inside surface of tube. The swab was then used to distribute the bacteria evenly over the entire surface of Mullen-Hinton agar. The inoculated plates were left at room temperature to dry for 3–5 minutes and a set of antibiotic discs such as About 21 antibiotic discs were used in the current study, Ampicillin (Amp 10 µg), Amikacin (AK 30 µg,(Azithromycin (AZM 15 µg), Amoxicillin (AMC 20/10 µg), Bacitracin (B 0.04 I.U), Ceftriaxone (CRO 30 µg), Chloramphenicol (C 30mg), Clindamycin (CD 2 µg), Cefotaxime (CTX 30 µg), Erythromycin (E 15 µg), Gentamicin (GEC 10µg,(Imipenem (IMP 10 µg), Lincomycin (L 10 µg), Amxoyclav (AMC 30 µg,(Quinupristin-dalfopristin (SYN 15 µg), Tetracycline (Tet 30 µg,(Trimethoprim+sulfame (SXT 1.25 / 23.75 µg), Telithromycin (TEL 15mg,(Vancomycin (V 30µg), Oxacillin (Ox 30 µg) and Rifampin (RIF 5 µg) were dispensed. The inoculated plate then incubated at 37oC for 24 hrs.

Statistical Analysis: Data analysis Data was entered and analyzed using SPSS version 22. Descriptive analysis such as frequencies and mean was used. Multiple antibiotic resistance (MAR) index was determined by following the procedure described by Krumperman (6). A MAR index for an isolate is calculated as: number of antibiotics to which isolate is resistant/ total number of antibiotics against which isolate was tested. P-value of < 0.05 was considered statistically significant. The results were presented using tables.

Results

Characteristics of patients:

Among two hundred pharyngitis patients, Patients who had been ill for more than one weak were 120 (55)%(while those with longer duration of the disease (>7 days) were 90 (45%). The ratio of antibiotic use is about 70% use the antibiotic while 30% of them are not use as show in table 1

Table 1: clinical characteristics of patients

		Symptomatic pharyngitis
Duration of illness (>7 days)	≤7 days 7days≥	90(45%) 110(55%)
Antibiotic use	Yes no	140(70%) 60(30%)

)N=200(

Antibiogram profile for S. aureus and S. pneumonae isolated from Pharyngitis :

S. aureus was identified 130 (65%) cases and S. pneumonae in 185 (92.5%) cases as the major causes of pharyngitis. Accordingly, S. aureus identified together with S. pneumonae in 131 of cases.

In general, S. aureus isolates revealed (6.98-92.80%) level of resistance against tested disks of antimicrobials. In the determination of the susceptibility of S. aureus on nine selected antibiotics by disk diffusion technique, the highest rate of resistance observed against Ampicillin (92.80%), followed by oxacillin and clindamycin (86.08%) of the isolates. A lower level of resistance was observed to Tetracyclin (6.98%) and Gentamycin (14.44%) (Figure 1).S. pneumonae isolates were almost resistant to Amoxicillin (79.6%), and to Clindamycin (67.4%), with moderate resistance to Ceftriaxon (52.1%) and Impenim (48.6%). The lower resistance found in Tetracyclin and Azthromycin . (Figure 2).

Multi-drug resistance in this study was taken as resistance to more than one of the antimicrobial drugs tested. Multidrug-resistant (MDR) status of S. aureus isolates were tested against ten classes of antimicrobials. Accordingly, the overall rate of MDR was 100%, all of the isolates was found to be resistant to more than two tested antimicrobials, in the same time S. pneumoniae were 100% possess MDR state. Table 2.

Table2: Antimicrobial resistance pattern for isolated S. aureus and S. pneumonae from pharyngitis patients.

Resistance pattern	Pneumoccoci	%	Staphyloccoci	%
1	6	3%	-	-
2	7	3.9%	8	4%
3	24	12%	2	1%
4	27	13.5%	23	11.5%
5	55	27.5%	20	10%
6	41	20.5%	25	12.5%
7	13	6.5%	24	12%
8	12	6.6%	15	7. 5%
9	-	-	10	5%
10	-	-	1	0.5%
11	-	-	2	1%
Total	185	100%	130	100%

Discussion:

This study focused on two commonly pharyngitis associated bacterial Overgrowth. Nasopharynx colonization by resistant Staphylococcus aureus and Streptococcus pneumoniae can lead to serious diseases. Emerging resistance to antibiotics commonly used to treat infections due to these pathogens poses a serious threat to the health system(7). The results showed that higher rates of S. aureus was identified 130 (65 %)cases and S. pneumonae in 185 (92.5%) cases. Based on several studies documented the colonization of S. aureus and S. pneumonae in pharyngitis among children 7–9 and / or adults10. Others suggests a higher role of S. aureus biofilm formation and development of multiple drug resistance state and might account for 41-85% of pharyngitis patients (11). Our results revealed a higher rate of isolation of these bacteria suggesting a higher degree of colonization and multidrug resistance with chronic pharyngitis. According to the recommendation of Clinical and Laboratory Standards Institute for testing of antibiotics sensitivity(5) and Central Public Health Laboratory working reference the researcher tested antibiogram profile for S.pyogenes, S. aureus and S. pneumonae. The results showed that S. aureus and Spneumonae reported as multi drug resistant presented in the throat region among adult pharyngitis patients. This may explain the chronicity and unresponsive to treatment with antibiotics (13–15). The majority of pharyngitis cases caused by wide range of viral etiologies when tonsillar exudate and fever are absent, so patients do not receive antibiotics (16) The same presentation could be displayed by S. pneumoniae throat infections without considerable attention (17)S. pneumoniae antibiotic resistance has become world-wide problem, with increasing in fluoroquinolone and macrolide resistance(18). Macrolide resistance in S. pneumoniae is generally caused by the genes ermB or mefA. ermB encodes a 23S methylase. The mefA gene encodes an efflux pump that is responsible for resistance to only 14- and 15-membered-ring macrolides(19.) In another hand, QRDRs (quinolone resistance-determining regions) of the genes (particularly parC and gyrA) encoding the A and B subunits of DNA gyrase and topoisomerase IV were responsible for Fluoroquinolone resistance in Pneumoniae (20,21).

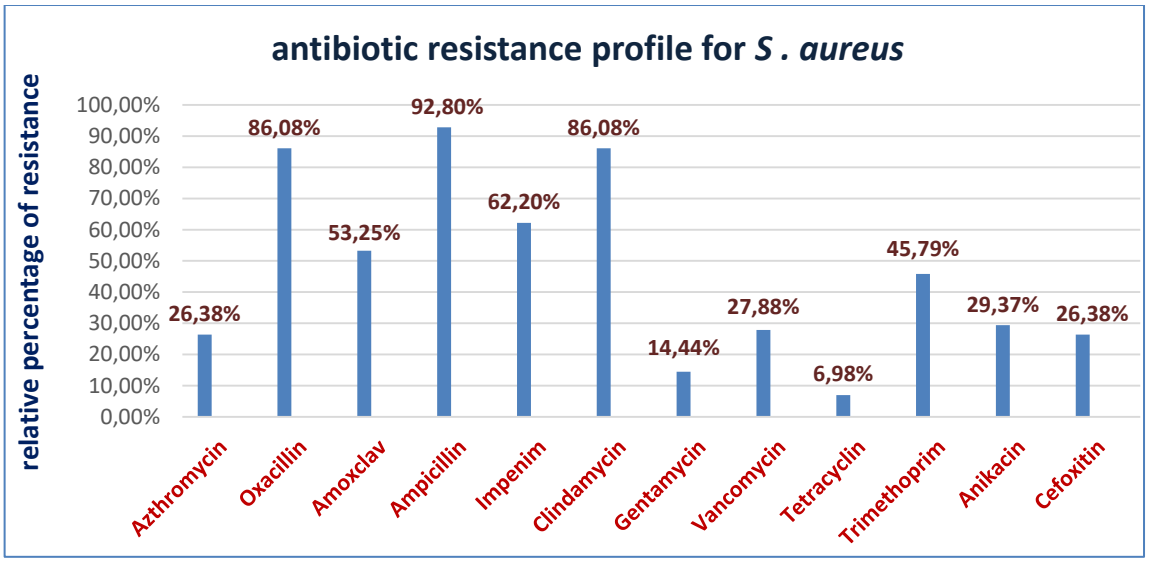


Fig1 : antibiotic resistance profile for S. aureus

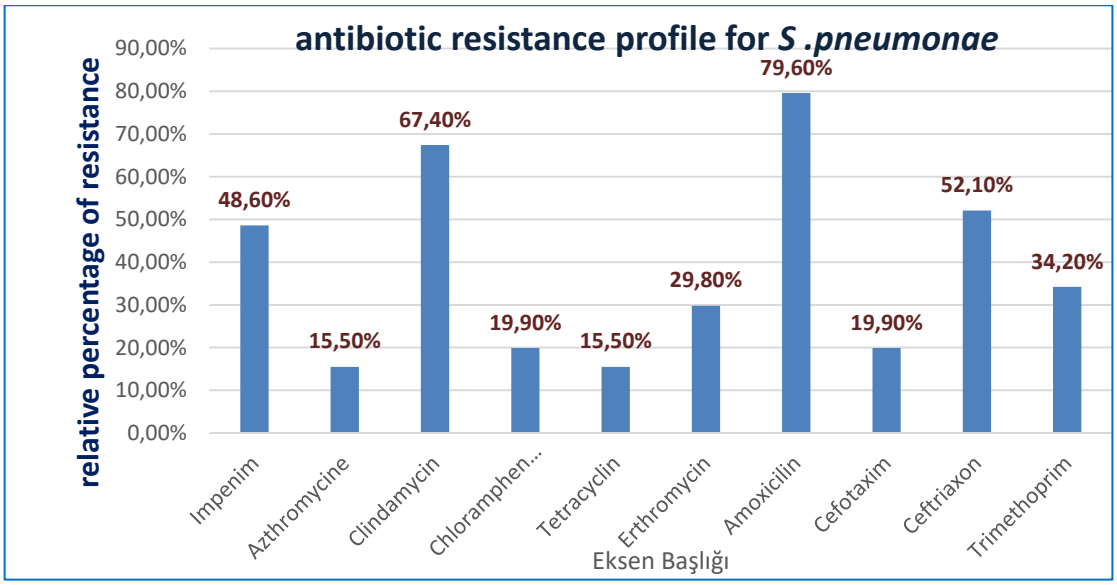


Fig2 : antibiotic resistance profile for S. pneumonae

Conclusion:

1. In order to manage this resistance problem, more extensive studies on phenotypical and molecular resistance of colonizing bacterial strains from the nasopharynx should be conducted.

2.We think the possibility of S. aureus and S. pnemoniae should always be considered. Furthermore, using selective antibiotics based on sensitivity testing is useful with an appropriate dosage and duration required for treatment.

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Background: nasopharynx colonization by resistant Staphylococcus aureus and Strepto

SOCIETAL AND SCIENTIFIC PERCEPTIONS TOWARDS 5G NETWORKS INTRODUCTION

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ABSTRACT

This study reports on societal and scientific perceptions towards 5G networks introduction. The introduction of 5G networks brings different views to different people at different places. One aspect of views looks at 5G networks as promising networks that will change and shake the whole world because of its benefit. On the other hand, some people in some places view its introduction (5G networks) as a new health challenge technology. The study finds out the significant rate at which people in the society understand the contributive effect of 5G networks and the rate at which researchers have explained and convinced society about the benefit of 5G networks via media services. The data were collected from 400 respondents. The questionnaire instrument used was validated by expert in computer networking and as well considered reliable with r=.86 index. The findings show that high significant rate of people in the society understand the contributive effect of 5G networks and researchers have been able to explain and convince people about the benefit of 5G networks using social media, radio and television services. This study contributes to an existing knowledge by filling the gap of different views regarding the introduction of 5G networks. It is therefore recommended that people should be sensitized about the genuine information towards any technology introduced.

Keywords: 5G network, societal perception, scientific perception, benefit of 5G network, media services, technology

INTRODUCTION

It is traditionally belief that when new technology is introduced, it means that the new technology must have features over the earlier ones. Without any doubt, the 5G networks will greatly improve efficiency over the existing fourth-generation (4G) platforms with support for higher bandwidth and low torque and communication services, as well as offering seamless connectivity to multiple phones, compatible with different technologies, knowledge, and mobility, Selinis, et al. (2018) said that even before the advent of 5G networks some researchers and organizations have proposed how the next generation of network will look like, this include: providing a cell border user bit rate at least 50 megabits per seconds (Mbit /s) in the lowest conditions with gigabit per seconds (Gbit /s) peaks; ultra-low end to end latency (possible below 10 ms) (Polese, M., Jana, R. and Zorzi, M., 2017). In looking at all these opportunities and benefits, yet it was noticed that by 2020 and beyond connectivity and mobile networks will face significant obstacles compared to today. The paper compares the societal and scientific views about the introduction of 5G networks. The below research

questions guide the study:

- What is the significant rate at which people in the society understand the reasons for the introduction of 5G networks?
- At what significant rate are researchers have explained and convinced society about the benefit of 5G networks via media services?

RELATED LITERATURES

The introduction of 5G networks has really shaken the whole world because we are living in a generation where we cannot do without the use of technology for daily basis. Generally, believes rest on the more technologies introduced the more our existence easy, relax and comfortable. Today we find ourselves in a situation whereby we can no longer do a thing without technology. So 5G technology that stands for fifth generation cellular technology has come to replace the use of mobile phones within real high bandwidth. 5G is a packet switched wireless application with advanced area broadcasting and high throughput. The 5th generation technologies contain all kind of leading qualities which shape the 5G technology most effective and in extreme large demand in forthcoming time. Far before now, the demand of new technology that will have new contents, such as 360-degree videos and holograms, and new service concepts, such as smart transportation and machine-type communications requires a very strong technology like 5G networks or services that we have today.

In the same vein, what will happen to 5G networks in years to come makes it indispensable to embrace because a lot of benefits came with the networks. Nonetheless, the number of new technologies such as virtual / augmented reality (VR / AR), autonomous driving, Internet of Things (IoT), and wireless backhaul (as a substitutes for labour-intensive optical fiber installation), as well as new applications not yet planned, will need even higher data rates and less latency than what 5G networks will deliver (Rappaport et al. 2019).

In other to embrace the potential benefits of 5G networks newly introduced, let compare the features of both 4G and 5G networks. According to Amin Salih Mohammed, Suzan Tahsein Husein, Dr. M.Sivaram, V. Porkodi and V.Manikandan, (2019) the following comparisons were made:

Table 1, Comparisons between 4G and 5G Networks

Full Shape	**Fourth Generation (4G Networks)**	**Fifth Generation (5G Networks)**
Bandwidth of Data	2Mbps to 1Gbps	1Gbps and higher as per requires
Band of Frequency	Al access convergence containing MC-CDMA, OFDMA,network-LMPS	BDMA and CDMA
Technologies	Integrated IP, integration seamless of broadband LAN/WAN/PAN and WLAN	Integrated IP, integration seamless of broadband LAN/WAN/PAN/WLAN and technologies of advanced focus on OFDM modulation used in 5G
Service	wearable devices, Dynamic information access, HD streaming, global roaming	wearable devices, Dynamic information access, HD streaming, any demand of users
Multiple Access	CDMA	BDMA, CDMA
Core network	All IP network	5G network interfacing(5G-NI), Flatter IP network
Handoff	vertical and Horizontal	vertical and Horizontal

The introduction of 5th generation networks known as 5G Networks, has created a lot of conspiracies about what will be the negative impact of its introduction as well as its benefits. According to Kaitlyn Tiffany; (2020) low frequency electromagnetic fields that were emanating from electronics and networks at all time can caused cancers and some other health challenges as a result of the radiation from televisions, microwaves, computers, handsets and other networks all these become a possible human health catastrophes. Nowadays, the advance of cell-phones, and more recently the new high speed networks such as 5G networks, to serve human beings, have given rise to a paranoid collision. It is then believe that the newly introduced networks are hazardous to health. He further said that the devices are different but the fear are the same (the radiation from the things we use every single day is destroying us; our modern world is a colossal mistake).

Many scholars alleged series of conspiracies towards 5G networks. As 5G heads into commercialization after a decade of research and development, arguments were made about the potential risks of the technology for the public health. The fear of 5G, propagating via social media and fuelled by an apparently disbelief that the economic interests of industries and governments may be the sole drivers for the deployment of the new technology, has grown to the point of pushing politicians to publicly advocate for experimental trials to be withhold in major cities in Europe (Celine Fremault, 2019).

The societal worries about the new technology are the great health challenges that are likely to emanate from its implementation, rather than the benefits it brings to the society. Luca Chiaraviglio, Marco Fiore and Edouard Rossi; (2019) give five allegations why they should not install a 5G radio base stations. Upon this worries, conspiracies and fears about the 5G networks, yet a group of scientists look at it from different angles when (Agiwal, Roy, and Saxena, 2016. Monserrat, Mange, Braun, Tullberg, Zimmermann, and Bulakci, 2015) said

that Fifth generation (5G) networks architectures able to handle this huge amount of data from heterogeneous devices are currently being investigated. At a minimum, 5G networks should be highly scalable with regards to the number of connected devices that they can handle, and to cater for a wide variety of services, including those services we cannot anticipate at the present moment, they should be adaptable enough to simultaneously provide a diverse range of quality of service (QoS) requirements. According to Abel Nyamapfene; (2016) 5G networks introduction will be greatly boost economy system of any nation who first adopt it, before getting to other nations that will embrace it later. Nevertheless, those countries will also have social benefit advantages of its introduction over other nations.

Conclusively, 5G networks advantages from scholars and scientists perspectives are summarized below according to Sharma, et al. (2014); Won et al. (2017); Samson Ejim; (2020); and Turkiewicz, (2019) the advantages of 5G technology are: Globally accessible, Dynamic information access, Lower battery consumption, High system level spectral efficiency, With 5^{th} sense technology, Faster data transmission than the previous generations and consistency in packet failure rates of 10^{-9}, improved coverage range and higher data rate availability at cell edge, 5G provides support for interactive multimedia, voice, video, Internet, and other broadband services which are more effective and more attractive and have bidirectional accurate traffic statistics, an estimated mobility data rate of over 1Gbps with a large broadcast capacity to 65,000 connections at a time, improved security features; better cognitive radio/Software Development Radio (SDR), Worldwide wireless web (WWW), wireless-based web applications that include full multimedia capability beyond 4G speeds and Several Artificial Intelligence (AI) aided applications at high bandwidth with multiple sensors enabled mobile devices. Handling some massive traffic is certain to refer a large challenge to the core network. Thus, advancement in setup connection and control signals efficient handling in the radio access network to 5G technology are needed desperately.

METHODOLOGY

The study was approached with descriptive research design which considered appropriate for the study because it suits the nature of the study. the target population covered both male and female adults in the society using any kind of network. A sample of 400 respondents selected for the study, the sample was randomly carried out within southwest geo-political zone in Nigeria. The instrument was validated by expert in computer network and social network.
In order to determine the extent of reliability of the instrument, the questionnaire was administered to (20) twenty respondents within the population but outside the sample. The scored obtained were tested for reliability and internal consistence using Cronbach alpha analyses yielded 0.86. After the administration of the questionnaire to the respondents, the result gotten were collated and analyzed via the use of chart (bar-chart) as analysis tools for the study.

RESULTS

Below is the analysis of the tested research question raised for the study. It also showed the result and discussion of findings.

Research Question 1: What is the significant rate at which people in the society understand the reasons for the introduction of 5G networks?

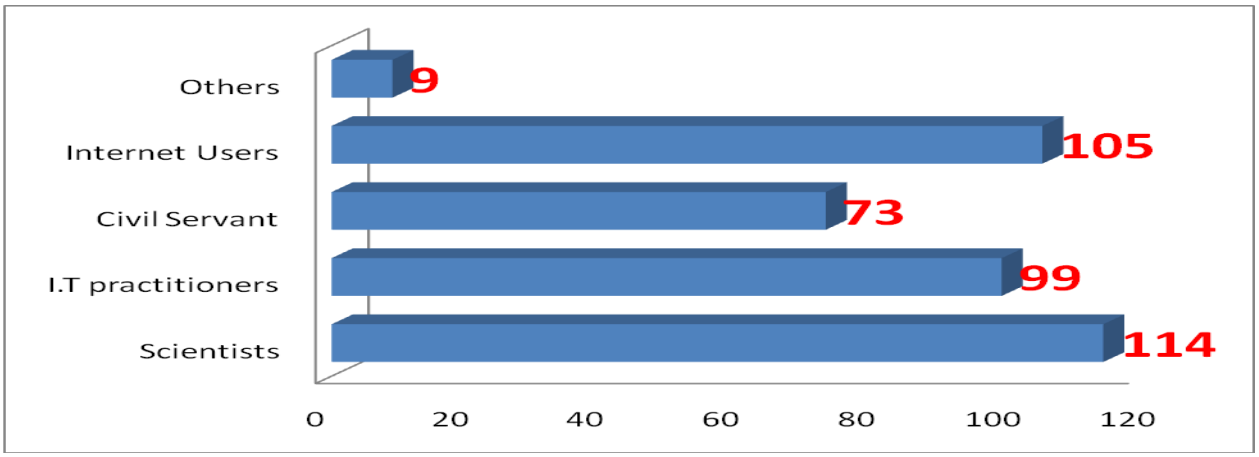


Fig 1: Rate at which people understand introduction of 5G networks

Figure 1 showed that majority of the respondents had (70) 25% and above all these implies that scientist respondents had (114) 29%, internet users had (105) 26%, while I.T practioners had (99) 25% respecively. It showed that civil servants had (73) 18% while others had (9) 2%. The result showed 80% of the respondents were aware and understood the reasons for the introduction of 5G networks. Therefore, 80% is the significant rate at which people in the society understand the contributive effect of 5G networks.

Research Question 2: At what significant rate are researchers have explained and convinced society about the benefit of 5G networks via media services?

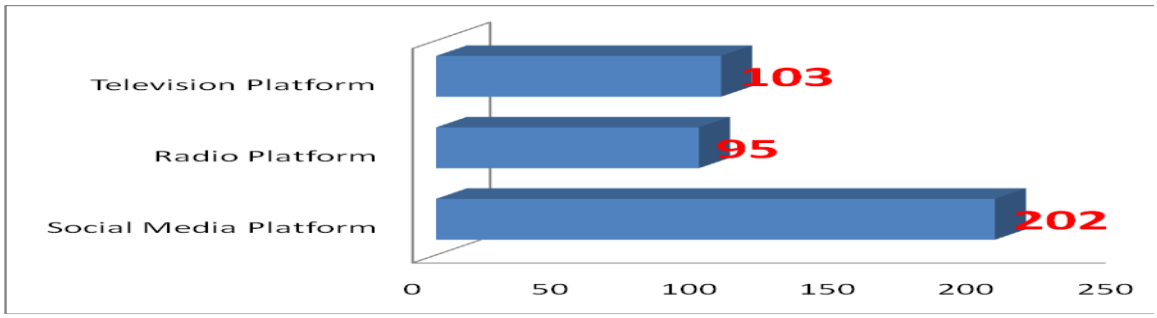


Fig 2: Media Services and 5G networks Benefits

Figure 2 showed the rate at which researchers have explained and convinced society about the benefit of 5G networks via media services. Social media platform contributed (202) 50% towards making people understand the benefit of 5G networks introduction. From this result, it is observed that social media platform had half of the entire sample. Hence, using television platforms and radio platforms showed (103) 26% and (95) 24% respectively. Therefore, 100% significant rate of which researchers have explained and convinced people about the benefits of 5G networks in the society through all the media services (social media platform, television platform and radio platform).

DISCUSSION

From the findings, it is crystal clear that significant higher rate of respondents such as scientist, I.T practitioners, internet users, civil servant and others were understood the reasons

for the introduction of 5G networks. The findings was supported by Turkiewicz, (2019) and Ni et al. (2019) that 5G can provide significantly higher data throughput and low-latency communications that will not only satisfy the increasing demand for high-resolution content across mobile networks but also for more interactive display modes such as 360° camera.

Similarly, the findings opined that the 3 media services (social media platform, television platform and radio platform) were used by researchers to explained and convinced about the benefit that 5G has brought to the society. This study of Babajide (2013) reviewed that the information producers use different cues to indicate credibility of the information they share on different media services including social media platforms.

CONCLUSION

It is well established that Information, one of modern society's most essential resources, and its prompt collection, distribution, and evaluation can offer numerous social and economic benefits. The information benefit are enjoyed in the society through high speed connectivity of networks, all these and other reasons have made society deem fit to have network like 5G. 5G networks can provide significantly higher data throughput and low-latency communications that will not only satisfy the increasing demand for high-resolution content across mobile networks but also for more interactive display modes such as 360° camera. Connectivity whether the Internet or mobile phones is increasingly bringing market information, financial services, health services to remote areas, and is helping to change people's lives in unprecedented ways. The study looks at the other side of the coin, by concluding that most of the disputes against 5G radio base stations are not supported by scientific evidence, but people in the society looked at it in different angle in terms of health challenges that may come with the new technology. Conclusively, the researchers suggest the importance of continuing medical and clinical research. This is needed to evaluate any potential health impact of low EMFs generated by all devices, including the ones in close proximity to users, e.g., 5G smart-phones, tablets and laptops.

RECOMMENDATIONS

The following recommendations were made:

In other to avoid undue conspiracy towards new introduction of any technology, public should be informed about the benefit of such technology.

Federal government should uncover all negative information attributed to the introduction of new technology so as to save life of people from the challenges in the introduction of that technology.

All hand most be on deck by all stakeholders of health to examine and re-examine the danger in new introduced technology may bring to the society.

Educational sensitization should put in place on different media services on the use and maintenance of new technology introduced to the society in other to make the life better.

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YEREL YÖNETIMLERDE KATILIM SÜRECINDE KENT KONSEYLERININ YERI

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Özet

Günümüzde kent yönetimi karmaşık ve çok boyutlu mahiyet arz ettiğinden kente dair sorunların demokratik bir şekilde çözülmesi kamu yönetiminin önemli gündem maddelerinden birisi haline gelmiştir. Kente dair sorunların çözümlenerek kentsel yaşam kalitesinin arttırılmasında yerel yönetimlerin aktif bir konumda olması yerel demokrasinin güçlenmesini sağlayan bir olgudur. 1992 yılında Birleşmiş Milletler tarafından düzenlenen Rio Konferansı ile kabul edilen Gündem 21 adlı eylem planının bir parçası olan Yerel Gündem 21 bölümünde yerel yönetimlerde yönetişimi ve katılımı artırmanın önemine vurgu yapılmıştır. Kentlerin yönetiminde yetkilerin büyük ölçüde merkezi yönetimden yerel yönetimlere aktarılması ve kentteki paydaşların yönetime daha etkin bir şekilde katılması yaklaşımı benimsenmiştir. Bu yaklaşım doğrultusunda Türkiye'de 2002 yılında yayınlanan Sürdürülebilir Kalkınma Raporu'nda belediyelerde yönetişimin gerçekleşebilmesi için katılımın genişletilmesi gerekliliği vurgulanmıştır.

Türkiye'de yerel yönetimler ortak ve mahalli niteliğe sahip ihtiyaçların karşılanması için oluşturulmuş, karar organları seçmenlerce belirlenen anayasal kuruluşlardır. Yerel yönetimlerin ortaya çıkışı cumhuriyetin kuruluşundan öncesine dayanmaktadır. Ancak 2000'li yıllardan itibaren yerel yönetimlerde yönetişimin artırılması amacıyla çeşitli reformlar gerçekleştirilmiştir. Bu reformlardan biri de kent konseylerinin kurulmasıdır. 2006 yılında 5393 sayılı Belediye Kanunu ve 26313 sayılı Kent Konseyi Yönetmeliği'ne dayalı olarak kent konseylerinin kurulması ise yerel yönetimlerde katılım düzeyinin arttırılması ihtiyacına bir yanıt olarak değerlendirilebilir. Yasal anlamda yerel düzeyde yeni bir katılım mekanizması olan kent konseyleri kentteki önemli aktörleri içinde barındıran, demokratik uzlaşıyı esas alan ve kentsel yaşam kalitesinin arttırılmasına yönelik faaliyette bulunan ve yerel katılım üzerine bina edilmiş demokratik bir yapı olarak kurgulanmıştır. Çalışmanın amacı kent konseylerinin yerel yönetimlerde katılım sürecinde yerinin ne olduğunu ortaya koymaktır. Bu amaç doğrultusunda yöntem olarak nitel araştırma deseninde yararlanılmıştır. Veriler doküman analizi yöntemiyle elde edilmiş ve içerik analizi yöntemiyle incelenmiştir.

Anahtar kelimeler: Kent Konseyleri, kent yönetimi, yerel yönetimler, katılım, yerel demokrasi

THE PLACE OF CITY COUNCILS IN THE PARTICIPATION PROCESS IN LOCAL GOVERNMENTS

Abstract

Today, since the city administration is complex and multidimensional, solving the problems of the city in a democratic way has become one of the important agenda items of the public administration. The active position of local governments in increasing the quality of urban life by solving urban problems is a phenomenon that strengthens local democracy. The importance of increasing governance and participation in local governments was emphasized in the Local Agenda 21 section, which is a part of the Agenda 21 action plan adopted by the

Rio Conference organized by the United Nations in 1992. In the management of cities, the approach of transferring the powers from the central government to the local governments and involving the stakeholders in the city more effectively was adopted. In line with this approach, in the Sustainable Development Report published in Turkey in 2002, it was emphasized that participation should be expanded for the realization of governance in municipalities.

Local governments in Turkey are constitutional institutions established to meet common and local needs, and whose decision-making bodies are determined by the voters. The emergence of local governments dates back to the foundation of the republic. However, since the 2000s, various reforms have been carried out in order to increase governance in local governments. One of these reforms is the establishment of city councils. The establishment of city councils in 2006 based on the Municipal Law No. 5393 and the City Council Regulation No. 26313 can be considered as a response to the need to increase the level of participation in local governments. City councils, which are a new participation mechanism at the local level in the legal sense, are designed as a democratic structure that includes the important actors in the city, is based on democratic consensus, operates to increase the quality of urban life and is built on local participation. The aim of the study is to reveal the place of city councils in the participation process in local governments. For this purpose, qualitative research design was used as a method. The data were obtained by document analysis method and analyzed by content analysis method.

Keywords: City Councils, city administration, local governments, participation, local democracy

GİRİŞ

Yerel yönetimler siyasi olgunluğu geliştirme, katılımı artırma, toplumsal huzur ve barışı sağlama gibi önemli işlevlere sahiptir (Tortop vd., 2006: 22). Yerel yönetimler ile katılım ilkesi arasında doğrudan bir ilişki vardır. Yerel yönetimlerde katılımın gelişmiş olması hem demokrasinin gelişmesine hem de kamusal hizmetlerin hızlı, etkin ve ucuz bir şekilde sunulmasına katkıda bulunmaktadır (Görmez ve Altınışık, 2011: 38-39). Yerel yönetimlere katılımın sağlanmasında temsili demokrasinin klasik yöntemi olan seçimler günümüzde yeterli görülmeyerek katılımcı demokrasi anlayışının bir uzantısı olan ek katılım mekanizmaları ortaya çıkmıştır.

Kent konseyleri yerel yönetimlerde halkın sorunlarının çözülmesi, kalkınma önceliklerinin ve vizyonlarının belirlenmesi hususlarını merkezi yönetim, yerel yönetim, kamu kurumu niteliğindeki meslek kuruluları ve sivil toplum kuruluşlarının ortak katılımıyla yönetişim anlayışına dayalı olarak ele alan organizasyonlardır. Kent konseylerinin kurulması fikri ilk olarak yerel yönetimlerde katılımın arttırılması ve sürdürülebilir kalkınmanın sağlanması amacıyla Yerel Gündem 21'de ortaya atılmıştır. Türkiye'de kent konseylerinin yasal dayanağa kavuşması 2006 yılında 5393 sayılı Belediye Kanunu ile gerçekleşmiştir. Yerel yönetimlerde yönetişim anlayışının gerçekleşebilmesi için katılım zorunlu bir faktördür. Kent konseyleri yerel yönetimlerde yönetişimin ve demokrasinin gelişmesi için ortaya çıkmış yönetsel mekanizmalar olarak katılımı sağlamada önemli bir işleve sahiptir. Belediye Kanunu'nun çıkmasının ardından kent konseyleri hem nicelik olarak artmış hem de önemli faaliyetlerde bulunmuşlardır. Ancak kent konseylerinin etkinliklerini sağlamaları noktasında kent konseyince alınan kararların bir bağlayıcılığının olmaması, fiziksel mekân zorunluluğunun bulunmaması, kendilerine ait personele ve bütçeye sahip olmamaları gibi sorunlar bulunmaktadır. Çalışmada yerel yönetimler için önemli olan hesap verebilirlik, şeffaflık, katılım ve demokrasiyi güçlendirme gibi ilkeler doğrultusunda ortaya çıkan kent konseylerinin katılım sürecindeki yeri yasal ve kurumsal yapıları ve işleyişleri incelenerek değerlendirilmiştir.

1. YEREL YÖNETİMLERDE KATILIM

Bir ilke ve pratik olarak katılım "vatandaşların siyasi karar mekanizmasına ve yönetim sürecine temsil yolu ile ya da doğrudan dâhil olmaları" şeklinde tanımlanabilir (Bozkurt, 2014: 231). Halkın yönetime katılmasının kapsamı ve nasıl gerçekleşeceğine dair tartışmalar sürmektedir. Ancak demokrasiye dayalı yönetimlerde katılım en önemli unsurlardan biridir. Yerel yönetimlerde katılım Avrupa Yerel Yönetimler Özerklik Şartı'nda bir hak olarak kabul edilmiştir.[80] Sözleşmeye göre üye devletler yerel yönetimlere katılım hakkının gerçekleşmesi için gerekli tedbirleri almakla yükümlüdür. Sözleşmede çevresine karşı duyarsız olan kapalı yerel yönetimler yerine geri bildirimi sağlayacak araçların benimsendiği açık yerel yönetim anlayışı hâkimdir. Sözleşme'nin 2. maddesinde bu tedbirlere örnek olarak istişare süreçleri, yerel referandum, dilekçe gibi yerel yönetimlere yönelik olarak şikâyet ve taleplerin iletilmesi için gerekli yönetsel mekanizmaların benimsenmesi verilmiştir.

Uluslararası Vatandaş Katılımı Birliği (International Association for Public Participation) IAP2 Uluslararası Programı'nda katılımın etkin bir şekilde gerçekleşememesinin en büyük nedeninin plansızlık olduğu ileri sürülmektedir. Etkin bir vatandaş katılımının gerçekleşebilmesi için gerekenler ise şu şekilde belirlenmiştir: (International Association for Public Participation, https://www.iap2.org/page/foundations)

- Bir kararın kapsamını değerlendirmek ve ihtiyaç duyulan süreçleri belirlemek,
- Zamanlama ve gerekli kaynaklar dâhil olmak üzere karar adımlarının belirlenmesi,
- Birincil tarafların rol ve sorumluluklarını belirlemek,
- Paydaş topluluğunun endişelerini ve beklentilerini belirlemek için kapsamlı bir karar etki analizi geliştirmek,
- Uygun katılım düzeyinin seçilmesi,
- Açık ve ulaşılabilir hedefler belirlemek,
- Ayrıntılı bir katılım planının geliştirilmesi
- Süreci destekleyen iletişim girişimlerinin planlanması,
- Girişimin etkinliğini ölçmek için uygun değerlendirme araçlarının belirlenmesi.

Kamu yönetiminde her düzeyde gerekli olan beceriler, öncelikle siyasi karar verme, planlama ve finansman becerileridir. Yerel yönetimlere altyapı ve hizmetlerin sağlanması sorumluluğu verilebilirken, özel sektör genellikle bu mal ve hizmetleri yürütme, yönetme ve sunma konusunda daha başarılıdır. Özel sektör ve sivil toplum kuruluşları belirli sorumluluklar almaları için sözleşme imzalanması yoluyla yerel yönetimlerde birden fazla teknik işleve duyulan ihtiyaç azaltılır. Yerel yönetimler, vatandaşlar ve merkezi yönetim arasında aracı olarak önemli bir rol oynayabilir. Aracı olarak hareket eden yerel yönetimler, vatandaşların merkezi yönetim tarafından kontrol edilen bilgiye, kaynaklara ve güce erişimini kolaylaştırabilir. Bu da yerel halkın daha bilinçli kararlar almasına yardımcı olabilecek sosyal, politik veya ekonomik konularda bilgi akışını kolaylaştıracaktır. Burke'e göre yerel yönetimlerde katılım bir yandan yerel yöneticilerin yerel topluluğun ihtiyaçlarına göre planlama süreçlerini geliştirmelerini sağlarken bir yandan da bireyleri ve grupları politikaların oluşturulmasında daha aktif rol almalarını teşvik edici bir role sahiptir (Burke, 1968-9: 290-292).

Katılımın aktif katılım ve pasif katılım olmak üzere iki boyutu vardır. Yerel yönetimler için aktif katılım vatandaşların kendiliğinden ilgi duyarak yönetsel faaliyetlere katılması, fikir ve eleştirilerini iletmesidir. Pasif katılım ise vatandaşların yöneticilerin talepleri doğrultusunda yönetsel faaliyetlere katılmasıdır. Özellikle 1990'lı yıllardan itibaren yerel

[80] Avrupa Yerel Yönetimler Özerklik Şartı, https://rm.coe.int/booklet-european-charter-of-local-self-government-turkish-version/168071b67b, [25.06.2021].

yönetimlerde aktif katılımın gelişmesine ağırlık verilmektedir. Yerel seçimler ve yerel referandum yerel yönetimlerde klasik katılım mekanizmalarındandır. Aktif katılımı sağlayacak yeni yerel katılım mekanizmalarına yerel yönetimler tarafından düzenlenen halk toplantıları, dernek, vakıf ve kent konseyleri gibi oluşumlarda yer alan kurulları, il genel veya belediye meclis toplantılarına ve ihtisas komisyonlarına katılım, dilekçe ve bilgi edinme hakkı, kamuoyu yoklamaları ve anketler yer almaktadır. Dolayısıyla yerel katılım halkın yerel yönetime doğrudan ve aktif bir şekilde katılması anlamına gelmektedir (Çevikbaş, 2008: 72).

2. YEREL YÖNETİMLERDE KATILIM İLE KENT KONSEYLERİ İLİŞKİSİ ÜZERİNE DEĞERLENDİRME

Yerel yönetimlerde katılım ve demokrasi vurgusu ile kent konseylerinin kurulması fikri Yerel Gündem 21'de ortaya atılmıştır. Yerel Gündem 21'de halka en yakın birim olan yerel yönetimlerde sürdürülebilir kalkınmanın sağlanması temel hedefine ulaşabilmede karar vericiler, çıkar grupları ve yerel halk arasında bir işbirliği ve uzlaşının sağlanması gerektiği anlayışı vardır (Kelly ve Moles, 2002: 890). Türkiye'de uygulamaya geçirilmesinin ilk adımı 1998 yılında geliştirilen "Türkiye'de Yerel Gündem 21'lerin Teşviki ve Geliştirilmesi Projesi" olmuştur. Kent konseylerinin yasal bir zemine kavuştuğu 5393 sayılı Belediye Kanunu'nun 76. Maddesinde kent konseylerine kentte "kent vizyonunun ve hemşehrilik bilincinin geliştirilmesi, kentin hak ve hukukunun korunması, sürdürülebilir kalkınma, çevreye duyarlılık, sosyal yardımlaşma ve dayanışma, saydamlık, hesap sorma ve hesap verme, katılım ve yerinden yönetim" ilkelerinin uygulanabilirliğini sağlamaya yardımcı olma görevi verilmiştir. Ayrıca Kanunun aynı maddesinde "Belediyeler kamu kurumu niteliğindeki meslek kuruluşlarının, sendikaların, noterlerin, varsa üniversitelerin, ilgili sivil toplum örgütlerinin, siyasî partilerin, kamu kurum ve kuruluşlarının ve mahalle muhtarlarının temsilcileri ile diğer ilgililerin katılımıyla oluşan kent konseyinin faaliyetlerinin etkili ve verimli yürütülmesi konusunda yardım ve destek sağlar." ifadesine yer verilmiştir. Böylece kent konseyinin faaliyetlerini ilgili tüm paydaşların katılımı ile işbirliği ve uzlaşıya dayalı olarak gerçekleştirmesine önem verilmiştir. 5393 sayılı Belediye Kanunu'nda yer verilen kent konseylerinin çalışma usul ve esasları Kent Konseyi Yönetmeliği ile düzenlenmiştir. Belediye Kanunu'nda kent konseyleri tarafından alınan kararların belediye meclislerinin ilk toplantılarında ele alınarak değerlendirecekleri belirtilmiştir.[81]

Doküman analizi yapılan çalışmamızda belediye kanunu, Avrupa Yerel Yönetimler Özerklik Şartı ve kent konseyi yönetmeliği, içerik analizine tabi tutulmuş ve tematik kodlar oluşturulmuştur. Tematik kodlar vasıtasıyla bulgular tespit edip yorumlanmıştır.

2.1.Bulgular

Türkiye'de kent konseylerine dair yasal mevzuat ve literatür incelendiğinde yerel yönetimlerde katılımı geliştirecek bir role sahip oldukları görülmektedir. Kent konseyleri karardan etkilenenlerin karar alma süreçlerine dahil olması, bilgi edinme yollarını genişletmesi, vatandaşların yönetime erişebilirliğini arttırması, yerel demokrasinin, hesapverebilirliğin ve şeffaflığın güçlenmesi gibi işlevlere sahiptir. Bu işlevler hizmetlerde etkinlik ve verimliliği arttırarak yerel halkın yönetime olan güvenini ve memnuniyetini sağlayacak bir etkiye sahiptir.

2.1.1.Yerel Demokrasinin Güçlenmesi

Kent konseylerinin gönüllülük esasına dayalı olması onları önemli bir katılım mekanizması kılmaktadır. Gönüllü katılım yerel halk ile konsey arasında bir köprü vazifesi görmektedir. Kent Konseyi Yönetmeliği'nin 6. maddesinde kent konseylerinin görevleri

[81] 5393 Sayılı Belediye Kanunu, http://www.mevzuat.gov.tr/mevzuatmetin/1.5.5393.pdf, [20.06.2021].

arasında ilk olarak belirtilen "yerel düzeyde demokratik katılımın yaygınlaştırılmasını, hemşehrilik hukuku ve ortak yaşam bilincinin geliştirilmesini, çok ortaklı ve çok aktörlü yönetişim anlayışının benimsenmesini sağlama" görevidir. Aynı maddede yer alan bir başka görev de "çocukların, gençlerin, kadınların ve engellilerin toplumsal yaşamdaki etkinliklerini arttırmak ve yerel karar alma mekanizmalarında aktif rol almalarını sağlama"dır.[82] Bu ifadeler incelendiğinde kent konseyinin yerel yönetimlerde hizmetlerden ve alınan kararlardan etkilenenlerin karar alma süreçlerine aktif olarak katılmalarının hedeflendiği görülmektedir. Batı'daki uygulamalarda kent konseyinin bir karar alma organı olarak oluşturulurken Türkiye'de bir danışma mercii olarak görülmesi kent konseylerinin karar alma süreçlerini etkilemesini zayıflatmaktadır (Çukurçayır, 2009: 96-97). Belediyeler, kent konseyleri aracılığıyla yerelden gelen talep ve beklentiler hakkında bilgi sahibi olurlar. Bu durum belediyelerin karar alma süreçlerini zorlaştırmak yerine karar alınmasından önce, karar alma anında ve sonrasında etkin ve çözüm odaklı olmalarını sağlamaktadır.

Kent konseyleri yerel demokrasiyi güçlendirme hedefi doğrultusunda yerel halkın katıldığı toplantılar düzenlemektedir. Bu hedefe ulaşılması için katılımın etkin bir şekilde gerçekleşmesi gerekmektedir. Kent konseyinde alınan karar o kentte yaşayan herkesi ilgilendirmektedir. Kent konseylerinin yerel halkın toplantılara geniş ve aktif bir katılım göstermesini teşvik etmesi yerel demokrasinin güçlenmesine katkıda bulunacaktır.

2.2.1 Vatandaşların Bilgi Edinme Yollarının Genişlemesi

Bilgi edinme hakkı yönetime katılmanın koşullarından birisidir. Kent Konseyi Yönetmeliği'ne göre kent konseyi genel kurulunca oluşturulan görüşler belediye meclisinin ilk toplantısında değerlendirildikten sonra kent konseyine bildirilir ve kamuoyuna uygun araçlarla duyurulur. Böylece halk kendilerini doğrudan ilgilendiren projeler ve kararlardan haberdar olurken konsey aracılığıyla karşılıklı müzakere ile katılım gerçekleşecektir. Kent konseyleri vatandaşların talep ve beklentilerini gündeme alma imkânı sunmanın yanında yerel yönetimlerin ve konseyin yürütmek istedikleri projeleri katılımcılar ile danışarak vatandaşlar ile konsey ve yerel yönetim arasında bilgi alışverişini sağlamaktadır. Günümüzde bilgi ve iletişim teknolojilerinin gelişmesi halkın yönetimlerin karar alma süreçleri, eylem ve işlemleri hakkında bilgi sahibi olmasını kolaylaştırmıştır (İzci ve Sarıtürk, 2019: 500).

Kent konseyi genel kurulu üyeleri arasında mahallin en büyük mülki idare amiri veya temsilcisi ve belediye başkanı veya temsilcisi bulunmaktadır. Yerel yönetim temsilcilerinin yanı sıra meslek kuruluşlarının, sivil toplum kuruluşlarının, üniversite temsilcilerinin ve kent konseyi gönüllü katılımcılarının yer aldığı toplantılarda vatandaşların talep ve beklentilerine, yaşamlarını etkileyecek faaliyetlere ilişkin konular görüşülür ve karar alınır. Böylece merkezi yönetim ve yerel yönetimlerin yerel halkın talep ve beklentilerini öğrenmesini sağlamaktadır.

2.2.2 Yerel Yönetimlerin Özerkliğinin Güçlenmesi

Kent konseyleri yerel yönetimlerin özerkliğini güçlendirme işlevine sahiptir. Avrupa Yerel Yönetimler Özerklik Şartı'nın 2. Maddesinin 1. bendinde özerk yerel yönetim "kanunlarla belirlenen sınırlar çerçevesinde, kamu işlerinin önemli bir bölümünü kendi sorumlulukları altında ve yerel nüfusun çıkarları doğrultusunda düzenleme ve yönetme hakkı ve imkânı" şeklinde tanımlanmıştır. Aynı maddenin 2. bendinde ise bu hakkın eşit ve genel oy ilkesine dayanan gizli seçim ile seçilmiş meclise ve meclise karşı sorumlu olan yürütme organına ait olduğu belirtilmiştir. Bendin devamında ise bu düzenlemenin "vatandaşlardan oluşan meclislere, referandumlara veya vatandaşların doğrudan katılımına olanak veren öteki

[82] Kent Konseyi Yönetmeliği, https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=10687&MevzuatTur=7&MevzuatTertip=5, [20.07.2021].

yöntemlere" başvurulabilmesini engellemesine izin verilmeyeceği belirtilmiştir.[83] Vatandaşlardan oluşan meclis ifadesinin Türkiye'de kavram olarak karşılığının kent konseyi olduğunu söylemek mümkündür. Şart'ta kent konseylerine yerel özerkliğin korunmasında özel bir yer verilmiştir.

Yerel yönetimlerin merkezi yönetimle olan ilişkilerinde kent konseyleri yerel yönetimi destekleyerek daha etkin hale gelmelerini sağlayabilmektedir. Kent konseyleri kendilerine ait personele sahip değillerdir. Ancak sivil toplum kuruluşu temsilcileri, kent konseyi gönüllü katılımcıları gibi güçlü ve maliyetsiz insan kaynağına sahiptir. Dolayısıyla yerel yönetimlerin bazı projeleri yürütürken kent konseylerinden destek almaları mümkündür. Böylece yerel yönetimlerin merkezi yönetimden bağımsız olarak çeşitli projeleri yürütme imkânı güçlenmektedir.

2.2.3 Yerel Yönetimlerde Hesapverebilirliğin ve Şeffaflığın Güçlenmesi

Yerel yönetimlerde katılım ile hesapverebilirlik ve şeffaflık ilkelerinin bir arada var olması ile yerel demokrasiden bahsetmek mümkündür. Kent konseyinde alınan kararların belediye meclisinde görülmesi nedeniyle kent konseyinin görevleri incelendiğinde belediyelerin görevleriyle örtüştüğü görülmektedir. Kent Konseyi Yönetmeliği'nin 5. maddesinde kent konseyinin görevleri şu şekilde belirtilmiştir:[84]

- *"Sürdürülebilir gelişmenin sağlanması ve bu konuda ortaya çıkan sorunların çözümüne yönelik planların hazırlanması ve uygulanmasını sağlamak,*
- *Kente ilişkin temel stratejiler ve faaliyet planlarının belirlenmesinde, uygulama ve izleme süreçlerinde tüm kenti kapsayan ortak bir aklın oluşturmasına katkıda bulunmak,*
- *Yerellik ilkesi çerçevesinde katılımcılığı, demokrasiyi ve uzlaşma kültürünü geliştirmek,*
- *Kentin kimliğine ilişkin tarihi, kültürel, doğal ve benzeri değerlere sahip çıkmak ve geliştirmek,*
- *Kent kaynaklarının etkili, verimli ve adil kullanımına katkıda bulunmak,*
- *Sürdürülebilir kalkınma anlayışına dayalı kentin yaşam kalitesini geliştiren, çevreye duyarlı ve yoksulluğu giderici programları desteklemek,*
- *Sivil toplumun gelişmesine ve kurumsallaşmasına katkıda bulunmak,*
- *Çocukların, gençlerin, kadınların ve engellilerin toplumsal yaşamdaki etkinliklerini arttırmak ve yerel karar alma mekanizmalarında aktif rol almalarını sağlamak,*
- *Kent yönetiminde saydamlık, katılım, hesap verebilirlik, öngörülebilirlik ilkelerinin uygulanmasına katkıda bulunmak,*
- *Kent konseyinde oluşturulan görüşlerin değerlendirilmek üzere ilgili belediyeye gönderilmesini sağlamaktır."*

Kent konseyinin görevleri incelendiğinde kente dair sürdürülebilir gelişme için hazırlanan planların, stratejilerin ve faaliyetlerin hazırlık, uygulama ve denetim aşamalarında etkili olmasının beklendiği görülmektedir. Ayrıca kentin yönetiminde hesapverebilir ve şeffaf olunmasında kent konseylerine denetleyici bir rol verilmesi yerel halkın yerel karar alma mekanizmalarına aktif olarak katılmasını sağlayacağı görüşünün benimsendiği

[83] Avrupa Yerel Yönetimler Özerklik Şartı, https://rm.coe.int/booklet-european-charter-of-local-self-government-turkish-version/168071b67b, [25.06.2021].
[84] Kent Konseyi Yönetmeliği, https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=10687&MevzuatTur=7&MevzuatTertip=5, [20.07.2021].

anlaşılmaktadır. Bununla birlikte kent konseyinin yerel yönetimin hesapverebilir ve şeffaf bir yönetim anlayışı benimsemesine teşvik etmesi için katılımcıların istekli ve aktif katılımı gereklidir. Böylece yerel yönetimler kendilerini denetleyen ve şeffaf olmasını bekleyen bir sivil inisiyatif olduğunun bilincinde olarak sorumluluk üstlenirler.

SONUÇ

Kent konseyleri potansiyel olarak yerel yönetimlerde katılımı güçlendirecek bir işleve sahiplerdir. Ancak konsey kararlarının bağlayıcı olmaması, kendilerine ait bir tüzel kişiliğe sahip olmamaları kent konseylerinin bu potansiyelleri için sorun teşkil etmektedir. Ayrıca kent konseyince alınan kararların belediye meclisinin değerlendirmesine tabii olması kent konseylerinin etkinliğini daraltmaktadır. Bir yerel demokrasi ve katılım aracı olan kent konseylerinin belediyeler üzerinde etkin bir denetim mekanizması olabilmesi için belli düzenlemelere ihtiyaç duyulduğu görülmektedir. Kent konseyleri Türkiye'de henüz kurumsallaşma aşamasında olsalar da yerel yönetimlerde katılım kapasitesini artırma işlevleri ile yerel demokrasinin gelişmesine katkıda bulunduğu görünen bir gerçektir.

Yerel yönetimlerde seçilmişlerden oluşan meclislere ek olarak geniş ve gönüllülük esasına dayalı bir katılım mekanizması sunan kent konseyleri yerel demokrasi açısından oldukça önemlidir. Kent konseyleri yerel halk ile yerel yönetimler arasında karşılıklı iletişimin sağlanması rolüne sahiptir. Bir yandan yerel yönetimlerin faaliyetlerini ve projelerini halka duyurmalarını sağlarken öte yandan halkın karar alma süreçlerinde daha etkin rol alma imkânı artmaktadır. Yerel katılımın gelişmesinin neticesinde alınan kararlarda vatandaş memnuniyetini arttırarak yerel yönetimlerin meşruiyetini güçlendirmektedir. Kent konseyleri tarafından alınan kararların kamuoyuna duyurulma zorunluluğu halkın kent konseylerinden daha yaygın bir şekilde haberdar olmasını ve katılım göstermesini teşvik edici bir unsurdur.

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INVESTIGATION OF THE ROLES OF MTHFR (C677T AND A1298C) GENE VARIATIONS IN ISCHEMIC STROKE PATIENTS WITH ATRIAL FIBRILLATION

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Abstract

The aim of our study is to investigate the roles of MTHFR gene variations in the ischemic stroke patients with AF in a population selected from Trakya Region. Our study was carried out by 80 ischemic stroke patients (21 ischemic stroke patients with atrial fibrillation) and 92 healthy controls. The patient and control DNAs were isolated from peripheral blood containing ethylenediaminetetraacetic acid (EDTA). Purity and quality of isolated DNAs' were identified by nanodrop spectrophotometer method. The genotype distributions of MTHFR gene variations were determined by using polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP) methods. The statistically significant difference was not determined between ischemic stroke patient with atrial fibrillation and healthy control groups in terms of MTHFR C677T and A1298C gene variations genotype distributions ($p>0,05$). On the other hand, statistically significant difference was determined between patients with normal sinus rhythm and patients with AF in terms of MTHFR C677T gene variation genotype distributions in the ischemic stoke patient ($p<0,05$). In spite of this, the correlation was not detected in terms of MTHFR A1298C gene variation genotype distributions ($p>0,05$). AC genotype of MTHFR A1298C was observed significantly higher than AA and CC genotypes in ischemic stroke patients with atrial fibrillation ($p<0,05$). The significant difference was not determined in terms of MTHFR C677T gene variation genotype distributions in ischemic stroke patients with AF ($p>0,05$). CT genotype of MTHFR C677T gene variation was observed significantly higher in the women ischemic stroke patients with AF. CC genotype was observed significantly higher in the men ischemic stroke patients with AF ($p<0.05$). The statistically significant difference was not determined in genotype distributions of MTHFR A1298C gene variation in ischemic stroke patients with AF in terms of gender ($p>0.05$). Consequently, the significant difference was detected between ischemic stroke patients with normal sinus rhythm and ischemic stroke patients with AF in terms of MTHFR C677T gene variation genotype distributions ($p<0.05$). AC genotype of MTHFR A1298C gene variation was determined as genetic risk factor in the ischemic stroke patients with AF ($p<0.05$). Also, CT genotype for women and CC genotype for men of MTHFR C677T gene variation were determined as genetic risk factors for ischemic stroke patients with AF ($p<0.05$).

Keywords: Ischemic stroke, atrial fibrillation, MTHFR C677T gene variation, MTHFR A1298C gene variation, PCR, RFLP

INTRODUCTION

Ischemic stroke is a multifactorial disease and is one of the important causes of morbidity and mortality in the world (Zheng et al., 2020). Since stroke can cause long-term disability, it is important to identify the risk factors associated with ischemic stroke and to prevent the disease by taking it under control (Du et al., 2020). Risk factors such as diabetes mellitus, hypertension, smoking, hyperlipidemia, hyperhomocysteinemia and atrial fibrillation play an important role in the occurrence of ischemic stroke. Atrial fibrillation is also recognized as one of the leading causes of thromboembolism. Ischemic strokes associated with atrial fibrillation cause higher incidence of mortality, morbidity, and recurrent stroke compared to ischemic strokes not associated with atrial fibrillation (Chita et al., 2020). Atrial fibrillation is the most common cardiac arrhythmia and affects 1% of the adult population (Dinç et al., 2020). Atrial fibrillation, a heart rhythm disorder that can significantly affect quality of life, is a leading cause of morbidity and mortality (Victorino et al., 2021). The prevalence of atrial fibrillation increases with age. Age-related loss of atrial myocardium and conduction problems as a result of isolation of atrial myocardium have been associated with the development of atrial fibrillation. Atrial fibrillation which causes thrombus formation in the left atrium can lead to ischemic stroke by preventing cerebral arterial circulation (Dinç et al., 2020). The mechanism responsible for atrial fibrillation is not fully understood (Victorino et al., 2021). Pathophysiologically, the main mechanism of stroke in patients with atrial fibrillation is considered as cardioembolism. However, ischemic stroke in patients with atrial fibrillation can be triggered by different mechanisms depending on vascular risk factors (Dinç et al., 2020). Atrial fibrillation develops as a result of abnormal electrical impulses in the atria that are not managed by the sinoatrial node. Then the propagation of reentrant waves in the refractory region is triggered. As a result of atrial contraction that becomes chaotic, appropriate ventricular stimulation is prevented and fibrillation occurs which causes disruption of normal heart function (Victorino et al., 2021). The modified atrial substrate is predisposed to develop atrial fibrillation. Structural and electrical remodeling plays an important role in the initiation and maintenance of atrial fibrillation. Factors such as fibrosis, hypocontractility, fat infiltration, inflammation, ion channel dysfunction, calcium imbalance, vascular remodeling and ischemia can lead to complex atrial remodeling as a result of stretching. Various risk factors such as age, gender, hypertension, cardiovascular diseases, diabetes mellitus, obesity, sleep apnea, uric acid, smoking, alcohol and genetic factors can contribute to the modification of the atrial substrate (Kodani and Akao, 2020). Effective medications are used for anticoagulation to reduce the risk of stroke in the treatment of atrial fibrillation, but antiarrhythmic medications do not show sufficient effect in reducing symptoms and these drugs have potential side effects. Therefore, it is necessary to develop new treatment methods for atrial fibrillation. Atrial fibrillation is a multifactorial disease in which environmental and genetic risk factors play a role. Understanding of the genetic mechanism underlying this disease is required in order to develop the new treatments for atrial fibrillation (Roselli et al., 2020). Methylenetetrahydrofolate reductase (MTHFR) gene variations are one of the genetic factors that play an important role in the development of ischemic stroke. The MTHFR enzyme plays an important role in folate metabolism which is necessary for DNA synthesis, repair and methylation. The MTHFR enzyme catalyzes the conversion of 5,10-methylenetetrahydrofolate to 5-methyltetrahydrofolate (Nissar et al., 2015). The human MTHFR gene is localized on chromosome 1 (1p36.3). MTHFR (C677T and A1298C) gene variations are the most common genetic variations identified in the MTHFR gene. The MTHFR C677T gene variation is characterized by a cytosine/thymine base substitution at position 677 in exon 4 of the MTHFR gene and an alanine/valine amino acid substitution at position 226 of the protein (Ay et al., 2018). As a result of the MTHFR C677T gene variation, the thermal stability of the MTHFR enzyme decreases and this genetic

variation is accepted as an important risk factor for thrombotic events (Nissar et al., 2015). The MTHFR A1298C gene variation is characterized by adenine/cytosine substitution at position 1298 of the MTHFR gene and a glutamine/alanine aminoaside substitution in the C-terminal regulatory region of the protein (Ay et al., 2018). As a result of MTHFR (C677T and A1298C) gene variations, MTHFR enzyme activity decreases and plasma total homocysteine levels increase (Nissar et al., 2015). Investigation of MTHFR gene variations associated with atrial fibrillation, which can lead to ischemic stroke, is important in determining the early diagnosis of the disease and developing treatment strategies for the disease. Therefore, the aim of our study is to investigate the roles of MTHFR (C677T and A1298C) gene variations in ischemic stroke patients with atrial fibrillation.

MATERIALS AND METHODS

Ischemic stroke patient and healthy control subjects

It was applied to Trakya University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee for our study and ethics committee approval was obtained. Signed informed consent forms were collected from the ischemic stroke patient and healthy control groups. This study was carried out at Trakya University Faculty of Medicine, Department of Biophysics and Trakya University Faculty of Medicine, Department of Neurology. Our study was performed with 80 patients with ischemic stroke (21 patients with atrial fibrillation and 59 patients with normal sinus rhythm) and 92 healthy controls. In our study, the patient group consisted of ischemic stroke patients with atrial fibrillation and normal sinus rhythm. The healthy control group consisted of healthy volunteers who were not diagnosed with ischemic stroke. Pregnant and breastfeeding women, those with any other neurodegenerative disease and those diagnosed with malignancy were excluded from our study.

DNA isolation from peripheral blood

DNA isolation was performed from peripheral blood containing ethylenediaminetetraacetic acid (EDTA) of ischemic stroke patients and healthy controls. Invitrogen DNA blood kits were used for DNA isolation. The purity and quality of DNA obtained from ischemic stroke patients and healthy control groups were determined by the Nanodrop spectrophotometer method, and the isolated DNAs were checked with 0.8% agarose gel electrophoresis.

Polymerase Chain Reaction method

Polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP) methods were used to determine genotype distributions of MTHFR (C677T and A1298C) gene variations. For our study, 15 µl of PCR mix was prepared. This mixture contained isolated DNA (50 nanograms), deoxyribonucleoside triphosphate (dNTP, 0.2mM), 1 x PCR buffer, forward and reverse primers, $MgCl_2$ (3mM) and Taq DNA polymerase (1.25 Units). PCR products for genotype distributions of MTHFR (C677T and A1298C) gene variations were observed by 2% agarose gel electrophoresis.

Restriction Fragment Length Polymorphism method

In our study, PCR reaction products, 1 x Buffer Tango, dH_2O and 5 Units restriction enzymes were used in the RFLP method to determine the genotype distributions of MTHFR (C677T and A198C) gene variations. Restriction was performed for 3 hours at 37^0C using specific restriction enzymes for each region. ***Hinf I*** and ***MboII*** restriction enzymes were used respectively to determine genotype distributions of MTHFR C677T and A1298C gene variants. Genotype distributions of MTHFR C677T gene variation were observed by 2.5% agarose gel electrophoresis. The PCR product length for the MTHFR C677T gene variation was observed at 198 bp. CC homozygous (198 bp), CT heterozygous (198 bp, 175 bp and 23

bp), TT homozygous (175 bp and 23 bp) genotypes were observed for the MTHFR C677T gene variation (Figure 1). Genotype distributions of MTHFR A1298C gene variation were observed by 3.5% agarose gel electrophoresis. The PCR product length for MTHFR A1298C gene variation genotype distributions was observed at 163 bp. CC homozygous (84 bp, 31 bp and 30 bp), AC heterozygous (84 bp, 56 bp, 31 bp, 30 bp, 28 bp and 18 bp) and AA homozygous genotype (56 bp, 31 bp, 30 bp, 28 bp) and 18 bp) genotypes were observed (Figure 2). The primer sequences, PCR conditions and restriction enzymes used in our study are presented in Table 1. MTHFR (C677T and A1298C) gene variation genotype distributions are presented in Table 2.

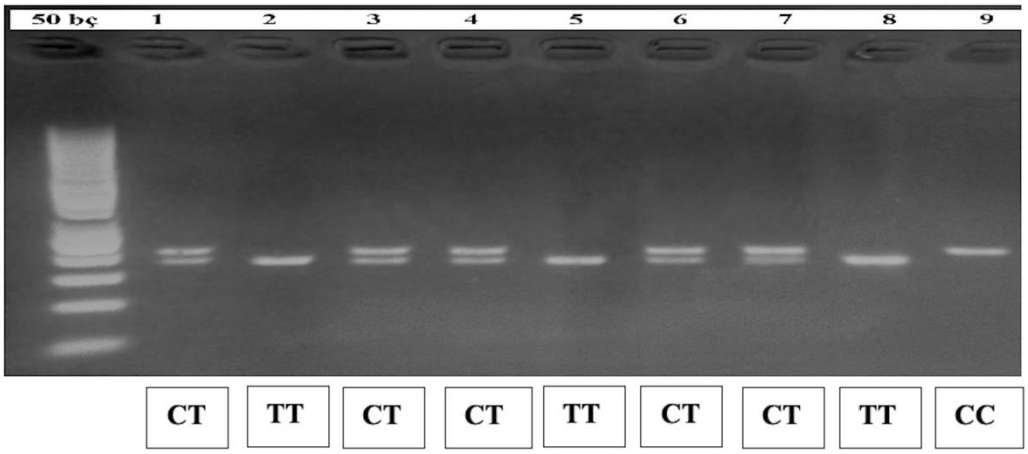
Table 1. Primer series, PCR conditions and restriction enzymes for MTHFR (C677T, A1298C) gene variations

Gene Variations	Primer series	PCR Conditions	RE
MTHFR (C677T)	**FP:**5'-TGAAGGAGAAGGTGTCTGCGGGA-3' **RP:**5'-AGGACGGTGCGGTGAGAGTG-3'	5 minutes at 94^0C 30 seconds at 94^0C 30 seconds at 62^0C 30 seconds at 72^0C } 30cycle 5 minutes at 72^0C	***HinfI***
MTHFR (A1298C)	**FP:**5'-CTTTGGGGAGCTGAAGGACTACTAC-3' **RP:**5'CACTTTGTGACCATTCCGGTTTG-3'	5 minutes at 94^0C 30 seconds at 94^0C 30 seconds at 62^0C 30 seconds at 72^0C } 35cycle 10 minutes at 72^0C	***MboII***

FP: Forward primer; **RP:** Reverse primer; **PCR:** Polymerase chain reaction; **RE:** Restriction enzyme

Table 2. MTHFR (C677T and A1298C) gene variations genotype distributions product lengths

CC: Cytosine-Cytosine; **CT:** Cytosine-Thymine; **TT:** Thymine-Thymine; **AC:** Adenine-Cytosine; **AA:** Adenine-Adenine



Gene Variation	PCR Product Length	Genotype Distributions Product Lengths
MTHFR C677T	**198bp**	**CC** → 198bp **CT** → 198bp, 175bp, 23bp **TT** → 175bp, 23bp (23bp is not observed; 50bp marker)
MTHFR A1298C	**163bp**	**CC** → 84bp, 31bp, 30bp **AC** → 84bp, 56bp, 31bp, 30bp, 28bp, 18bp **AA** → 56bp, 31bp, 30bp, 28bp, 18bp (30bp, 28bp and 18bp are not observed; 50bp marker)

Figure 1. Patient and control RFLP fragments for MTHFR C677T gene variation

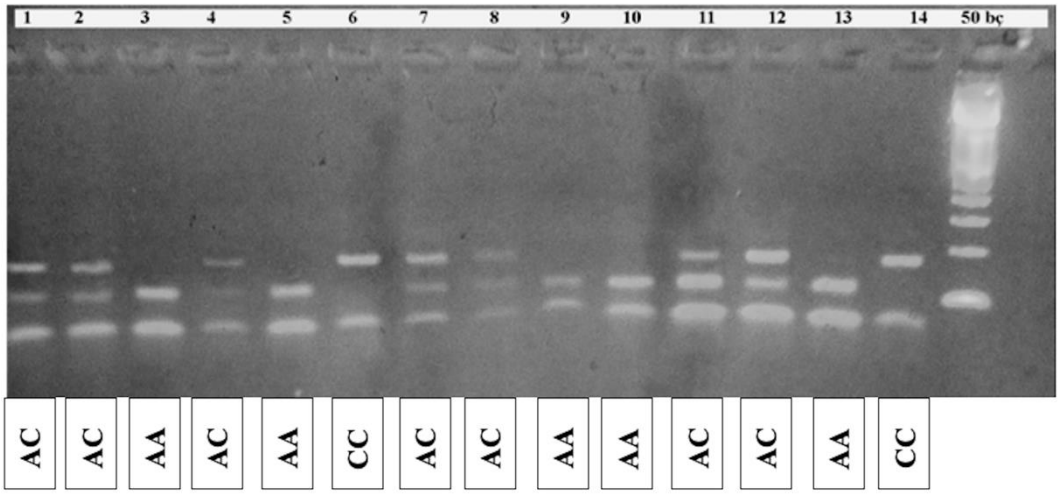


Figure 2. Patient and control RFLP fragments for MTHFR A1298C gene variation

Statistical analysis

Statistical analysis of the data obtained in our study was performed using the SPSS 20.0 (Statistics Package of Social Science) statistical program. Results were expressed as a percentage or mean ± standard deviation. Statistical significance was accepted as $p<0.05$. The Chi-Square test was used to compare of hypertension, diabetes mellitus, history of cerebrovascular disease (CVD), heart diseases, smoking and alcohol parameters between the ischemic stroke patient group with atrial fibrillation and the ischemic stroke patient group with normal sinus rhythm. Comparison of fasting blood glucose, triglyceride, high-density lipoprotein and low-density lipoprotein parameters was performed using the Independent Samples test or the Mann-Whitney U test. Genotype distributions of MTHFR (C677T and A1298C) gene variation between ischemic stroke patient group with atrial fibrillation and healthy control group were compared using Chi-Square test. Genotype distributions of MTHFR (C677T and A1298C) gene variation between ischemic stroke patient group with atrial fibrillation and ischemic stroke patient group with normal sinus rhythm were compared using Chi-Square test. Chi-Square test was used to compare genotype distributions of MTHFR (C677T and A1298C) gene variations by gender between ischemic stroke patients with atrial fibrillation and ischemic stroke patients with normal sinus rhythm in the patient group.

RESULTS

The significant difference was not determined between the atrial fibrillation ischemic stroke patient group and the normal sinus rhythm ischemic stroke patient group in terms of hypertension, diabetes mellitus, history of CVD, heart diseases, smoking, alcohol, fasting blood glucose and high-density lipoprotein parameters ($p>0.05$). However, the significant difference was detected between the ischemic stroke patient group with atrial fibrillation and the ischemic stroke patient group with normal sinus rhythm in terms of cholesterol, triglyceride and low-density lipoprotein parameters ($p<0.05$) (Table 3).

Table 3: Clinical parameters between atrial fibrillation and normal sinus rhythm in patient group

		Patient group (n:80)		
		AF (n:21)	NSR (n:59)	p
HYPERTENSION	(-)	3 (%14,3)	23 (%39,0)	0,071[a]
	(+)	18 (%85,7)	36 (%61,0)	
DIABETES MELLITUS	(-)	13 (%61,9)	43 (%72,9)	0,506[a]
	(+)	8 (%38,1)	16 (%27,1)	
HISTORY OF CVD	(-)	16 (%76,2)	38 (%64,4)	0,472[a]
	(+)	5 (%23,8)	21 (%35,6)	
HEART DISEASES	(-)	15 (%71,4)	48 (%81,4)	0,089[a]
	(+)	6 (%28,6)	11 (%18,6)	
SMOKING (PACKAGE/DAY)	(-)	18 (%85,7)	42 (%71,2)	0,304[a]
	(+)	3 (%14,3)	17 (%28,8)	
ALCOHOL	(-)	19 (%90,5)	46 (%78,0)	0,331[a]
	(+)	2 (%9,5)	13 (%22,0)	
FBG		121,52±40,46	124,24±63,17	0,457[b]

CHOLESTEROL	159,48±36,54	186,12±42,01	**0,012[b]***
TRIGLYCERIDE	102,43±40,82	157,95±89,07	**0,009[b]***
HDL	40,04±11,44	40,36±9,74	0,903[b]
LDL	107,23±32,88	127,49±35,34	**0,024[b]***

[a]Chi-Square Test
[b]Independent Samples Test or Mann-Whitney U Test
AF: Atrial Fibrillation; **NSR:** Normal Sinus Rhythm; **CVD:** Cerebravascular Diseses; **FBG:** Fasting Blood Glucose; **HDL:** High Density Lipoprotein; **LDL:** Low Density Lipoprotein; **(-):** Absent; **(+):** Exist

In the ischemic stroke patient group (atrial fibrillation), CC homozygous genotype of MTHFR C677T gene variation was observed more than CT heterozygous genotype. TT homozygous genotype was not observed in the ischemic stroke patient group with atrial fibrillation. The significant difference was not determined in terms of genotype distribution of MTHFR C677T gene variation in the ischemic stroke patient group with atrial fibrillation ($p>0.05$). In ischemic stroke patient group with atrial fibrillation, AC heterozygous genotype of MTHFR A1298C gene variation was observed more than AA homozygous and CC homozygous genotypes. The significant difference was detected in terms of genotype distribution of MTHFR A1298C gene variation in the ischemic stroke patient group with atrial fibrillation ($p<0.05$) (Table 4).

Table 4: MTHFR gene variations genotype distributions in ischemic stroke patient group with atrial fibrillation

Polymorphisms	Genotypes	Patient (n:21)	%	p
MTHFR C677T	CC	10	47,60	
	CT	11	52,40	0,827[a]
MTHFR A1298C	AA	5	23,80	
	AC	14	66,70	**0,004[a]***
	CC	2	9,50	

[a]Chi-Square Test
CC: Cytosine-Cytosine; **CT:** Cytosine-Thymine; **AC:** Adenine-Cytosine; **AA:** Adenine-Adenine

The significant difference was not determined between the ischemic stroke patient group with atrial fibrillation and the healthy control group in terms of genotype distribution of MTHFR (C677T and A1298C) gene variations ($p>0.05$). In the ischemic stroke patient group with atrial fibrillation, the CT heterozygous genotype of the MTHFR C677T gene variation was observed more than the CC homozygous genotype. TT homozygous genotype of MTHFR C677T gene variation was not observed in the ischemic stroke patient group with atrial fibrillation. In the ischemic stroke patient group with normal sinus rhythm, CC homozygous genotype of MTHFR C677T gene variation was observed more than CT heterozygous and TT heterozygous genotypes. CC homozygous genotype, CT heterozygous genotype and TT homozygous genotype of MTHFR C677T gene variation were observed more in the ischemic stroke patient group with normal sinus rhythm compared to the ischemic stroke patient group with atrial fibrillation. The significant difference was detected between the ischemic stroke

patient group with atrial fibrillation and the ischemic stroke patient group with normal sinus rhythm in terms of genotype distribution of MTHFR C677T gene variation ($p<0.05$). AC heterozygous genotype of MTHFR A1298C gene variation was observed more in ischemic stroke patient group with atrial fibrillation compared to AA homozygous and CC homozygous genotypes. In the normal sinus rhythm ischemic stroke patient group, AC heterozygous genotype of MTHFR A1298C gene variation was observed more than AA homozygous and CC homozygous genotypes. AA homozygous, CC homozygous and AC heterozygous genotypes of MTHFR A1298C gene variation were observed more in the ischemic stroke patient group with normal sinus rhythm compared to the ischemic stroke patient group with atrial fibrillation. The significant difference was not determined between the ischemic stroke patient group with atrial fibrillation and the ischemic stroke patient group with normal sinus rhythm in terms of MTHFR A1298C gene variation genotype distributions ($p>0.05$) (Table 5).

Table 5: MTHFR genotype distributions between atrial fibrillation and normal sinus rhythm in patient-control groups and in patient group

		Patient-Control (n:113)			**Patient (n:80)**		
		AF (n:21)	**NSR (n:92)**	**p**	**AF (n:21)**	**NSR (n:59)**	**p**
MTHFR C677T	CC	10 (%22,2)	35 (%77,8)	0,055[a]	10 (%25,6)	29 (%74,4)	**0,016[a*]**
	CT	11 (%20,0)	44 (%80,0)		11 (%36,7)	19 (%63,3)	
	TT	0 (%0,0)	13 (%100,0)		0 (%0,0)	11 (%100,0)	
MTHFRA1298C	AA	5 (%13,2)	33 (%86,8)	0,555[a]	5 (%33,3)	10 (%66,7)	0,781[a]
	AC	14 (%21,5)	51 (%78,5)		14 (%25,0)	42 (%75,0)	
	CC	2 (%20,0)	8 (%80,0)		2 (%22,2)	7 (%77,8)	

[a]Chi-Square Test

AF: Atrial Fibrillation; **NSR:** Normal Sinus Rhythm; **CVD:** Cerebravascular Diseses; **FBG:** Fasting Blood Glucose; **HDL:** High Density Lipoprotein; **LDL:** Low Density Lipoprotein

In addition, the significant difference was not determined between the ischemic stroke patient group with atrial fibrillation and ischemic stroke patient group with normal sinus rhythm in terms of gender ($p>0.05$). CC homozygous, TT homozygous, and CT heterozygous genotypes of MTHFR C677T gene variation were observed more in male patients with normal sinus rhythm than in female patients with normal sinus rhythm. The significant difference was not determined for the genotype distributions of the MTHFR C677T gene variation in the normal sinus rhythm ischemic stroke patient group in terms of gender ($p>0.05$). The CC homozygous genotype of the MTHFR C677T gene variation was significantly higher in male patients with atrial fibrillation compared to female patients with atrial fibrillation. CT heterozygous genotype was observed significantly more in female patients with atrial fibrillation compared to male patients with atrial fibrillation. The significant difference was detected for the genotype distributions of the MTHFR C677T gene variation in ischemic stroke patients with

atrial fibrillation in terms of gender ($p<0.05$). The significant difference was not determined for the genotype distributions of the MTHFR A1298C gene variation in ischemic stroke patients with atrial fibrillation and normal sinus rhythm in terms of gender ($p>0.05$) (Table 6).

Table 6: MTHFR genotype distributions between atrial fibrillation and normal sinus rhythm in terms of gender distributions

		Gender		
		Female (n:34)	**Male (n:46)**	**p**
ECG RESULTS	AF	12 (%35,3)	9 (%19,6)	0,186[a]
	NSR	22 (%64,7)	37 (%80,4)	
AF/MTHFR C677T	CC	2 (%16,7)	8 (%88,9)	**0,002[a*]**
	CT	10 (%83,3)	1 (%11,1)	
NSR/MTHFR C677T	CC	12 (%54,5)	17 (%45,9)	0,705[a]
	CT	7 (%31,8)	12 (%32,4)	
	TT	3 (%13,6)	8 (%21,6)	
AF/MTHFR A1298C	AA	3 (%25,0)	2 (%22,2)	0,971[a]
	AC	8 (%66,7)	6 (%66,7)	
	CC	1 (%8,3)	1 (%11,1)	
NSR/MTHFR A1298C	AA	5 (%22,7)	5 (%13,5)	0,593[a]
	AC	14 (%63,6)	28 (%75,7)	
	CC	3 (%13,6)	4 (%10,8)	

[a]Chi-Square Test

AF: Atrial Fibrillation; **NSR:** Normal Sinus Rhythm; **CC:** Cytosine-Cytosine; **CT:** Cytosine-Thymine; **AC:** Adenine-Cytosine; **AA:** Adenine-Adenine; **ECG:** Electrocardiogram

DISCUSSION

Ischemic stroke mortality and morbidity vary according to region. Ischemic stroke is a multifactorial disease caused by the interaction of genetic factors and environmental factors (Zheng et al., 2020; Hou et al., 2018). Atrial fibrillation known as common cardiac arrhythmia greatly increases the risk of ischemic stroke in the elderly. Ischemic stroke in patients with atrial fibrillation causes atrial fibrosis and decreased myocardial contractility. Thus, blood flow is interrupted, especially in the left atrial appendage. In addition, a high incidence of carotid artery stenosis has been determined in atrial fibrillation patients with acute ischemic stroke, therefore, ischemic stroke may develop in atrial fibrillation patients with ischemic stroke due to small vessel occlusion (Dinç et al., 2020). In addition to environmental factors, genetic factors are also very important in the risk of atrial fibrillation. Genetic studies in patients with familial atrial fibrillation have shown coding mutations in genes that inhibit electrical conduction. As a result of these mutations the duration of the cardiac action potential is reduced which causes faster repolarization of heart cells (Victorino et al., 2021). In some previous studies, a significant association between MTHFR C677T gene variation and the development of ischemic stroke has been reported. The prevalence of the MTHFR C677T gene variation varies considerably in different races and populations. T allele frequency of MTHFR C677T gene variation has been reported as high in European, North American and East Asian populations and low in African population (Hou et al., 2018). Various studies have been performed with different races and populations to investigate the relationship between MTHFR (C677T and A1298C) gene variations and ischemic stroke. In a previous meta-analysis study, MTHFR A1298C gene variation was associated with a higher risk of ischemic stroke. The T allele of the MTHFR C677T gene variation has been associated

with a higher risk of ischemic stroke. The C allele of this gene variation is thought to be a protective factor for the development of ischemic stroke. In a Romanian population study, MTHFR C677T gene variation was associated with higher cardiovascular comorbidity, thromboembolic and bleeding risk in patients with non-valvular atrial fibrillation. In the same population, MTHFR A1298C gene variation has been associated with a higher incidence of lacunar stroke and stroke recurrence rate (Chita et al., 2020). In another study conducted with the Singapore population, the TT homozygous genotype of the MTHFR C677T gene variation was determined a genetic risk factor for acute ischemic stroke disease (Du et al., 2020). In a Chinese population study, the T allele of the MTHFR C677T gene variation and the A allele of the MTHFR A1298C gene variation have been associated with an increased risk of ischemic stroke (Zheng et al., 2020). In a study performed with the Brazilian population, MTHFR C677T gene variation was not determined as a genetic risk factor for ischemic stroke. In a meta-analysis study, TT homozygous genotype and T allele of MTHFR C677T gene variation were detected as genetic risk factors for the development of ischemic stroke (Shinjo et al., 2007). Numerous studies have identified a significant association between MTHFR C677T gene variation and increased risk of ischemic stroke. A significant relationship has been suggested between the T allele of the MTHFR C677T gene variation and decreased MTHFR enzyme activity (Kim et al., 2017). In a study performed with the Southern Chinese Hakka population, the TT homozygous genotype of the MTHFR C677T gene variation has been associated with increased plasma total homocysteine levels and an increased risk of ischemic stroke (Hou et al., 2018). In another study performed with a South Indian population, a significant relationship was determined between MTHFR C677T gene variation and ischemic stroke, ischemic stroke subtypes, and hemorrhagic stroke. In the same study, CT heterozygous genotype of MTHFR C677T gene variation was determined as genetic risk factor for ischemic stroke and hemorrhagic stroke. In addition, a significant relationship was determined between CT heterozygous genotype of this gene variation and intracranial large artery, lacunar stroke, undetermined etiology. In a meta-analysis study, the TT homozygous genotype of the MTHFR C677T gene variation has been associated with ischemic cardiovascular disease and venous thromboembolism. In another study, it was determined that the CT heterozygous genotype of MTHFR C677T gene variation decreased the MTHFR enzyme activity by approximately 30%, while the CC and TT homozygous genotypes decreased the enzyme activity by 60%. In a study performed with the Tamil South Indian population, MTHFR A1298C gene variation was not identified as a genetic risk factor for the development of ischemic stroke, but MTHFR C677T gene variation hes been associated with an increased risk of ischemic stroke (Das et al., 2015). In another study performed with the Chinese population, the MTHFR C677T gene variation may affect the risk of ischemic stroke by modulating serum homocysteine levels (Nissar et al., 2015). In our study performed with the Thrace population, the significant difference was not determined between the ischemic stroke patient group with atrial fibrillation and the healthy control group in terms of genotype distributions of MTHFR (C677T and A1298C) gene variations. In the ischemic stroke patient group (atrial fibrillation), the AC heterozygous genotype of the MTHFR A1298C gene variation was observed significantly more than the other genotypes. The significant difference detected in terms of genotype distribution of MTHFR A1298C gene variation in the ischemic stroke patient group. CC and TT homozygous genotypes were observed significantly more in the ischemic stroke patient group with normal sinus rhythm than in the ischemic stroke patient group with atrial fibrillation. Although the significant difference was not determined in terms of MTHFR A1298C gene variation genotype distributions between ischemic stroke patients with atrial fibrillation and ischemic stroke patients with normal sinus rhythm, a significant difference was detected in MTHFR C677T gene variation genotype distributions. In addition, the CC homozygous genotype of the

MTHFR C677T gene variation was determined significantly higher in male patients with atrial fibrillation compared to female patients with atrial fibrillation. In female patients with atrial fibrillation, the CT heterozygous genotype of the MTHFR C677T gene variation was observed significantly more than in male patients with atrial fibrillation. In the ischemic stroke patient group with atrial fibrillation, a significant difference was detected for the genotype distributions of the MTHFR C677T gene variation in terms of gender.

CONCLUSION

Numerous studies have been performed to investigate the roles of MTHFR (C677T and A1298C) gene variations in ischemic stroke patients. However, there are very limited studies aiming to investigate MTHFR (C677T and A1298C) gene variations in ischemic stroke patients with atrial fibrillation. Different results were obtained in studies carried out with different populations. Differences in the results of the studies may be due to different selection criteria for the patient and control groups, they were performed with different races and populations and population sizes. In our study, the significant difference was not determined in terms of MTHFR A1298C gene variation genotype distributions between ischemic stroke patients with atrial fibrillation and ischemic stroke patients with normal sinus rhythm in the Thrace population, but a significant difference was detected in terms of MTHFR C677T gene variation genotype distributions. In addition, a significant difference was determined for the genotype distribution of the MTHFR C677T gene variation in the ischemic stroke patient group with atrial fibrillation in terms of gender. Determining the relationship between MTHFR (C677T and A1298C) gene variations and atrial fibrillation is extremely important in terms of obtaining genetic biomarkers in the early diagnosis, prognosis, progression and development of new treatment strategies for ischemic stroke-associated atrial fibrillation. In order to confirm the results of our study, more comprehensive studies should be carried out with different races and populations.

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SETTING UP RAPID DETECTION AND QUANTIFICATION OF LISTERIA MONOCYTOGENES IN FOODS BY REALTIME PCR

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Abstract

In this study, we develop a quantitative PCR (qPCR) technique to detect and quantify *Listeria monocytogenes* (*L.monocytogenes*) in foods. The real-time PCR assay using Sybr green was designed to amplify a 96-bp fragment of *hly*A gene in this strain. Other strains of *Listeria* spp and non-*Listeria* were used to verify the specificity of the primers. Standard curve was constructed to demonstrate the correlation between logCFU/ml and the value of cycle threshold (Ct). The quantification limit was of 92 CFU/ml *L.monocytogenes* and relevant Ct was 37.18. By using this method, the time-frame was faster than current standard-cultured method, reduced from 5-7 days to 1-2 days. We applied this assay in several artificially contaminated culture enriched foods, including meat, milk, yoghurt, eggs and rice. This method enabled detection of more than 10^2 CFU *L.monocytogenes* per 10 g food sample after 4 hours enrichment. Two samples which contained less than 10^2 CFU *L.monocytogenes* could not be quantified.

Keywords: *Listeria monocytogenes*, realtime PCR, *hly*A gene, quantification.

Introduction

Listeria monocytogenes (*L.monocytogenes*) is a foodborne pathogen that causes human listeriosis [1]. This disease has a high mortality rate (20 to 30%) and is most likely to sicken pregnant women and their newborns, adults aged 65 or older, and people with weakened immune systems [2]. These bacteria invade
human intestinal cells and proliferate inside phagocytic vacuoles and nonphagocytic cells, such as epithelial cells, hepatocytes, and endothelial cells [3]. Among many methods for detecting *L. monocytogenes* in foods, culture methods remain the gold standard for the identification of this pathogen in food samples; however, these methods are time-consuming and labor-intensive [1]. Therefore, molecular method such as PCR technique has been examined to detect *L. monocytogenes* because of its high sensitivity, specificity, and rapidity. However, the sensitivity and specificity of PCR assay are dependent on the target genes, DNA extraction procedure, and primer sequences. In addition, this test only can determine the presence or absence of target bacteria rather than the number of bacterial colonies. Therefore, the real-time PCR (RT-PCR) method has been suggested. With using Sybr green, primers and target genes used for PCR methods can be adapted for RT-PCR analysis, and the incorporation of a fluorescent reporter system into the primer design or the synthesis of fluorescently labeled probes or beacons that are specific only for a target sequence is not required [4]. To improve and optimize RT-PCR methods, several studies have been conducted to quantify *L. monocytogenes* in various foods [5], [6]. However, the detection specificity and sensitivity of this quantitative PCR method need to be improved. In this study, we aim to

evaluate the quantitative detection of *L. monocytogenes* in various food sample by RT-PCR, using a specially designed set of primers and fluorescence dye Sybr green. Moreover, we compared this method with the traditional culture method using at Quality assurance and testing center 2 (QUATEST 2).

Materials and methods

Microorganism. *L. monocytogene* ATCC 19115 is preserved and cultured at QUATEST2. These bacteria are enriched in ALOA medium for 18hr at 37^0C. The culture was centrifuged at 5000 rpm for 10 mins at 4^0C, and the pellet was washed twice with 0.1% buffered peptone water, followed by 10-fold serial dilution with BPW. The different diluents were then used as inocula for food matrices.

Primers. The primers used for Realtime PCR were designed with Primer3 software (https://primer3.ut.ee/) in order to target the *hly*A gene, a specific sequence for *L. monocytogenes*. The primer sequences are shown in Table 1, were synthesized by IDT company.

Table 1. Sequence of primers targeted *hly*A gene

	Sequence (5'-3')	**%GC**	**Length**	**Tm**	**Length of product**
Forward primer (878-897)	CGCTTACGGCAGCATCAAAA	50	20	56,5	96 bp
Reverse primer (954-973)	TCTCAAGTGTGGCGTATGGC	55	20	57,5	

DNA isolation. DNA from *L. monocytogene* cultures and spiked food samples was isolated by using the Accurive bacteria DNA prep kit (KT Biotech). The protocol is followed by the instruction with some modification. Briefly, 1ml cell culture was suspended into 1 ml KTL1 solution, vortex carefully, followed by centrifuging for 5 min at 13000rpm. The supernatants were discarded, and 150 µl KTL2 solution was then added to the pellet for resuspension by vortex. The tubes were incubated at 100^0C for 15-20 min, followed by cooling at room temperature for 5 min. The supernatants collected by centrifugation at 13000 rpm for 5 min were ready to use for RT-PCR

RT-PCR assay. Each RT-PCR assay was performed in a 25µl volume of the mixture (master mix with Sybr green 2X, primers, and template DNA). Reactions were run in an ABI Prism 7900 HT. Thermal cycling was 95^0C for 10 min and 40 cycles as follows: 95^0C for 15 s and 57^0C for 30s. RT-PCR assays with cycle threshold (Ct) values of ≥39 were considered negative.

Standard curve preparation. The standard curve was constructed based on correlation between value of cycle threshold (Ct) and *L.monocytogenes* concentration (logCFU/ml). The quantification limit and R^2 value for amplification for the RT-PCR were calculated through three independent experiments. The DNAs extracted from serially diluted *L. monocytogenes* cultures were amplified by RT-PCR. The signals for each dilution of *L. monocytogenes* in BPW were plotted against the log CFU, and standard curves were prepared.

Food sample collection and quantify of *L. monocytogenes*. Fresh meat, steamed fork, milk, and rice were used in this study. Ten-gram amounts of all samples were added into 40 ml of Fraser buffer (Oxoid) and homogenized in a stomacher for a minute, then incubated at 37^0C for 4hr [1]. The collected samples with or without *L.monocytogenes* were applied to the DNA extraction, and followed by RT-PCR assay to determine the amount of *L. monocytogenes*.

Moreover, 1-ml amounts of the homogenates were used to enumerate *L. monocytogenes* on Aloa agar for 24 to 48 hr.

Result and discussion

Specificity of designed primers. The PCR primers were not matched with other Listeria strains and any other microbial DNA sequence obtained from the BLAST-N program (http://www.ncbi.nlm.nih.gov). The RT-PCR assay showed that using these primers *L. monocytogenes* strain tested were positive, with CT values of 23.95, but *E. coli* and *Salmonella* sp were all undetected (fig 1). These results indicate that the PCR primers designed in this study are specific to *L. monocytogenes*.

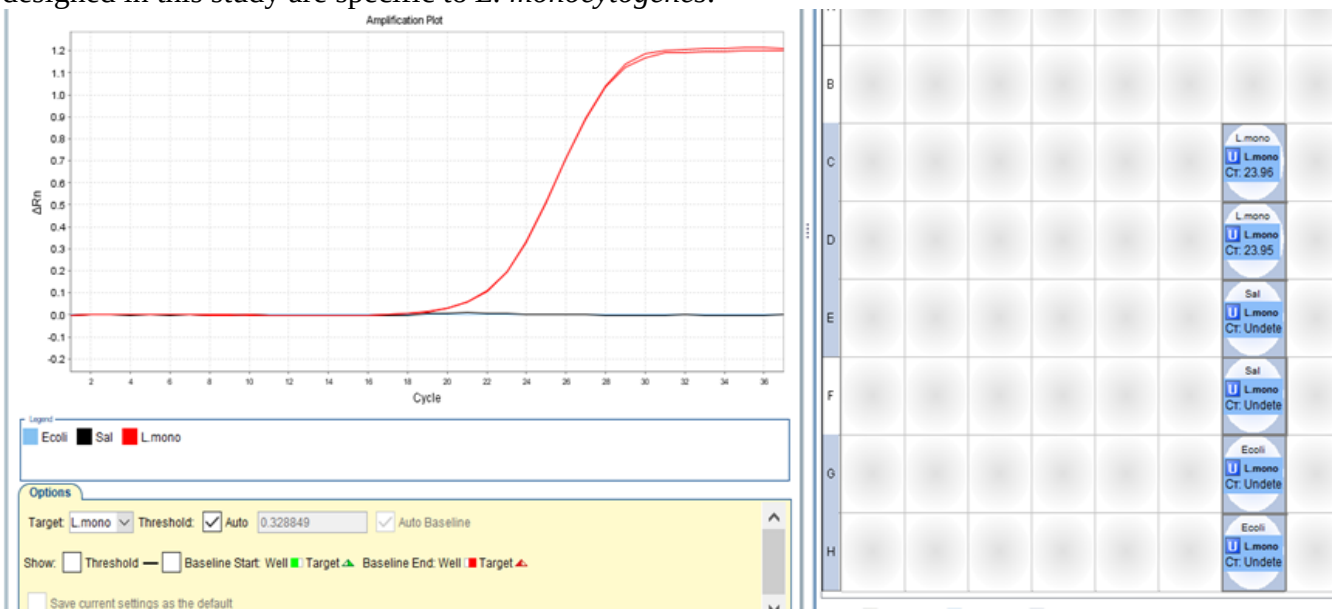


Figure 1. *Melting cure and Ct value of RT-PCR using design primers on L.monocytogene, E.coli and Salmonella sp*

Optimization of annealing temperature

Next, we investigated the annealing temperature for the reaction from 55^0C to 62^0C. Except for the change in the annealing temperature, the other components (template DNA, primer, ...) and other conditions (equipment conditions, reaction time, ...) of the reaction are kept the same. The result was shown in table 2. At 57^0C, the value of Ct was lowest, so we chose this optimal annealing temperature for the following experiments.

Table 2. The result of annealing temperature investigation

Annealing temperature	Value of Ct
55^0C	28.91±0.05
57^0C	27.91±0.41
60^0C	29.46±0.5
62^0C	29.93±0.01

Correlation between the value of cycle threshold (Ct) and *L.monocytogenes* concentration

To evaluate whether the RT-PCR assay could produce a dose-dependent standard curve, we plotted the Ct values versus different *L. monocytogenes* decimal dilution. The curve showed a linear relationship between the Ct values and logarit colony per unit (CFU/ml) counts, with a high R^2 value (0.985) (Fig. 2). This result indicates that the RT-PCR detection method using the above designed primers and sybr green dye is appropriate to quantify *L. monocytogenes.*

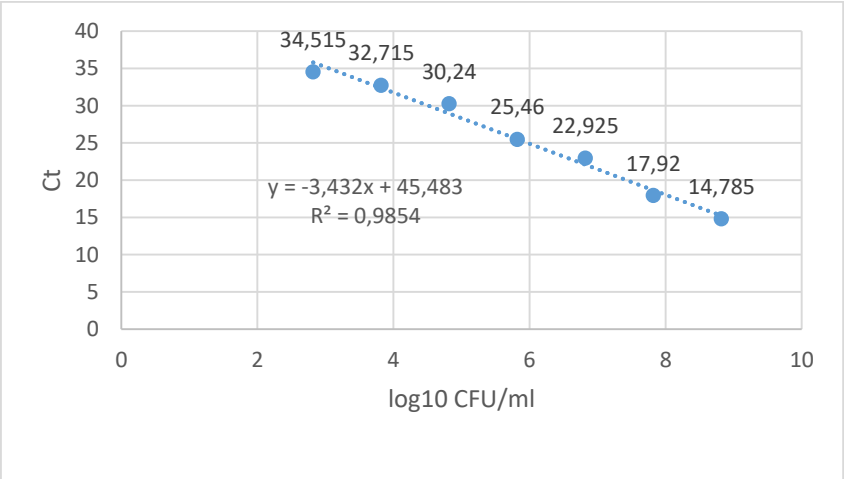


Figure 2. *The standard curve demonstrate correlation between the value of cycle threshold (Ct) and L.monocytogenes concentration (CFU/ml)*

Apply on food samples

After optimizing the quantification process of *L. monocytogenes* by RT- PCR, we applied this procedure on some food samples. Because testing food sample matrices by traditional culture method have no infection with *L. monocytogenes*, so we mixed this bacteroa into the above samples and conducted two survey examination. Firstly, all samples were divided into 10 g, put in filter bag. 1 ml of standard strain *L. monocytogenes* was added to each samples, marked"+" as positive ones. After incubation at 36^0C for 4 hours, we carried out the DNA separation and quantified the mixed strain density. As shown in table 3, *L.monocytogenes* can be detected in different food samples; otherwise, the matrices do not significantly affect to this method and the RT-PCR results are relative to those of traditional culture method.

Table 3. Detection of *L.monocytogenes* in food samples

Sample	Ct value	Result		Concentration of *L.monocytogenes* in stock
		Log CFU/ml	CFU/ml	
Fork+	27.35±0.05	5.43	27×10^4	$7,7 \times 10^4$
Steamed meat+	27.27±0.01	5.45	28×10^4	
Corn milk+	27.33±0.11	5.43	27×10^4	
Milk powder+	27.19±0.03	5.47	30×10^4	
Milk powder	Not Detected (ND)			
Corn milk	ND			
Fork	ND			
Steamed meat	ND			

Then, we added different concentrations of the standard strain into all the food sample matrices, quantified and compared with the results given by culture methods. The results were shown in Table 4. Samples that are randomly mixed at high concentration of bacteria have interpolation results that are close to that of traditional culture methods. For samples that are mixed at concentrations below the 100 CFU/ml, the RT-PCR in this study can not detect.

Table 4. Quantify L.monocytogenes in food samples

Sample	Ct value	Result		Result (current standard-cultured method)
		Log CFU/ml	CFU/ml	
Pumpkin milk	27.06±0.37	5.37	$2,3 \times 10^5$	$4,0 \times 10^5$
Egg	35.37±0.16	2.95	$8,8 \times 10^2$	$6,9 \times 10^2$
Beef	24.37±0.61	6.15	$1,4 \times 10^6$	$1,6 \times 10^6$
RTE	35.17±0.8	3.00	$1,0 \times 10^3$	$1,1 \times 10^3$
Fresh milk	ND			41
Yoghurt	ND			65

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