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V. ASC 2023 / Spring Congress

Everchanging World: Challenges and Opportunities

10-12 May 2023, Multan - Pakistan

hosted by

MNS - University of Agriculture, Multan, Pakistan

FULL TEXTS BOOK / TAM METİNLER KİTABI



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Design	İlknur Hersek Sarı
1 st Edition	September 2023
E - ISBN	978-625-6942-45-5
Pub. Rights	51372 / HOLISTENCE PUBLICATIONS
Address	Sarıcaeli Köyü, Sarıcaeli Yerleşkesi, ÇOMÜ Teknopark No:29 D. 119 Merkez/Çanakkale / TURKEY
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Preface

The 5th International Academic Studies Congress under the theme of “Everchanging World: Challenges and Opportunities” was held on May 10 – 12, 2023, at MNS University of Agriculture Multan-Pakistan. There were eight sub-themes covering all important areas of natural sciences and social sciences. The main objective of the congress was to provide a forum for discussion, to facilitate and integrate the knowledge and expertise on the challenges and opportunities of the changes happening worldwide. The congress brought together researchers, scholars, and students from all areas around the world. A total number of 374 papers were presented in the congress from 25 universities/organisations of 17 countries.

In the congress 7 concurrent sessions were held for three days from morning to evening in which there were invaluable presentations. I thank Prof. Erol Turan, Rector, Food & Agriculture University, Konya, Turkiye, co-chairs, Dr. Logaiswari Indiran (Malaysia), Prof. Dr. Avdesh Jha (India), Asst. Prof. Dr. Azamat Maksudunov (Kyrgyzstan), Prof. Dr. Yu-Feng Lee (USA), Prof. Dr. Nasiba Naralieva (Uzbekistan), Assoc. Prof. Dr. Mustafa Aslan (Turkiye) and Congress Secretary Lect. Sidar Atalay Şimşek for their efforts to make this event very successful. I also sincerely thank the presenters, chairpersons, and the participants, who contributed magnificently to the success of the congress. My team tried hard to ensure that the congress is well organized, and I hope that it met the expectations. I, on my personal behalf and on behalf of the team, extend the best wishes to all those who have contributed to this scholarly event from around the globe.

Prof. Asif Ali (T.I.)

Vice Chancellor, MNS University of Agriculture, Multan-Pakistan
Congress Chairpersons

CONTENTS

Preface	ii
Congress Executive Board.....	IX
Organizing Committee at MNS University of Agriculture, Multan.....	XI
Society of Social Scientists at MNS University of Agriculture, Multan	XIII
Participants	XV
Keynote Speakers.....	XXIII
 A CASE STUDY ON SUSTAINABLE DESIGN THROUGH THE TWELVE PRINCIPLES OF GREEN ENGINEERING	1
A PORTABLE SOLAR POWERED WATER FILTER SYSYEM: PROPOSAL STUDY	11
DEVELOPMENT OF AN AUTOMATIC CABLE WINDER FOR THE AVIATION HEADSET	17
THE POTENTIAL OF TOURISM PHOTOGRAPHY: A CASE STUDY OF PADANG BESAR, MALAYSIA	25
AUTOMATED CONVEYOR SYSTEM TRAINING KIT	37
DESIGN AND ANALYSIS OF HANDY DRILLING MACHINE FOR EDUCATIONAL PURPOSE (WOODWORK)	43
EFFECTIVE MAINTENANCE ENGINEERING AND MANAGEMENT IN MANUFACTURING INDUSTRY.....	53
TURKISH VERSION OF CAREER COMPETENCIES QUESTIONNAIRE: A CROSS-CULTURAL VALIDATION STUDY	57
PERSONALITY TRAITS AND ORAL PRESENTATION ANXIETY AMONG ESL LEARNERS	63
A SUSTAINABLE INNOVATIVE CONGKAK BOARD.....	71
TEACHER COMPETENCIES.....	87
POLLUTION HAVENS HYPOTHESIS: SMOOTH QUANTILE EVIDENCE FROM BRICS	93
THE IMPACT OF CORRUPTION ON TAX REVENUES: EVIDENCE FROM CENTRAL AFRICAN COUNTRIES	103
THE USE OF THE DMAIC MODEL IN IDENTIFYING POTENTIAL DEFECTS IN MANUFACTURING INDUSTRY	113
THE USAGE OF RICE HUSK ASH IN THE MATERIALIZATION OF CEMENT SAND BRICKS: IMPACT AND POTENTIAL	119
THE ROLE OF THE HUMAN FACTOR IN THE ISLAMIC AND SCIENTIFIC APPROACH TO THE MANAGEMENT OF THE DIGITAL ECONOMY.....	127
SOSYAL MEDYA İLETİŞİMİ VE İLETİŞİM HASTALIKLARI	137
HEMŞİRELERİN ÇOCUK İHMAL VE İSTİSMAR BELİRTİLERİ İLE İSTİSMAR RİSKLERİNİ TANILAMA DÜZEYLERİNİN BELİRLENMESİ	
DETERMINATION OF NURSES' LEVELS OF DIAGNOSİİG CHILD NEGLECT AND ABUSE SYMPTOMS AND ABUSE RISKS	145
DÜNYA ÜZERİNDE KRONİK HASTALIKLARIN DURUMU	

THE STATUS OF CHRONIC DISEASES IN THE WORLD	153
HASTALARDA GÖRÜLEN BEKLENMEDİK SEMPTOMLarda (AĞRI, ANKSİYETE VE UYKU BOZUKLUĞU) AROMA TERAPİNİN ETKİSİ	
UNEXPECTED SYMPTOMS IN PATİENTS (PAIN, ANXIETY AND SLEEP DISORDER) EFFECT OF AROMA THERAPY	161
HEMŞİRELİK EĞİTİMİNDE SİMÜLASYON UYGULAMALARININ ETKİNLİĞİNİN BELİRLENMESİ	
DETERMINING THE EFFICIENCY OF SIMULATION APPLICATIONS IN NURSING EDUCATION	167
MAKİNE ÖĞRENMESİ ALGORİTMALARINI KULLANARAK EKSİK VERİ TAMAMLAMA	173
OPEN BANKING (AÇIK BANKACILIK) TÜKETİCİ DAVRANIŞLARININ GELECEĞİNİ DEĞİŞTİREBİLİR MI?	
.....	185
MUHASEBE ÖĞRENCİLERİNİN ONLINE EĞİTİMDE WEB TABANLI YAZILIM KULLANIMININ TEKNOLOJİ KABUL MODELİ İLE İNCELENMESİ	193
SOSYAL MEDYA KULLANIMININ İŞLETMELERDEKİ ÖNEMİ	
THE IMPORTANCE OF SOCIAL MEDIA USE IN BUSINESSES	203
HAVAYOLU ULAŞIMI HİZMET KALİTESİNİN SERVQUAL YÖNTEMİYLE ÖLÇÜMÜ	
MEASUREMENT OF AIR TRANSPORTATION SERVICE QUALITY BY SERVQUAL METHOD	209
THE ART OF PSYCHOLOGISM BY CHINGIS AYTMATOV IN THE STORY "JAMILIA" ON THE BACKGROUND OF ART AND AESTHETIC EXPERIENCE OF THE KYRGYZ AND WORLD LITERATURE	221
COGNITIVE FLEXIBILITY AS A PREDICTION OF CAREER COMPETENCY IN UNIVERSITY STUDENTS.....	227

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A CASE STUDY ON SUSTAINABLE DESIGN THROUGH THE TWELVE PRINCIPLES OF GREEN ENGINEERING

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Abstract

Sustainable design is an essential aspect of mitigating environmental impacts, and green engineering offers a framework for incorporating sustainable design practices. The twelve principles of green engineering provide a guideline for designing sustainable products and systems, emphasizing reducing waste and pollution, minimizing resource depletion, and prioritizing sustainability over short-term gains. This case study focuses on sustainable design through the twelve principles of green engineering. Through case studies and analysis, this assignment examines the application of the twelve principles to sustainable design and explores the benefits and challenges of sustainable design practices. The study referred to in the paragraph focuses on the “Twelve Principles of Green Engineering,” which are intended to guide the use of science and technology in achieving sustainability. The conclusions drawn from the study relate to how these principles can be used to optimize the use of resources and reduce environmental impact in the short term. The principles are seen as an essential strategy for achieving sustainability through green engineering. However, the study also highlights the potential for even greater sustainability gains through the reengineering of entire systems, such as personal transportation networks. By considering the principles of green engineering in the design of these systems, it becomes possible to create more flexible and sustainable solutions. Therefore, the study emphasizes the continued importance of the principles of green engineering, both in optimizing current technologies and in creating more sustainable systems for the future. The case study concludes by highlighting the importance of sustainable design in mitigating environmental impacts and providing direction for future research and practice in the field of green engineering.

Keywords: sustainable design; green engineering; environmental impacts

1. Introduction

The concept of sustainable design and green engineering has gained significant attention in recent years as the environmental impact of human activities has become increasingly apparent. The depletion of natural resources, pollution, and climate change are some of the significant environmental problems caused by human activities. As such, sustainable design and green engineering have emerged as essential fields of study for engineers, designers, and policymakers who seek to mitigate the environmental impact of human activities.

Sustainable design and green engineering aim to create products and systems that are environmentally friendly, socially responsible, and economically viable. These fields promote the use of renewable resources, the reduction of waste and pollution, and the development of products and systems that have a minimal environmental impact. Sustainable design and green engineering consider the entire lifecycle of a product or system, from the sourcing of raw materials to the end-of-life disposal or recycling.

Since then, sustainable design and green engineering have become increasingly important in various fields, including architecture, product design, and manufacturing. Governments, businesses, and individuals have also recognized the importance of sustainable design and green engineering and have taken steps to incorporate these principles into their practices.

2. LITERATURE REVIEWS

Sustainable design is an essential aspect of mitigating environmental impacts and ensuring a sustainable future for our planet. With the increasing awareness of the environmental impact of human activities, the field of green engineering has emerged as a framework for incorporating sustainable design practices. Green engineering emphasizes the need to design products and systems that prioritize the well-being of the environment and society over short-term gains.

The twelve principles of green engineering provide a comprehensive guide for designing sustainable products and systems. These principles were developed to guide engineers in creating products and systems that are environmentally friendly and sustainable. The principles emphasize reducing waste and pollution, minimizing resource depletion, and prioritizing sustainability in the design process. Each principle is interconnected and works together to create a holistic approach to sustainable design.

The application of the twelve principles of green engineering to sustainable design is crucial in mitigating environmental impacts. By case studies, this paper explores how these principles can be utilized in designing sustainable products and systems. The case studies highlight the importance of integrating the twelve principles into the design process to create products and systems that are sustainable and environmentally friendly. This paper also examines the benefits and challenges of sustainable design practices. While sustainable design has numerous benefits for the environment and society, there are also challenges to implementing these practices. The challenges include technological and financial barriers, as well as a lack of awareness and education on sustainable design practices. In conclusion, this assignment emphasizes the importance of sustainable design through green engineering principles. Sustainable design is critical for mitigating the environmental impact of human activities and creating a more sustainable future. The twelve principles of green engineering provide a valuable guide for incorporating sustainable design practices, and their application can result in sustainable products and systems that benefit society and the environment.

3. METHODOLOGY

One research method that could be used to study sustainable design through the twelve principles of green engineering is a case study analysis. This method involves analysing real-world cases of sustainable design projects and evaluating them against the principles of green engineering. To conduct a case study analysis, the researcher would select several sustainable design projects that align with the principles of green engineering.

These could include projects in a variety of fields, such as renewable energy, sustainable transportation, or green building design.

Once the projects have been selected, the researcher would collect data on each project, including information on the design process, materials used, energy consumption, and environmental impact. This data could be collected through a combination of interviews with project stakeholders, review of project documentation, and on-site observations. Next, the researcher would evaluate each project against the principles of green engineering. This would involve comparing the design choices made in each project to the principles, and assessing the extent to which the project aligns with each principle.

Finally, the researcher would draw conclusions based on the analysis of the case studies. This could include identifying best practices for sustainable design, highlighting areas for improvement in existing projects, and making recommendations for future sustainable design projects. One advantage of the case study analysis method is that it allows for a detailed examination of real-world examples of sustainable design. This can provide insights into the challenges and opportunities associated with implementing sustainable design principles in practice. Additionally, the method allows for a comparison of different projects, which can help identify patterns and trends across different fields of sustainable design.

However, one potential limitation of this method is that the findings may not be generalizable to other contexts or projects. Additionally, the analysis may be subjective to some degree, as the researcher's interpretation of the principles of green engineering may differ from others. To address these limitations, it may be necessary to supplement the case study analysis with other research methods, such as surveys or focus groups, to obtain a more comprehensive understanding of sustainable design practices and principles.

4. RESULTS AND DISCUSSIONS

Green engineering is a field that seeks to create environmentally responsible and sustainable products, processes, and technologies. The objective of green engineering is to reduce the negative impact that human activities have on the environment by promoting the use of renewable resources, minimizing waste and pollution, and prioritizing prevention over treatment. The principles of green engineering provide a framework for achieving these objectives and can be applied to a wide range of industries and applications as simplified in Table 1.

Table1. Twelve (12) Principles of Green Engineering – Problems & Solutions

No.	Principle	Problem	Solution
1	Inherently Risk-Free -refers to the concept that a product or process is designed in a way that eliminates or minimizes the risk of harm or adverse effects to humans and the environment.	Many products and processes in various industries have inherent risks that can harm humans and the environment such as, chemicals used in manufacturing processes can be hazardous to human health and the environment if not properly managed. This poses a significant challenge to promote sustainable and safe practices.	Green engineering and sustainable design provide a framework for developing products and processes that are inherently risk-free or have a minimal environmental impact using renewable resources, reducing waste and pollution, and designing products and processes that eliminate or minimize the use of hazardous chemicals.
2	Instead of Therapy use Prevention -preferable to prevent waste than to treat or clean up after it has already been created.	Waste is not just some unfortunate byproduct of a process but is deliberately included in it without much thought. Even though it seems obvious that should be minimized or avoid producing waste whenever possible.	All technologies aimed at achieving waste-free design.
3	Create a Separation Plan -separation and purification processes should be planned to use the least amount of energy and resources possible.	The initial design decisions made in the early stages of a project can have a significant impact on how easy it is to separate and purify products, enabling their subsequent reuse and recycling.	Simplify the process of recovering, recycling, and reusing materials.
4	Maximize Efficiency in terms of Mass, Energy and Time -states that the efficiency of mass, energy, space, and time should be maximized in the design of products, processes, and systems.	This approach can also be applied in the water and wastewater industries, where treatment systems are controlled.	Effectively control complex water and wastewater treatment processes, advanced control algorithms should be considered.
5	Input-Pushed vs Output-pulled -by the use of energy and resources, processes and systems should be “output pulled” rather than “input pushed”.	Increasing the output generation of a system can alleviate the stress caused by an increase in input.	This approach involves recycling and reusing materials instead of disposing of them, which conserves energy and resources while reducing environmental harm.
6	Maximize Complexity -design decisions on recycling, reuse, or good disposition, inherent entropy and complexity must be seen as an investment.	Separating the different components for recycling would be a challenging and time-consuming process with little financial benefit, thus a poor choice for these extremely complicated items or processes.	By improving recycling, it can help to reduce waste and promote sustainability.
7	Instead of immortality, Choose Durability -targeted durability, not immortality.	Products that have a lifespan that extends far beyond their effective economic use are often the root cause of environmental issues	It is important to design products with sustainability in mind and consider their entire lifecycle.

8	Fulfil Need while Reducing Excess -design for unneeded capacity or capability solutions should be viewed as a design mistake.	The water and wastewater sectors after the individual household has its own set of restrictions as well as a variety of inputs and outputs.	To improve water safety and minimize disinfection byproducts, exploring alternative disinfection methods is crucial.
9	Minimize the Variety of Materials -to encourage disassembly and value retention, material diversity in multi-component items should be reduced.	By limiting the range of materials used, it may be more challenging to incorporate sustainable or eco-friendly options, which could have negative environmental impacts.	Creating sustainable products involves considering the environmental impact of the materials used and the product's end-of-life management.
10	Integrate Regional Energy and Materials Flows -the integration and interconnection with accessible energy and material flows must be incorporated into the design of products, processes, and systems.	Integrating regional energy and material flows can create social and political challenges.	Develop mechanisms that can prevent conflicts from disrupting progress, promote cooperation and collaboration, and create a more cohesive and sustainable regional integration process.
11	Design for Future Commerce -systems, processes, and products should be created to function in an “afterlife” of commerce.	The future is inherently unpredictable, and designing for it requires making assumptions and projections that may not come to fruition.	Adaptive management approaches involve continuously monitoring and adjusting plans based on new information and changing circumstances should be considered.
12	Instead of Decreasing, Renewable -emphasizes that energy and material inputs should be replenishable rather than finite.	The continued exploitation of diminishing resources only serves to exacerbate environmental harm as virgin compounds require repeated extraction procedures.	Encouraging consumers to adopt more sustainable consumption patterns can help to reduce demand for virgin resources and minimize the environmental impact of resource extraction.

In conclusion, the review paper methodology provides researchers with a comprehensive and systematic approach to analysing and synthesizing existing literature on a specific topic. This methodology involves several key steps, including defining the research question, conducting a literature search, screening, and selecting studies, extracting data, synthesizing findings, and writing the review paper. By following this methodology, researchers can ensure that their review is thorough, accurate, and informative.

One of the main advantages of the review paper methodology is that it provides a structured and rigorous approach to reviewing the literature. By defining clear research questions and conducting a systematic literature search, researchers can ensure that they capture all relevant studies on a particular topic. This can help to identify gaps in knowledge, highlight areas for future research, and provide evidence-based recommendations for practice.

Moreover, the review paper methodology is particularly useful for synthesizing findings across multiple studies. By extracting key data from each publication and synthesizing the findings across the literature, researchers can identify patterns, trends, and themes that may not be apparent from individual studies. This can provide a more comprehensive and nuanced understanding of a particular topic and can help to inform evidence-based practice.

4.1 An Example Of Converting Foundry Waste Materials Into Bricks (Principles 6, 9 & 12)

Recycling foundry waste into bricks is a project that aims to produce high mechanical compressive properties and to reduce the cost of the production of the building bricks. Nowadays, foundry waste of CO₂ sand is abundant because after used the foundry waste CO₂ sand, the factory or the others party will just throw away them into the disposal site. In addition, the use of foundry waste CO₂ sand can help to reduce the cost of production of building bricks and utilize residual waste aware garbage, most of which is highly regarded by some. With the success of this project, foundry waste CO₂ sand can be used to produce a composition of

new brick ornaments (Refer to Fig. 1). The aim is to change the waste foundry sand with the original sand to make a cement brick. From that, it can help Malaysia to decrease the discharge of the waste. Current use of cement brick in the growing economic situation got more request from many companies in development. The production of cement brick by industry also increased based on increasing the usage of cement brick. Addition in waste of foundry sand can reduce the absorption and porosity in structure.



Fig. 1. Experimental Study on Recycling Foundry Waste into Bricks

4.2 Inorganic Waste Treatment (Principles 2, 3, 5 & 6)

The majority of inorganic waste at Polytechnic Seberang Perai (PSP) is generated by engineering departments such as the Electrical and Mechanical Departments. Waste cables and PVC pipes used in the wiring laboratory are collected in separate containers for the electrical department and sold back to the recycling company. The department also encourages students and lecturers to collect electronic items such as batteries, unused phones, and others from workshops, homes, offices, or hostels and bring them to the department so that they can be disposed of properly and without harming the environment. This recycling initiative runs throughout the semester, with proceeds going to fund laboratory and department operations.

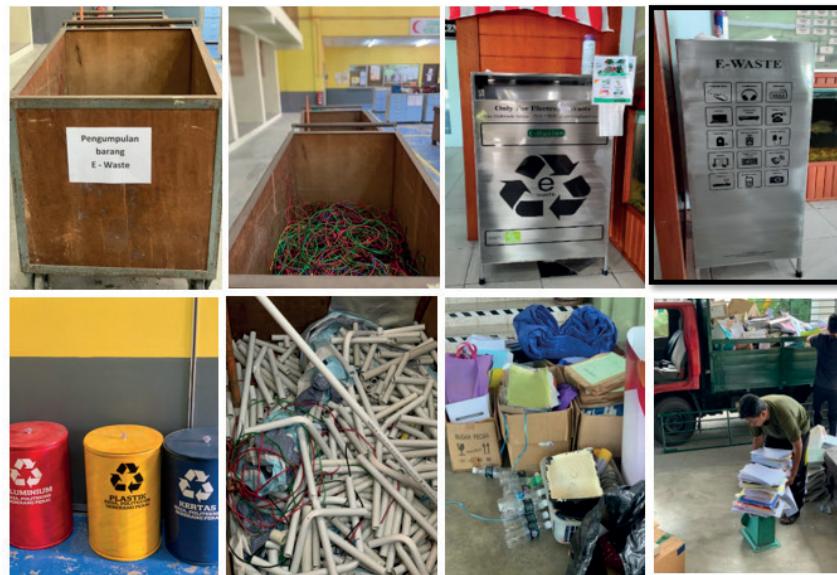


Fig. 2. Examples of e-waste, plastic, bottle, PVC and paper

4.3. Toxic Waste Treatment (Principles 1, 5 & 12)

Several programs have been organized to provide good hazardous management at Polytechnic Seberang Perai, allowing trash to be treated systematically. The waste of wasted cooking oil is one of the harmful wastes discovered in PSP. Canteen operators generate the garbage. The PSP has invited Fat Hopes Energy Company to collect the waste for recycling. In addition to good administration, the canteen earns money from the sale of used oil waste. Water waste machine treatment is also available in the electrical engineering department. Where the etching process's chemical waste will be cleansed before disposal. Chemical waste will be collected in a receptacle and sent to a processing facility for disposal.

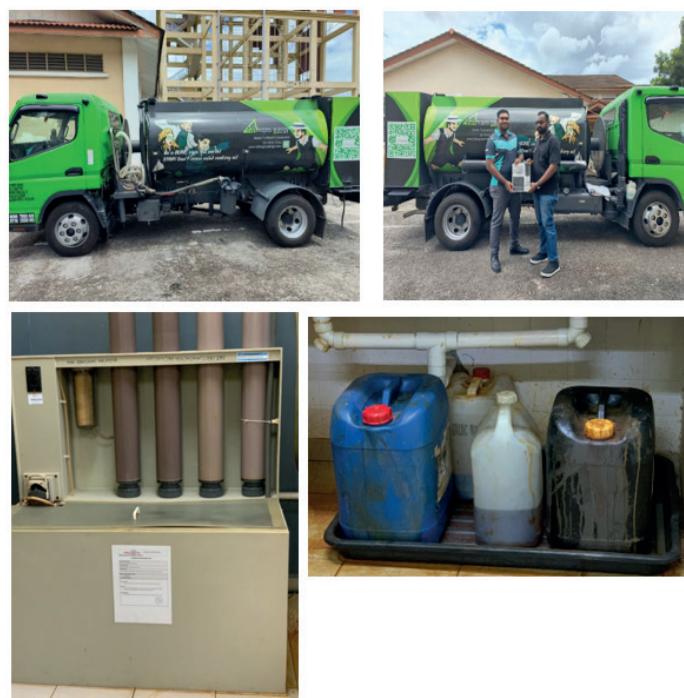


Fig. 3. Examples of the toxic waste (used cooking oil) and etching process treatment

4.4. Energy and Climate Change (Principles 10, 11 & 12)

Polytechnic Seberang Perai plans to save even more energy by paying strict attention to energy management. Polytechnic Seberang Perai (PSP) collaborates with Taiace Engineering Sdn. Bhd. (Energy Services Company) through the Energy Performance Contract (EPC), which directly contributes to the reduction of energy costs and the implementation of energy efficiency and conservation measures. This indirectly assists Polytechnic Seberang Perai in consistently lowering the costs of electricity demand.

The following Energy Saving Measures (ESM) were implemented in PSP as part of the Energy Performance Contract (EPC) between PSP and Taiace Engineering Sdn. Bhd. (TESB). Both sides signed a contract that guaranteed a 10% savings with a one-year baseline before implementation. Any savings between 10% and the indicated percentage will be split 20:80 between PSP and TESB. The following are a list of energy-saving initiatives that have been implemented:

- (i) 36W T8 Fluorescent replaced with 18W tube fluorescent type;
- (ii) 18W T8 Fluorescent Light Bulb replacement with 10W tube fluorescent type;
- (iii) 250W HPSV street light replaced with 150W induction type;
- (iv) High-efficiency split unit air conditioner installation for server rooms;
- (v) Hydrocarbon Gas Migration;
- (vi) Optimization cooling system-Variable frequency drive; and
- (vii) Online web dashboard.

According to Table II, Polytechnic Seberang Perai's efforts to save even more energy by replacing energy-efficient appliances have resulted in a reduction of 15.75% of total energy consumptions on campus. This has indirectly reduced the cost of electricity.

Table 2. ENERGY EFFICIENCY appliances

Appliance	Total Number	Total number energy efficiency appliances	Percentage
LED Lamp	8,500	8,000	94%
Air-conditioning	150	80	53%
Variable frequency drive (VFD)	20	20	100%
150W HPSV Street Light	88	80	90%
		Average Percentage	84.25%

5. CONCLUSIONS

In recent years, there has been growing recognition of the importance of sustainable design through the twelve principles of green engineering. As we face an increasingly urgent need to address the environmental challenges that we are currently experiencing, traditional approaches to design and engineering are no longer sufficient. Instead, we need to adopt a more sustainable approach that prioritizes environmental sustainability and social responsibility.

The twelve principles of green engineering provide a comprehensive framework for sustainable design, covering a wide range of areas, including waste reduction, renewable materials, energy efficiency, and pollution prevention. By incorporating these principles into our design processes and practices, we can create products and systems that minimize waste, reduce energy consumption, and promote environmental sustainability.

Ongoing research and development in this area are crucial to advance sustainable design practices and drive innovation in various fields, including construction, product design, renewable energy, and sustainable agriculture. This research is exploring new ways to design and construct buildings that reduce energy consumption, developing new materials and manufacturing processes that minimize waste, and investigating new technologies for generating renewable energy. It is also exploring new methods for sustainable agriculture that can reduce soil erosion, promote biodiversity, and improve the sustainability of our food systems.

The benefits of sustainable design through the twelve principles of green engineering are clear. It can help us to reduce our environmental impact, promote social responsibility, and create a more sustainable, equitable, and just society. By implementing these principles, we can build a future that is resilient, inclusive, and environmentally sustainable.

However, there are also challenges that must be overcome to achieve these goals. One of the most significant challenges is to ensure that sustainable design practices are widely adopted and implemented across all industries and sectors. This will require significant changes in the way we approach design and engineering, as well as a shift in mindset and culture towards sustainability.

In conclusion, sustainable design through the twelve principles of green engineering is essential for addressing the environmental challenges we face today. Ongoing research and development in this area are crucial to advance sustainable design practices and drive innovation. By implementing these principles, we can build a more sustainable future and create a world that is resilient, inclusive, and environmentally sustainable. However, achieving these goals will require significant changes in the way we approach design and engineering, as well as a cultural shift towards sustainability. We must continue to invest in research and development and work collaboratively across industries and sectors to ensure that sustainable design becomes the norm rather than the exception.

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A PORTABLE SOLAR POWERED WATER FILTER SYSTEM: PROPOSAL STUDY

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Abstract

The water system in the hostel produces poor-quality tap water, which is unfit for the students to drink. Traditional water filters take a while to filter the water and are inefficient in providing clean water to many kids. The Plan, Do, Control and Act (PDCA) cycle was used as the foundation for the creation of a portable solar-powered water filter system to address this problem. Water filters, solar panels, water pumps, brackets, and other materials were used to construct the system, which was created using the Inventor software. The hostel's water supply is a potential issue because it can include impurities that render the water unsafe for drinking. The portable solar-powered water filter device provides the student with clean, safe water, enhancing their quality of life. The water filter, which efficiently removes contaminants from the water, is powered by the solar panel and draws water from a dependable source. The filter contains activated carbon, silica sand, zeolite, and mineral sand. Clean water will be effectively produced with this procedure. As it can be advertised in the larger corporate sector to offer clean water to communities, this project has the potential to be commercialized.

Keywords: water filter; portable; solar; pump

1. INTRODUCTION

Modern life is dependent on electricity, particularly alternating power (AC) power. Electricity is necessary for people to use and charge their technological devices. However, AC power has its restrictions and is difficult to get in far-off places. For instance, a water pump needs a power source to run, yet in the wilderness it might be impossible to find AC electricity. Water pumps can be powered by diesel generators, but their upkeep and operation are costly. Consequently, my research will investigate the more affordable and environmentally friendly option of using solar energy to run water pumps. The power output of the solar panel must be evaluated to identify the kind of solar panel needed to power a 12V direct current (DC) water pump. Even though the solar panel's voltage is higher than the water pumps, a voltage regulator or DC-DC converter can step down the solar panel's output to 12V so that the water pump is powered.

A mechanical tool called a water pump is used to transport water from one place to another. There are many uses for water pumps, from moving water for irrigation, livestock, and industrial processes to pumping water from wells for domestic consumption. Several fuels, including electricity, diesel, petrol, and solar energy, can be used to power water pumps. They are available in various shapes and sizes, ranging from tiny hand-operated pumps to massive industrial pumps. The impeller, a revolving part that propels the water, and the motor or engine that drives the impeller are the two essential parts of a water pump. There are numerous kinds of pumps as well, each with its own unique characteristics, such as centrifugal pumps, submersible pumps, and diaphragm pumps. While utilizing a renewable energy source, using solar energy to power water pumps can dramatically lower operating and maintenance costs. Because they have more moving parts and are vulnerable to wear and tear over time, AC-powered water pumps may require more maintenance. Fig. 1 shows the project dimensions of the proposed project design.

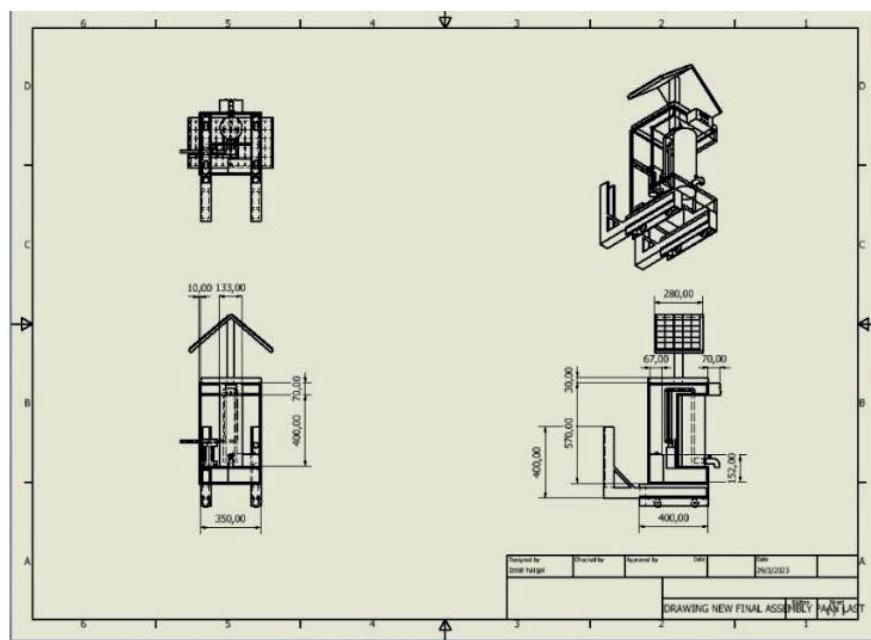


Fig 1. Project Dimensions

2. METHODOLOGY

The process flow as in Fig. 2 shows the steps used to complete this project from the start until end.

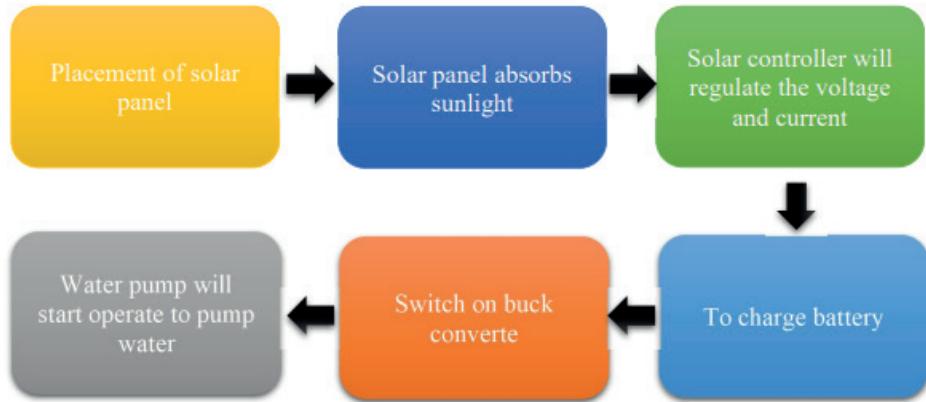


Fig. 2. Design and Development Process

Based on Fig. 2, firstly, solar panel absorbs sunlight, and the solar controller regulates the voltage and current from solar panel. Then, solar controller will output a steady current to charge battery. Switch on the buck converter to connect the battery and water pump and the output of buck converter to power the water pump. After that, the water pump will start operating to pump water. The power requirements of the pump, the size and capacity of the solar panel, and the storage capacity of the battery system must all be carefully considered when designing a solar panel system to power a water pump.

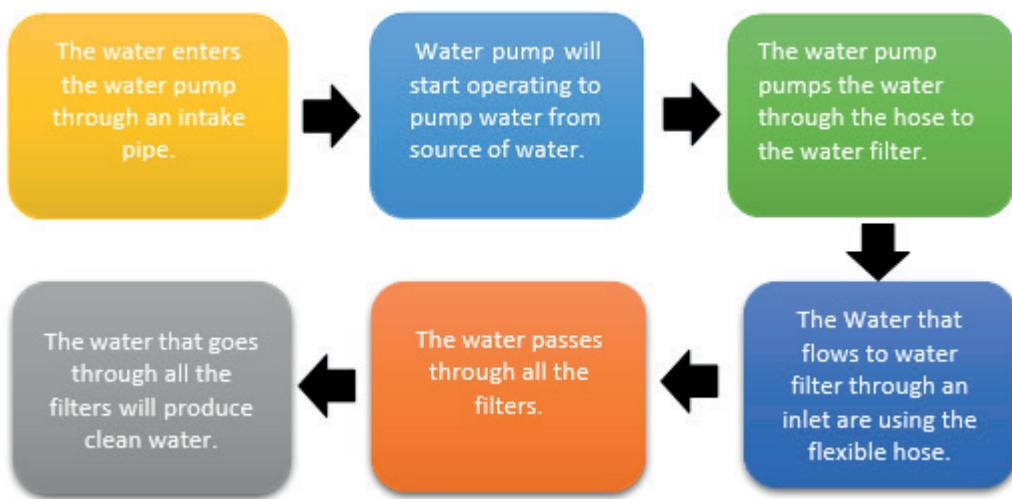
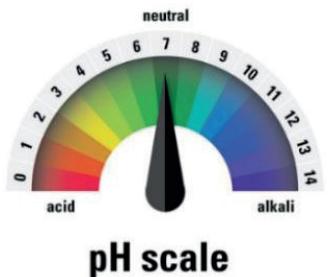


Fig. 3. Process flow the Portable Solar Powered Water Filter System

By referring to Fig. 3, firstly, two different intakes, which are made up of direct pipes and other water sources, allow water to enter the water pump. The water pump will then start working to pull water from the water supply. Water is delivered to the water filter by the water pump through a hose. The flexible hose and sufficient water pressure from the water pump are used to sustain the water's flow as it enters the water filter through an input. Following that, the water is forced through every filter by a water pump. Clean water will eventually be produced from the water that passes through all the filters. When building a solar panel system to power a water pump, it is important to take the power requirements of the pump, the size and capacity of the solar panel, and the storage capacity of the battery system into consideration.

3. RESULTS AND DISCUSSIONS

Table 1. Result Comparisons of Two Portable Water Filter System

NAME	MULTI LAYER WATER FILTER SYSTEM	DETACHABLE WATER FILTER SYSTEM																
PICTURE																		
PROCEDURE	 <ul style="list-style-type: none"> • Pour hostel & cafe water; and • Wait until water is being filtered 	 <ul style="list-style-type: none"> • Pour hostel & cafe water; and • Wait until water is being filtered 																
TDS READING	Hostel Water Before: 44 After (final): 89 Cafe Water Before: 41 After (final): 72	Hostel Water Before: 44 After (final): 89 Cafe Water Before: 41 After (final): 72																
pH READING	Hostel Water Before: 6.76 After (final): 7.61 Cafe Water Before: 6.53 After (final): 7.77	Hostel Water Before: 6.76 After (final): 9.19 Cafe Water Before: 6.53 After (final): 9.20																
CHLORINE TESTER SPECIAL	Color change to clear	Color change to clear																
DISCUSSION	The thicker the diameter of the filter, the better the quality of water is produced. Filter needs to be changed to improve TDS and pH readings. Materials needs to be applied into the filter: Peat moss & humic acid	The thinner the diameter of the filter, the water quality will not be changed drastically. Filter needs to be changed to improve TDS and pH readings. Materials needs to be applied into the filter: Peat moss & humic acid																
STANDARDS	 <p>pH scale</p>	<p>TDS in PPM = mg/L</p> <p>Total Dissolved Solids in Parts Per Million</p> <table border="1"> <thead> <tr> <th>TDS (PPM)</th> <th>Water Quality Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Ideal drinking water from Reverse Osmosis, Membrane, etc.</td> </tr> <tr> <td>50</td> <td>Carbon filtration, mountain springs or aquifers.</td> </tr> <tr> <td>100</td> <td>Hard Water (TDS 170)</td> </tr> <tr> <td>200</td> <td>Marginally Acceptable</td> </tr> <tr> <td>300</td> <td>High TDS water from the sea or mineral springs</td> </tr> <tr> <td>400</td> <td>Average Tap Water</td> </tr> <tr> <td>500</td> <td>Standard maximum level drinking water</td> </tr> </tbody> </table> 	TDS (PPM)	Water Quality Description	0	Ideal drinking water from Reverse Osmosis, Membrane, etc.	50	Carbon filtration, mountain springs or aquifers.	100	Hard Water (TDS 170)	200	Marginally Acceptable	300	High TDS water from the sea or mineral springs	400	Average Tap Water	500	Standard maximum level drinking water
TDS (PPM)	Water Quality Description																	
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From Table 1, the TDS of the water throughout the tap water from the hostel and café at PTSS does not improve is because the arrangement of the material is incorrect. The activated carbon layer is too thick compared to the others that it slowed down the flow rate of water through the filter and reduced its effectiveness in removing contaminants. Next, the pH water does not improve as well because there are two materials with mineral sand and zeolite that does not help the filtration process to improve the pH level. So, the materials must be changed. Both materials are not acidic, so it will not change the pH level when the water is undergoing the filtration process. After that, the tap water from both places' changes to no color because of activated carbon that had improved the taste and odor throughout the filtration process. Lastly, Celsius and Fahrenheit have no changes.

Based on the results from the detachable water filter system data collected, there is better reading of TDS and pH over the water from hostel and water from café of PTSS. That is because larger multimedia water filters can produce cleaner water than smaller ones because they have more filtering media and a larger surface area, which increases the amount of time the water spends in contact with the media. As a result, pollutants and impurities are removed from the water more successfully. The size of the detachable water filter system has a smaller surface, thickness, and diameter. Overall, the results are still not the best. That is because of the material selection.

From the findings above, activated carbon, zeolite, silica sand, and mineral sand are commonly used in water filtration to get rid of contaminants and poisons. Each of these filter media serves a specific purpose during the process, increasing the effectiveness of the filtering system. One of the adjustments that must be made is the substitution of peat moss and humic acid for other materials. Mineral sand and silica sand will take the place of both ingredients. Peat moss could slightly reduce the pH of water due to its acidic nature. Peat moss releases organic acids as it filters water because it is constituted of partially decomposed organic material. These organic acids may slightly reduce the pH of the water. In water treatment applications, it is important to carefully monitor the amount of humic acid present because it can have an acidic influence on water and potentially lower pH. Fig. 4 shows the proposed prototype of the portable solar powered water filter system.



Fig. 4. A Proposed Prototype of the Portable Solar Powered Water Filter System

4. CONCLUSIONS

A dependable, long-lasting, and affordable option for supplying clean and safe drinking water is what is anticipated when a water pump is operated using solar energy to circulate through a water filter. The water pump can run continuously without relying on fossil fuels or grid electricity by utilizing solar energy as a renewable and abundant source of power, making it a dependable and sustainable solution for powering water filtration systems. Solar-powered water pumps are not only good for the environment, but they can also save money in the long run. The water pump has very low ongoing costs because there are no fuel or electricity bills, even though there may be upfront installation costs. Due to the potential for financial savings, solar-powered water pumps are a viable choice for supplying clean water. Solar power is a reliable, healthy, and sustainable form of energy that does not harm the environment or the water supply. By employing solar energy to power the water pump, it can reduce the negative effects on the environment and the carbon footprint associated with conventional energy sources, so boosting environmental sustainability.

With a portable solar water filter, the hostel's location should have access to clean, secure drinking water. The water pump is powered by solar energy, making the filter ideal for use in remote locations like camping, the wilderness, etc. By eliminating contaminants, germs, viruses, and other potentially harmful elements, the filter should render the water fit for human consumption. In the filtering process, materials designed to remove contaminants from water, such as ceramic filters, activated carbon, and others, are routinely utilized. Overall, it is expected that a portable solar-powered water filter will be a realistic choice for producing clean drinking water in regions where traditional water treatment methods are unavailable or prohibitive. It offers a sustainable solution for students who need access to clean water while they are on the go.

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DEVELOPMENT OF AN AUTOMATIC CABLE WINDER FOR THE AVIATION HEADSET

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Abstract

In this project, an automatic cable winder is constructed which is specially designed for aviation industry headsets. The aim of this project is to develop an automatic cable winder for the aviation headset which is user friendly. The design comprises of a touch sensor that receives the inputs and actuates the DC motor with the presence of an electronic control system which consists of a forward and reverse speed adjustable motor, optocoupler relay module and breadboard power stick. Solid works is the only software used to fabricate 3D drawings into a usable prototype as well as simple analyses are also executed to determine the performances between the meshing parts and structures. All the structures were fabricated using a lightweight material, PLA to reduce overall weight of the design and minimize the load on the motor that leads in precise and smoother motor operation. Compared with other designs which are available on the market, the structures are designed to be more robust and easier to handle besides electronic control system integration that are simple yet easy for maintenance. It is also observed throughout the development that the adaptability of various electronic components is made to be as precise and accurate as possible for a reliable operation as well as makes the assembling process easy and neat with the completed hardware structures that done via 3D printer. Frequent testing and troubleshooting are also carried out for proper operation of the system which recorded the expansion time of the cable as 14.8 seconds and the retraction time as 24.8 seconds for high mode motor setting at 150 RPM speed level. Thus, these indicate the reduction time as much as 50% during expansion mode and as much as 75% while in retraction operation. As a result, the entire assembly is completed, the communication of the system with hardware structures relatively successful in dispensing and retracting the cable into and out of the system which improves the efficiency and performance of the aircraft operation in return.

Keywords: *automatic cable winder, aviation headset, electronic control system, development, performances*

1. INTRODUCTION

Due to the persistency of high demand to communicate within the exposure of high level of ambient noise environments, various headsets comprising of an active noise reduction (ANR) approach have been developed and introduced to the aviation industry wherein the headset is produced with the generation of anti-noise signal which will then be added to the anticipated communication signal. As the communication is filtered and amplified based on the user desire, cable has been playing an important role in which such communication signals will be carried by the conductor to the receiver. Even though, current aviation industries are being encouraged on the usage of wireless headset but due to the relative complexity and cost, potential users have avoided to purchase and continue to depend on straight cord headset as both the devices carry the same function which is used to achieve a proper communication with the ground personal and pilot. Besides of advance research on the modifications of the headset on various aspects, research have not been emphasized much on the straight cord cable performance. In fact, the current design of the headset only comprises the headset assembly connected to the jacket. As the cable is too long, it made the potential users feel uncomfortable holding the entire length of cable while performing their communications with pilot. This creates a situation where they place the excessive length of the cable on the ground and drag the cable while moving away from the aircraft. Apparently, this could damage the insulator and followed by conductor slowly. Once the cable reaches the maximum tension it leads to the breakage of the conductor that ends up making the user unable to communicate. Thus, an automatic cable winder is developed to reduce cable breakage and increase the cable life.

2. LITERATURE REVIEW

2.0 Cable Design and Configuration

The term “cable” refers to a flexible tension member that is added by strength member and power and/or signal conductors within the structure. Cable is usually used to transmit tensile loads to relocate locations, and they typically possess sufficient flexibility to compensate repeated bending over sheaves and drums (Gibson, Philip T.,2001). When a cable is subjected to combined tension and bending, deterioration and final retirement of the cable will occur due to exertion of forces and motions on each individual element. This leads to a torque imbalance of the component layer that is caused by tension-induced or pressure-induced diameter reduction (Costello, G.A. and Sinha, S.K.,1977) as illustrated in Figure 1. Based on the Figure 1, by considering a cable that passes through a sheave, in a straight portion of the cable (indicated as one lay length) all the elements within a given layer have precisely the same length within a given length of cable. As it passes over a sheave, there is a torque imbalance occur due to bending. The upper outer layer will experience a tension (Position 4 to 5 in Figure 1) while the lower outer layer will experience a compression (Position 5 to 6 in Figure 1). Thus, the process of bending onto a sheave, to compensate helical geometry distortion the cable experiences relative motions among its individual elements that causes a torque imbalance (Gibson, Philip T.,2001).

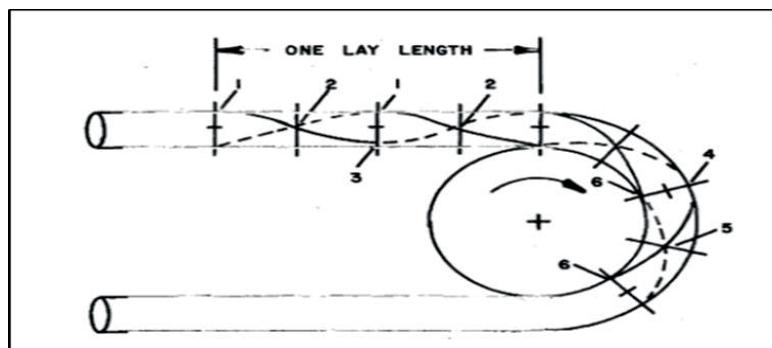


Fig 1. Motion of the cable while bending.

2.1 Minimum Bending Radius

To reduce the torque imbalance, the strategy of determining the minimum bending radius is important in which such method will determine how tight a cable can be bent without putting too much stress on the cable. Besides that, it also provides a safe operational range for the cable's application, ensuring optimal performance (Gleason Reel Corp., n.d). To visualize the method, Figure 2 illustrates the comparison between cable radius and performance of the cable based on the bending radius.

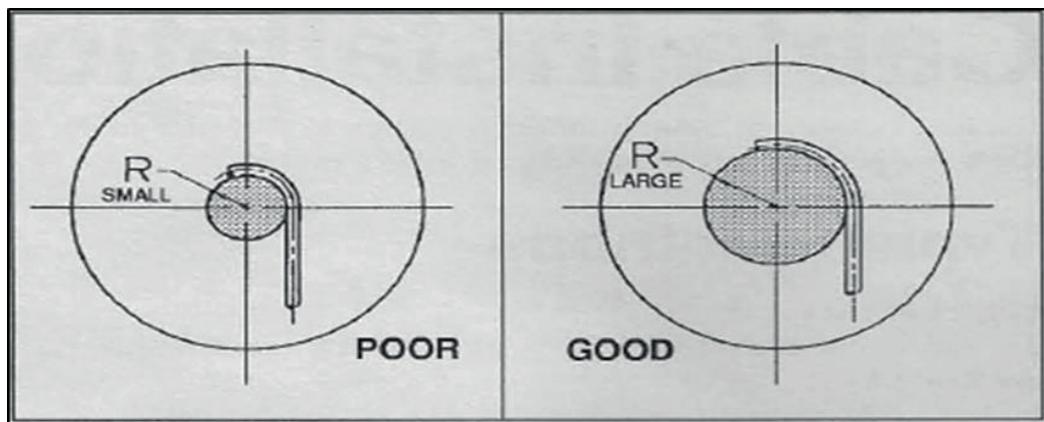


Fig. 2. Comparison between bending radius and the performance of cable onto the sheave.

To measure the minimum bending radius, we can refer to Table 1 that describes the type of cables and the suitable minimum bending radius based on the configuration of the cable (Westflorida components, n.d).

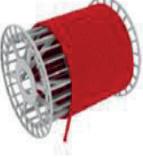
Table 1.

Type	Min Bending Radius
Single or multiple conductor cables - no metallic shielding	8 x the overall cable diameter
Single conductor cable - with metallic shielding	12x the overall cable diameter
Multiple conductor cables-with individually shielded conductor	12x the individual cable diameter or 7 x the overall cable diameter (whichever is greater)
Fiber Optic Cables	6 x (<5000V rating); 8 x (>5000V rating)

2.2 Winding Reel Designs

To design a self-retractable cable, it is vital to analyse the current designs of cable reeling systems in the market today. To ensure the good spooling of the cable on the drum, the angle between the barrel of the drum and the flange should be 90° (Samset, I., 2013). The device for attaching the end of the rope to the drum should be constructed so that it does not spoil the spooling (Gleason Reel Corp., n.d). The following Table 2 will explain the current designs and applications of the cable reeling system and its prominent impacts of the designs while it is being utilized in cables rolling application. The table is as follows:

Table 2.

			
Monospiral Winding Reel	Spreader Winding Reel	Random Winding Reel	Level Winding Reel
Prominent Impacts of the Designs			
<ul style="list-style-type: none"> • High tensile loads can occur during tensile loading • Torsional stresses through the use of guiding pulleys • Abrasion through the inner spokes of the drum body 	<ul style="list-style-type: none"> • Very high tensile load from vertical pull • The metal cleaves on the drum body may lead to abrasion • Temperature drops effect the cable jacket rigidity 	<ul style="list-style-type: none"> • Random winding on the drum • Smaller bending radii stress the conductors which need to be flexible 	<ul style="list-style-type: none"> • Winding of one layer has to be exact over the large width of the reel body • Extreme ambient influences on the jacket (e.g. UV, ozone, coal dust, graphite) • Max 2 layers on drum body because of heat emanation

2.3 Existing Designs of Similar Automatic Cable Winder

Dominique et al. (1996) invented a reel assembly that can carry elongated flexible members or hose. This invention comprises of a reel that connects one end of the elongate member which will be supported by a rotatable frame, frame supported electric motor which used to retract the elongate member and at least one sensor to sense the reel rotational movement. Such an invention works when the sensor senses the rotational movement of the reel at first predetermined amount in payout direction that opposes the retraction direction and actuates the motor to dispense the elongate member. As the amount of second predetermined payout direction is greater than first predetermined direction, it actuates the motor to retracts the hose via a third predetermined amount lower than that necessary to retract completely the hose. The advantages of the invention are the motor is actuated to retract the elongate member completely into the system without depending on manual retraction such as using switch or remote-control unit as well as there is no tension force on the hose is required to unreel the hose from the reel.

On the other hand, Schwartz (1990) introduced the motor-driven electric cable assembly that functions like Dominique et al. (1996) where some minor improvements were made to the system. The operation of the assembly first started with applying some force on the actuator which can be operated by foot pedals. This causes the sidewall of the drum to rotate to a terminal position and engages the switches to activate so that current is supplied to the motor to rewind the cable onto the drum. When the reactance force produced due to the friction between cable and drum exceeds, the side wall of the drum will rotate reversely and disengage the switch and stop current supplies to the motor. Contrarily, to dispense the cable from the system, the cable is pulled out by applying some force on the cable. As an advantage of his invention, it is easier for the cable to drawn out from the drum when sufficient current is supplied to the motor besides of accommodating longer cable and the cable is reeled onto the drum slowly and smoothly that helps to reduce cable wearing which leads to the risk of impact to the cable.

3. METHODOLOGY

To describe the process flow, Figure 3 illustrates the required processes that is executed by the system from the beginning till the end. When the power source (rechargeable battery) is connected by fusing the jack of the rechargeable battery and receptacle of the electrical control system, the system will be switched on automatically. Upon this action is done, the reversible switch is pressed to change the mode of drum's operation either rotates the drum clockwise or anticlockwise direction. Then, the touch sensor is touched by the user by means of placing his/her finger on the sensor pad to operate the system based on the switching mode as chosen during pressing the reversible switch. As a final step, the power system is switched off by disconnecting battery's jack and the system's receptacle.

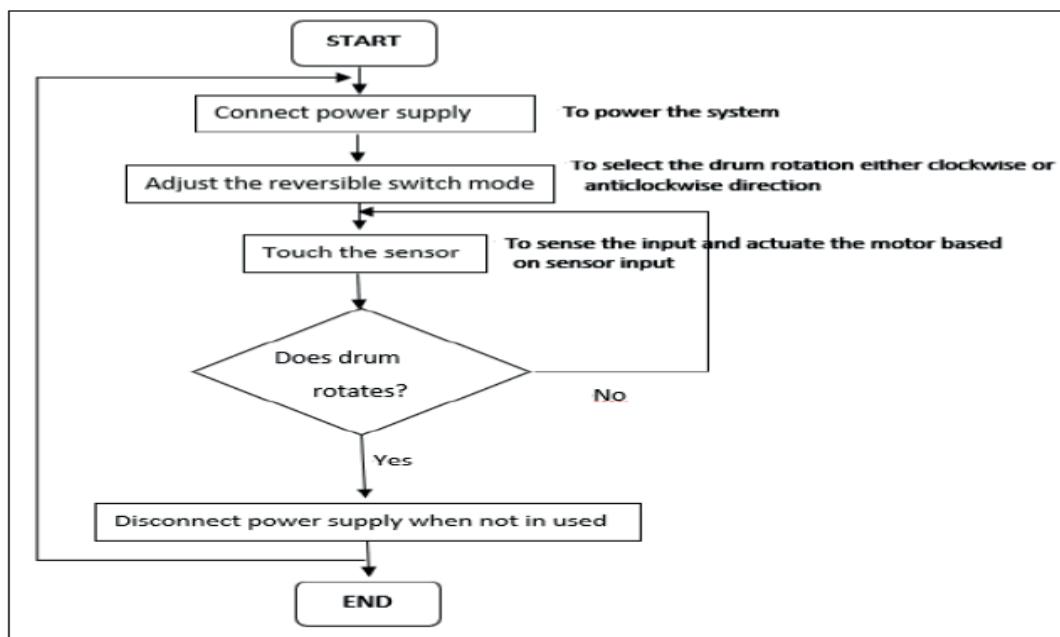


Fig 3. Overall flowchart of the operation of the automatic cable winder.

3.0 Integration of Hardware and Electronics Control System

Upon all the hardware parts that are fabricated using 3D printer and the purchased electronic components are prepared, the assembly process is executed. The parts were designed using Solidworks and then 3D printed using PLA materials which are lightweight and withstand torque generated by the entire system while the cables are wound or dispensed from the system. The electronic circuit diagram connections which shown in Figure 4 is neatly arranged and embedded inside the casing. Furthermore, on the electronic parts, a single channel capacitive touch sensor used as an input device to sense the physical motion namely sense of touch, a forward and reverse speed adjustable DC motor controller to adjust the mode of operation (clockwise and anticlockwise direction) as well as adjust the speed, a single channel optocoupler relay module to control 250VAC at 10A and to protect the micro controller, a breadboard power stick to convert battery voltage of 7.4V DC to 5V for circuit operation and a high torque DC gear motor to rotate the drum by means of a shaft and a driving gear.

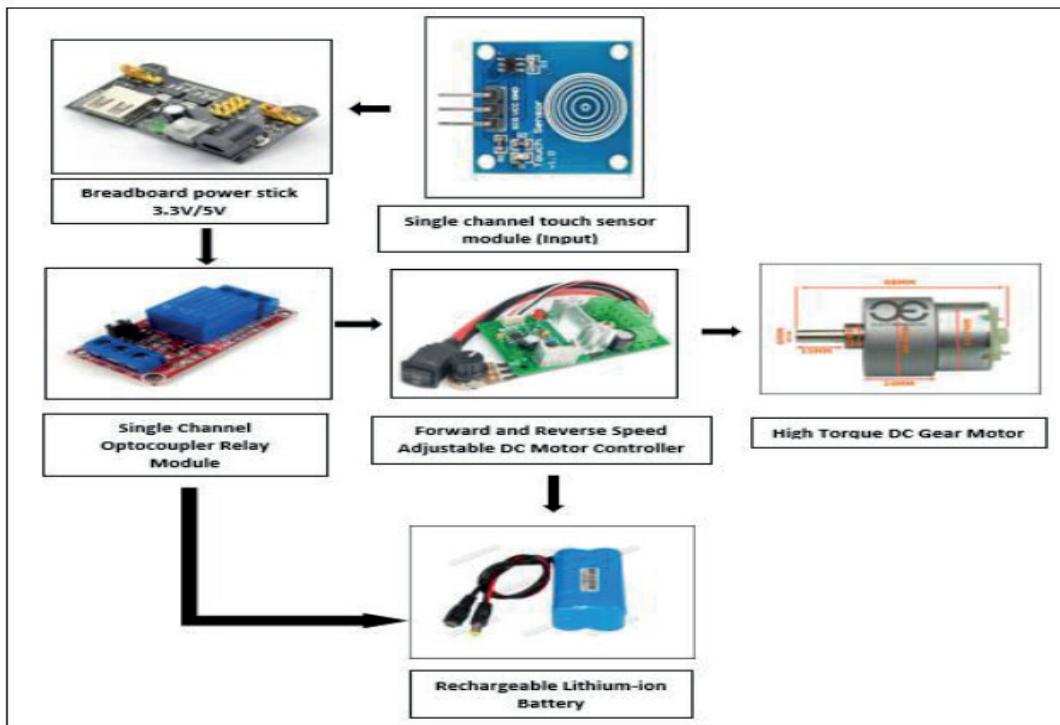


Fig 4. Electronics Control System Overview.

4. RESULT & ANALYSIS

The overall assembly of the design can be depicted in Figure 5. The automatic cable winder is made by incorporating hardware parts and electronic control system. The electronic components were neatly arranged and glued at specific locations to prevent contact with the drum surface while in operation. The power supply (rechargeable battery) is a detachable unit that is fixed on the outer surface of the casing for the ease of connection and disconnection of the power supply. The drum is rotated in an anticlockwise direction to dispense the cable out of the system and the drum is rotated in clockwise direction to retract the cable into the system. In overall, the performance of the system in retracting and dispensing the cable was smooth and there is no disturbance such as cable get stuck while the drum rotates is observed. The sensor does operate accurately and precisely when touch input is given, and this can be clearly seen when the motor shaft and gear train rotate the drum.



Fig 5. Overall assembly of the automatic cable winder.

To evaluate the performance of the system, a simple experiment is done, and results obtained are recorded in Table 3 which are as follows:

Table 3.

Mode of Speed (RPM)	Time Taken for Cable (s)		Operational Remarks
	Dispense	Retract	
Low (75 RPM)	34.5	81.2	<ul style="list-style-type: none"> The drum rotates slower that causes cable to be stuck in the middle of the operation. It consumed more time to retract and dispense the cable. The motor speed should be greater than cable rotation speed to counteract the forces.
Medium (110 RPM)	22.7	49.8	<ul style="list-style-type: none"> Cable wound randomly on the drum. Cable dispenses and retracts properly and neatly while in operation. Motor speed is sufficient in counteracting the speed of cable rotation during retraction.
High (150 RPM)	14.8	24.8	<ul style="list-style-type: none"> Cable wound randomly on the drum. More cable dispenses at one time that causes cable to be stuck in the system. Motor speed is more than the cable rotation speed.

Based on Table 3, it can be observed that at low and high speed (RPM) the motor speed is either greater or lower than cable rotation speed. This retards the smooth and proper cable dispensing and retraction operation. At lower motor speed (RPM) cable consumes more time to retract and dispense in and out of the system and cable was stuck in middle way of the operation due to slower drum rotation. On the other hand, at high motor speed (RPM) more cable is dispensing out of the system at one time that causes cable to be stuck in the system even though cable wound randomly on the drum. However, when the motor rotates at medium speed (RPM), the expected results of the performance of the prototype are achieved. Cable dispenses and retracts properly and neatly while on operation despite random winding of cable on the drum. It has also been observed that the motor speed is sufficient to counteract the speed of the cable rotation. Hence, for a proper and neat operation of the cable that leads to a reliable operation, it is suggested to fix the motor speed at 110RPM. The time taken for cable to dispense fully out of the system is 22.7s whereas to retract the cable fully into the system about 49.8s is needed. Apart from that, based on the Pos Aviation Technician, the turnaround time for the pushback of the aircraft is not more than 15 minutes. Thus, for such reason, the medium motor speed is more suitable to perform the intended functions by the automatic cable winder.

5. CONCLUSION

Upon completion of this project, the prototype design of the automatic cable winder is developed and fabricated which is specially designed to implement on the aviation headset. To do so, hardware parts are fabricated successfully, and it is then integrated within the electronic control system that is functioning efficiently as intended. The capacitive touch sensor together with the accompanied external power source and electronic control system circuit can be able to drive the motor to rotate the drum. The automatic cable winder is properly utilized as a winder mechanism to dispense and retract the cable based on the user input. Frequent testing and troubleshooting must be done periodically on the system as well as further improvements to the system and hardware designs are encouraged. This includes designing a better frame of the casing that is easy to hold by hand rather than fixing onto the headset which could deteriorate the headset frames and structure due to added weight. Besides that, rather than using more electrical components that

consumes lots of spaces and adding weight to the entire system, a more digitize system may introduce to eliminate components usage. This can be executed by implementing the programming into the design that incorporates all the functions into a system.

Acknowledgment (Heading 5)

We would like to express our gratitude to the Aircraft Maintenance Engineering Department of Banting Polytechnic, Selangor and School of Mechanical Engineering Universiti Teknologi Malaysia for their continuous support and strong engagement in providing all information regarding project idea, project designs, development of the product and analysis on the performance of the developed prototype towards achieving project objectives outlined. All of this strong and continuous effort has made this research and prototype development possible .

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THE POTENTIAL OF TOURISM PHOTOGRAPHY: A CASE STUDY OF PADANG BESAR, MALAYSIA

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Abstract

Travel photography has become an interesting form of tourism nowadays and has become one of the potential market segments as a motivator to travel. Perlis is Malaysia's smallest state, filled with breathtaking landscapes and ever-vibrant and growing urban cities, but has done little to provide this experience of travel photography to travellers. The project aims to identify unique photo spots and develop travel photography as a tourism product to promote Perlis tourism. This project will be focused on Padang Besar township, which consists of Titi Tinggi, Beseri, Chuping, Santan, and Mata Ayer as tourist attractions. To accomplish this goal, the project has primarily emphasised tourism product development that can be applied to travel photography as innovative tourism products to maintain tourism destinations' competitiveness. Using an innovative tourism product development approach and quantitative statistical techniques, this project is expected to implement an attractive, affordable, and unforgettable travel photography product that would provide a complete travel photography experience for a group of domestic tourists.

Keywords: *Travel photography, Travel experience, Perlis*

1. INTRODUCTION

Photography for tourists and photography taken by tourists can be broadly divided into two categories. The first category comprises photographic photographs that are used as promotional materials as well as those that are sold and given away as travel souvenirs (Botterill, 1987; Chalfen, 1979). The term “tourist photography” generally refers to both tourist-related photographic practices and the associated artifacts (Robinson & Picard, 2009). Both photographic acts and photographic objects are included under the umbrella term of photography. The actions are typically referred to as “photographic practices” and include buying photography equipment, learning and honing photographic techniques, as well as taking, processing, reviewing, sharing, editing, saving, organizing, captioning, and discussing images. In this thesis, the terms “photo” and “photograph” are used synonymously to denote photographic objects or the visual images created by cameras or mobile phones.

In recent years, a new tourist niche has emerged as a result of the growing popularity of photography as a hobby (Palmer & Lester, 2005). In that regard, certain visitors may choose to travel for other purposes besides photography (Baerenholdt, Framke, Haldrup, Larsen, & Urry, 2004). Some studies investigate the ways in which photographic images mediate the travel experience (Tussyadiah & Fesenmaier, 2009) or aid in generating travel desire (Lin & Huang, 2005). To document the contrasts and preserve the memories of their travels, travellers were thought to need to incorporate photography into their rituals (Graburn, 1989). According to Berger, Denk, Dittenbach, Pesenhofer, and Merkl (2007), photography encourages pleasant recollections of vacation destinations and captures trip experiences in images. A tourism activity that is strongly rooted in the experiences of travellers is taking pictures (Cederholm, 2004). According to Groves and Timothy (2001), photographs can be used to convey the meaning of a journey and its destination. According to Yin, Cao, Han, Zhai, and Huang (2011), these landscape characteristics are largely constant and highlight the distinctiveness of the destination site in the longitude and latitude dimensions.

The image can be linked to the physical world as a tangible, material proof (Markwick, 2001), documenting the sequence of consumption (Sontag, 1973), and being transformed into a vehicle that allows the everyday consumption of the experience thanks to the photograph (Gal and Donaire, 2005). Photographs “appear to be credible as a direct representation of reality, a ‘true’ reflection of actual places, people, and events” (Markwick, 2001), and have been utilised to better understand the tourist experience (MacKay & Couldwell, 2004). The mental image a traveller has of a particular place influences their decision to visit and considers their interests, values, and attitudes while also being shaped by the general public’s perception of the place (Obenour, Lengfelder, et al., 2005). Travelling outside one’s typical surroundings for personal, business, or professional reasons is known as tourism, and it is a social, cultural, and economic phenomenon. Visitors—tourists or excursionists; residents or non-residents—are these individuals, and tourism has to do with their activities, some of which entail spending money on travel (United Nations World Tourism Organisation, 2008).

2. THE ROLE OF PHOTOGRAPHY IN TOURISM

This implies that Urry believes the concepts and practises of tourism and photography are conceptually and practically linked. Urry then goes on to further develop this relationship, basing his arguments on eight congruent claims, including the following: photography is (or at least appears to be) a tool to accurately capture reality; the power of photography is in its ability to pass itself off as a genuine miniature replica of the real thing; photographs allow the photographer to interpret the image captured thereon and to tell stories about it; and photography involves the selection, structuring, and shaping of what is to be acquired, enabling an idealised image of the object of the gaze to be captured. that photography is a common phenomenon and a democratised activity; that photography shapes travel, largely dictating the places we go and the activities we engage in while there; that travel is a method for taking images; and, it is possible to view photography as a component of the “hermeneutic circle” of tourism reproduction, in which travellers look to take pictures of

the places they are visiting in order to demonstrate to others that they have been there. As a result, according to Urry (1990, p. 140), tourism is summed up by visitors to a place “demonstrating that they have really been, thereby showing their version of the images that they had originally seen before they set off.”

3. PHOTOGRAPHY AS DESTINATION IMAGE

People enjoy travelling, and the majority of tourists snap pictures while they are there as part of their tourism activities (Cederholm, 2004). As a result, it is clear that photography and tourism are interconnected (Lo, McKercher, Lo, Cheung, & Law, 2011). On the other hand, numerous tourist locations also use photography to convey their destination images to their intended tourists (Jenkins, 2003). Therefore, photos are essential marketing communication tools that many marketers employ to advertise tourism-related events (Cederholm, 2004). Numerous websites now provide more visual content, enabling visitors to explore and view these photographs of the destination (Cao et al., 2010). This is due to the fact that visual elements like the images and colours in a photograph have a direct impact on how easily people can recognise and remember an advertisement (Percy & Rossiter, 1983). Photographs are employed as significant determinants of tourists’ choices of vacation destinations, affecting their actions, and revealing their pleasure with tourist destinations (Garrod, 2008).

As a result, many forms of photography can show tourist destinations from various angles. For instance, images of various tourist places display the stunning architecture and landscapes there (Snavely, Seitz, & Szeliski, 2006). Some images depict landscapes and specific locations (Cao et al., 2012). According to Lynn, Giebelhausen, Garcia, Li, and Patumanon (2013), some photographs may use various components, such as colour, to influence viewers. Most tourists like to spend time travelling to the beach during their summer vacation, making it one of the most alluring locations (Cao et al., 2012) and well-liked travel destinations (Lobo, 2014). According to Lundberg (1971), more than 80% of tourists who visit beach regions like Hawaii and the Caribbean do so for leisure. Travellers frequently take pictures of stunning beaches, many of which are famous and have distinctive features (Cao et al., 2012). Because they can be depicted by utilising photographic theories like composition, the rule of thirds, visual weight balance, colours, and lighting, images of locations are most likely to depict the location artistically (Bhattacharya, Sukthankar, & Shah, 2010).

According to Berger et al. (2007), people utilise images to jog their recollections and first-hand accounts of the places they’ve visited. Photographs also show the various viewpoints that visitors have of the destination’s visuals, which can be thought of as each person’s individual visual experience (Lo et al., 2011). Some images also highlight the allure and distinctiveness of the locations. One of the key elements influencing consumer decisions on holiday expenditures, together with tourist resources, is image (Ispas and Saragea, 2011). According to several scholars, the term “tourist destination image” can refer to everything from travel preferences to how possible destinations are seen (Jenkins, 1999; Echtner and Ritchie, 2003). In addition, different sciences investigate images, which leads to the range of perspectives they can take. As Crompton (1979), cited in Jenkins (1999), put it, “The sum of beliefs, ideas, and impressions that an approach.

4. RELATIONSHIP BETWEEN TOURISM DESTINATION IMAGE AND TOURIST PHOTOGRAPHY

Academics have long been intrigued by the nature of the connection between tourism and photography (e.g., Albers and James 1988; Chalfen 1979; Cohen, Nir, and Almogor 1992; Crang 1997; Feighey 2003; Garlick 2002; Haldrup and Larsen 2003; Jenkins 2003; Markwell 1997; Teymur 1993). According to Haldrup and Larsen (2003, pp. 23–24), “taking photographs is an emblematic tourist practise; it is almost unthinkable to travel for pleasure without bringing the lightweight camera along and returning home without snapshot memories.”

The Tourist Gaze by Urry (1990), which has since become the standard explanation of tourism in modern society, looks at the close connection between tourism as a production system and photography as a tourist

activity. The tourist gaze and photography go hand in hand. Photographic images help us organise our fantasising or anticipation of the locations we might look at. We capture photographs of what we have been seeing while we are away. And when we travel to photograph locations, we do it in part by choice. Our experiences as tourists are organised in part by the acquisition of photographs. And when we display photographs to other people, we often accompany them with mostly verbal language that helps shape our recollections of the places we have been. This makes the visitor gaze unavoidably into the rapid circulation of photographic images Urry.

In order to explain how tourism is formed and repeated as a socially constructed phenomenon, Urry (1990) developed the paradigm of the tourist gaze. The tourist gaze is defined as a specific “way of seeing” the world that is imposed on travellers and is fundamentally shaped by the visuals produced by the tourism industry for tourist locations. Therefore, the primary reason for visiting such places is to take in the views of the panoramas, landscapes, buildings, people, and other manifestations of the place that, as a result of exposure to visual representations in travel advertisements, television broadcasts, movies, brochures, travel books, and, crucially for the purposes of this article, picture postcards, they have been led to expect to find there. Urry continues by explaining the connection between tourism and photography. While some authors, like Garlick (2002), contend that Urry just uses photography as an illustration of the tourist gaze’s ubiquitous effect, others contend that the conventions of tourist photography are integral to the idea of the tourist gaze. For instance, Cornelissen (2005) emphasizes the significance of tourism marketing organisations as agents in the collection and presentation of place signifiers that attract tourists’ attention.

Through the use of images and notably photography, in its brochures and other marketing materials, the tourism sector conveys these signs. Jenkins (2003) contends that snapping pictures is a key activity for tourists, in addition to the fact that these visual representations of a place stimulate them to travel there. When travel tales are later retold, personal images also serve as evidence that the tourist has actually visited the area (and possibly engaged in certain activities while there). By reinforcing the tourist gaze that the tourism industry has established, travellers’ photos help maintain a favourable perception of the destination. Since photography is a key dynamic element in the cyclical replication of the tourism gaze and is essential to contemporary tourism as we know it, Urry’s theory of modern tourism fundamentally implicates photography.

5. IMPACT OF PHOTOGRAPHY ON THE REPRESENTATION OF TOURISM

The result is a paradoxical fusion of aesthetic and practical photography that affects viewers and draws their attention to the neglected, unnoticed, or devalued elements of heritage. The researcher also wants to show that reality itself is not as interesting as how it appears in photographs. By utilizing this strategy, it is possible to open the eyes of common people to the world of art, causing them to take notice of their surroundings and even fostering a sense of place attachment among locals.

Our world is documented by photographs, which serve as evidence of what is or was there. Photographs provide viewers with a glimpse of the genuine truth. First-hand experiences seem increasingly trivial in comparison to images. Despite the sense that images serve the purpose of understanding reality, which comes from first-hand experience, photographs seem to have “seized” reality. Therefore, comprehending an image in its entirety is essential to uncovering a lost reality as well as understanding how a photograph develops into a structure that represents its own consensus (Crimp 1979).

In other words, this kind of photographic representation has the power to improve a society’s visual culture by fostering an appreciation for the arts and encouraging citizens to devote significant resources to their education. Anything that has been photographed is thought to be significant since it is presumed that the object is valuable enough to warrant being captured on camera, especially if the photo is taken by a renowned or professional photographer, printed in a large format, and displayed. A picture can give anything credit or increase its credit because it is a simulation of reality. Therefore, a photographer’s choice of framing has the power to influence and inform the public, whether they are elites or laypeople. According to Sontag,

“Photographs transform and broaden our conceptions of what is worth looking at and what we have a right to see in teaching us a new visual code. They serve as grammar and, more significantly, as visual ethics (1977: 3). He was able to persuade people to visit and see something they had never imagined to be worth seeing through the distinctive portrayal of photography.

6. TOUR EXPERIENCES IN PHOTOGRAPHIC TOURISM

Photographic tourism, a branch of cultural and nature-based tourism, has surged in popularity due to the widespread use of digital photography and social media platforms. The purpose of this review is to present a comprehensive overview of the main themes, motivations, effects, and challenges associated with tour experiences in photographic tourism.

A. Motivations for Engaging in Photographic Tourism:

Travelers partake in photographic tourism for various reasons, including the intention to capture visually appealing images, share their experiences on social media, and create enduring memories. Yoo and Gretzel (2011) have observed that taking photographs amplifies tourists' connection to the environment, resulting in a deeper bond with the destination.

B. Tour Experiences and Engagement:

Photographic tourism experiences are shaped by factors such as the design of the tour, the schedule, and the accessibility of photogenic spots. According to Scott, McBoyle, and Handford (2017), the expertise of the tour guide and their capacity to facilitate photographic opportunities significantly influence participants' overall experience. Captivating tour experiences can stimulate participants' creativity and provide them with fresh viewpoints of a destination (Guttentag, 2013).

C. Impacts on Tourists and Destinations:

Photographic tourism can yield both positive and negative outcomes for tourists and destinations. On the positive side, participants often derive a sense of accomplishment and self-expression through their photographs. Additionally, the sharing of these images on social media platforms can function as unpaid promotions for destinations. However, concerns about over-tourism and potential environmental harm arise due to the popularity of specific photographic locations (Newsome et al., 2018).

D. Emotional and Psychological Aspects:

Photography frequently involves an emotional link between the photographer and the subject. Photographic tourism can offer tourists a means of self-expression and a way to capture personal interpretations of a destination (Mason & Paggi, 2015). The process of selecting subjects to photograph and composing shots can lead to increased mindfulness and a heightened appreciation for the surroundings.

E. Selecting a Template (Heading 2)

First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the Microsoft Word, Letter file.

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G. Challenges and Future Directions:

Challenges in photographic tourism encompass finding a equilibrium between experiencing the moment and capturing it through a camera lens. The pressure to create visually impressive images for platforms like Instagram can result in superficial engagement with the destination (Ekinci, Sirakaya-Turk, & Ekinci, 2020). Additionally, ethical considerations regarding the treatment of local communities and environments must be addressed to ensure the sustainability of photographic tourism.

Photographic tourism provides an avenue for travelers to interact with destinations in a creative and individualized manner. The experience of capturing moments through photography enhances emotional connections and can lead to a deeper appreciation for the environment. However, it is imperative for stakeholders in the tourism industry to tackle the challenges posed by over-tourism and environmental impacts to ensure the long-term viability of this form of tourism.

7. METHODOLOGY

The methodology will focus on project planning, project development process, process developing innovation, and project implementation. Project planning has 3 phase that includes product development, product launching and product improvement. Next is about project development process that refers to the article and makes it as a reference on the processes. In product development process have 3 step that involves an introduction, design project, evaluation and product development. All this step is the planning to make this project successful. In project, planning have product development that explains about planning to identify the photo spot and develop travel photography as a tourism product. For product launching is planning for make collaborate with the travel agency and launch the Perlis Travel Photography route tour package to the market and make a test run. Finally, after the test run and it is successfully then tried to make product improvement for the future such as upgrade the currents package and develop the package to the various place.

In phase 1 Product Development, data collection method was made in this project to get the more information. Next step, make a brainstorm and do a site visit to get the information face to face and see the potential of places. In addition, make a survey and interview with a staff, worker or local people and others about the places. Also make an inventory to identify the best spot photo places to put in the package that can be more potential. This is because, this project will develop tourism photography into a tourism product. After that, come out with suggestion for the product development for this project, which is do a route tour, trial run package, get evaluate that custom feedback and finalize the result. The project will also evaluate tourism photography products as part of tourism packages. In phase 2 Product Launching, this project will collaborate with other agencies to improve this product. For example, make a collaboration with Ummul Travel, photographers and tour guides. This is because the cooperation will benefit both. For example, Ummul Travel will get more attractions after the launch of this product and this project will also get more benefits such as facilities and transportation. In this phase, this product will develop a photographic journey to promote Perlis to be more attractive. This project will promote Perlis by providing a unique and hidden photo spot. In Phase 3 Product Improvement will be the improvement of the final product, this project will improve the existing package. For example, will improve the current packages in Perlis such as leisure, gastronomy and nature and make them more attractive. This is because, it not only just builds tourism photography packages but also can include various types of tourism such as leisure, gastronomy, and nature. This project also developed packages in various places in Perlis. As we know Perlis is famous for certain places such as Kangar, Arau and Padang Besar. This package is more for various places. For example, we went to Chuping, Mata Ayer, Santan, Beseri and Titi Tinggi which are fewer places for promotion.

8. PROJECT DEVELOPMENT PROCESS

The process of planning and allocating resources to fully develop a project or product from concept to go live is known as the project development process. Introduction, design, assessment, and development make up

its four processes. This procedure is based on an essay by Santos from 2020 in Sustainability that describes the product development process. Because the current models frequently only offer a partial framework for the creation of these goods, it is necessary to create a conceptual model of innovative tourism product development. The models that have been presented up to this point concentrate on either the resources required for the tourism experiences to be offered, or development procedures. The concept of service, which is at the foundation of the model, must continuously keep in mind that the goal is to provide the right framework based on staging that produces the ideal conditions for unforgettable and transformative visitor experiences. These two processes are vital in design because they direct and steer the entire process of service innovation and give it the necessary efficacy and efficiency, according to Scheuing and Johnson (1989), who examine the creation of strategy and objectives. The majority of current models contain this phase for evaluation, regardless of whether they focus on the creation of tangible goods, intangible services, or tourism products; nevertheless, the components included in this phase may vary between models (Johnson, 2002). The “service blueprint” mapping technique, which is still under development, is one useful technique for visualising service systems (Shostack, 1988). A service blueprint is essentially a diagram listing all the elements of the service being examined, and its major purpose is to allow for more unbiased evaluations of the service process.

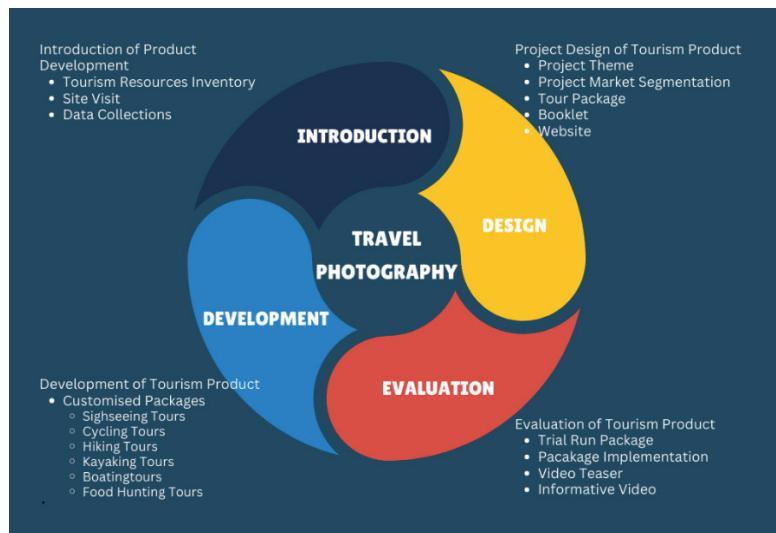


Fig 1. Process of Tourism Product Development

In general, this project has developed its product primarily using four processes. The introduction process outlines the steps that must be taken, such as visiting the site, creating an inventory list, and others. The idea that must be used to create the product is displayed during the design phase. Make a pamphlet, a website, a brochure, and other materials, for instance. Additionally, as part of the evaluation process, a product trial is required to test the market and gauge consumer satisfaction. Create a questionnaire, distribute it to visitors, and ask them about their pleasure with the merchandise. Process of development, improved techniques to provide the greatest possible product.

9. FINDINGS AND DISCUSSIONS

This study used a descriptive survey method to explore the potential of tourism photography as an innovative tourism product for tourism destination development. This survey questionnaire was adapted from (Ozan Atsiz et al., 2021) according to the condition prevailing in the local environment. A five-point Likert scale questionnaire was designed which comprises two categories as follows:

- Package tour experience

The package tour experiences scale consists of educational, entertainment, escapism, and esthetic experience dimensions.

ii. Overall Package tour satisfaction and behavioural intention

The survey was conducted face-to-face with participants through a travel photography package. A total of 210 self-administered questionnaires were distributed in person. Respondents were given 5-10 minutes to fill out the questionnaire that had been given. Only 83% of questionnaires were collected according to the number of participants. Table I there were presented the main characteristics of the sample profile of the respondents who travel to Padang Besar, Perlis.

Table 1. Characteristics of the sample of tourists who travel to Padang Besar, Perlis.

DEMOGRAPHIC CHARACTERISTICS	CATEGORY	FREQUENCY	PERCENTAGE
Gender	Male	63	36%
	Female	112	64%
	Total	175	100%
Age	18-20 years	154	88%
	21-25 years	21	12%
	25-30 years	0	0%
	Total	175	100%
Education Level	Primary School	0	0%
	High School	0	0%
	University	154	88%
	Others	21	12%
	Total	175	100%

Data were analyzed and interpreted using Microsoft Excel. The respondent profile shows that males have only 36% and females have 64% respondents. Based on this, the majority have a high percentage and the frequency is females aged between 18-20 years which is 88%. This is because, in this expected age, they prefer to take pictures of their surroundings and outfit of the day for upload to their social media. Approximately the level of education of the participants is more at university where the percentage is 88% while others are 12%.

Based on the survey, the dimensions of the tour experience consist of 4 questions in each dimension: education, entertainment, escapism, and esthetic. Education dimensions consist of 4 questions, of which more than half (68%) of the respondents agree that the tour package has made them knowledgeable; 76% of respondents agreed that they have learned a lot during the tour of tourism photography; 80% of the respondents indicated that the tour stimulated tourist curiosity to learn new things; and the last is that the package tour experience was highly educational. The second dimension of the tour experience is entertainment, which includes the majority (94%) of tourists having surprising events during the tour; 76% of tourists felt entertained, astonished (78%), and fascinated (76%) during the tour. Besides that, the majority of tourists agreed that the travel experience transformed them in a good way (94%), made them forget about their daily worries (98%), and gave them a sense of freedom during the tour (100%). It seems that most of the tourists are satisfied with the tour experience and enjoyed the tour to Padang Besar for the theme of photography tourism. Based on the survey on the esthetic dimension, 92% of tourists enjoyed seeing the environment during the tour, About 80% of tourists agreed that the tour was rich in beautiful scenery, but only 68% agreed that the expression of local arts (e.g., handcrafts) was nice to see. The lower rate percentage was due to the package, which

was not involved much in the Perlis local's art. The package was introduced on sightseeing tours instead of handicrafts or art about Perlis.

Table 2. Summary of the tourist tour experience of traveling to Padang Besar, Perlis.

STATEMENT	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
TOUR EXPERIENCE					
EDUCATION					
The package tour experience has made me more knowledgeable.	0%	0%	32%	52%	16%
I learned a lot during the tour.	0%	0%	24%	60%	16%
The package tour stimulated my curiosity to learn new things.	0%	0%	20%	64%	16%
The package tour experience was highly educational for me.	0%	0%	14%	70%	16%
ENTERTAINMENT					
The tour had surprising events	0%	0%	6%	50%	44%
The package tour was entertaining	0%	6%	18%	40%	36%
The tour was astonishing	0%	0%	22%	62%	16%
The tour was fascinating	0%	0%	24%	40%	36%
ESCAPISM					
The package tour transformed me in a good way	0%	0%	5%	51%	44%
The package tour made me forget my daily worries	0%	0%	2%	48%	50%
I felt a sense of freedom during the package tour	0%	0%	0%	52%	48%
ESTHETIC					
I really enjoyed seeing the environment during the tour.	0%	0%	8%	48%	44%
The tour was rich in beautiful scenery.	0%	0%	20%	40%	40%
Expression of local arts (e.g. handicrafts) was nice to see	0%	0%	32%	42%	26%

Table III shows the overall tourist satisfaction with the tour experience: tourists are overall satisfied with the package tour (96%), the package offered exceeded their expectations (76%), and lastly, tourists will share their experience with others (72%). This can indicate that tourists are satisfied and may have the intention to come back again to the tour package offered by Perlis Travel and Tour Operation, which conducted the photography tourism product. Padang Besar, Perlis, has the potential to promote photography as an innovative tourism product.

Table 3. Summary of the tourist satisfaction of traveling to Padang Besar, Perlis.

STATEMENT	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
TOUR SATISFACTION					
Overall, I am satisfied with the package tour.	0%	0%	4%	52%	44%
This package tour exceeded my expectations	0%	0%	24%	48%	28%
I would participate in this package tours in the future.	0%	0%	48%	48%	4%
I will share my experiences during this tour with others when I return home.	0%	0%	28%	60%	12%

10. CONCLUSION

Photography is inspired by the beauty and uniqueness of a place. Encouraging tourists to enjoy and strengthen the image of Perlis as a tourist destination is a big challenge. This project aims to show the potential and satisfaction of tourists towards the natural beauty and uniqueness of photo spots in Perlis. As a result of this research, we can find out what we can do to improve tourist satisfaction. Tourist satisfaction with the overall package and behaviour is explored in this study. Photo spots seem to have a direct effect on tourist satisfaction, such as intention to return and positive word of mouth, according to relationship analysis. Because tourists rely on images, all good marketing methods should strive to further enhance the image of Perlis. Furthermore, word of mouth from own experience is important in making a project successful in introducing Travel Photography to the public. The influence of overall satisfaction on tourists is significant. Therefore, it is important for Perlis to use an effective marketing plan to promote photography spots to improve its image and tourist satisfaction. In conclusion, attention and cooperation between all those involved in introducing travel photography are important in promoting the image of Perlis as the best tourist destination. This is because it can attract more visitors and tourists from outside who come to Perlis to enjoy its beauty and uniqueness.

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AUTOMATED CONVEYOR SYSTEM TRAINING KIT

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Abstract

The title of this project was 'Automated Conveyor System Training Kit'. The purpose of this project is to study how a system works using Programmable Logic Controller (PLC) and how to learn more about the operation of PLC in controlling the conveyor system with the function of the PLC. In this training kit prototype, the function of motor, sensor, pneumatic system was studied and analyzed. The operation of the system begins with the materials from the shelves, placed at the base plate, where the sensor will detect the object, thus activating the single acting cylinder. It will then push the material to the conveyor system. On the conveyor system, if the material is not according to size, the sensor will detect, and the single acting cylinder will push the material into the reject bin. Otherwise, when the sensor does not detect any irregular material size, the material will move until the end of the conveyor. At the end, when the material is placed on the plate, a single acting cylinder will push the plate and the material will roll into the slider. This training kit contains a PLC system which uses the pneumatic system and sensor were able to help students to understand better PLC control and pneumatic movement. Students can understand the application of PLC control system by learning the programming method. As a conclusion, this project is suitable to be used as a training kit for PLC and pneumatic teaching method.

Keywords: conveyor system; pneumatic; Programmable Logic Controller (PLC); training kit

INTRODUCTION

A digital computer called a programmable controller, also known as a programmable logic controller (PLC), is used to automate and robotically operate electromechanical processes, such as the machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are employed in numerous equipment and industries. The PLC is made for diverse input and output configurations, wide temperature ranges, immunity to electrical noise, and tolerance to vibration and impact, unlike general-purpose computers. Typically, non-volatile, or battery-backed memory is where programs that regulate machine function are kept.

PLCs can perform a variety of automated tasks. These are often manufacturing industrial processes where the cost of creating and maintaining the automation system is high in comparison to the overall cost of the automation and where changes to the system are anticipated during the system's operational life. PLCs include input and output components that are compatible with industrial pilot devices and controls; hence, there is little need for electrical design, and the design challenge is in expressing the intended order of activities. Because PLC applications are frequently highly customized systems, a packaged PLC is less expensive than a particular custom-built controller architecture.

Belt conveyors are the most widely utilized powered conveyors due to their greatest versatility and lowest cost. Since the product is moved directly on the belt, it is possible to move successfully both objects with regular and asymmetrical shapes, regardless of size or weight. Because premium belting of the finest quality decreases belt stretches and necessitates less maintenance for tension adjustments, it should only be used on these conveyors. Product can be moved along a straight path or through changes in elevation or direction using belt conveyors. They can also be employed in some applications for static build-up or packing.

The best and most relevant option for this project is a belt conveyor because it operates with less horsepower than other types of conveyors. This is because the bulk materials on the conveyor belt remain static, and as a result, just a minimal amount of energy is required to move the conveyor. The design of the Automated Conveyor System Training Kit is depicted in Fig. 1. Among the objectives of this project are: -

- (i) To design and fabricate an automated training kit;
- (ii) To incorporate safety features into the designed automated training kit; and
- (iii) To program the automated training kit using PLC.

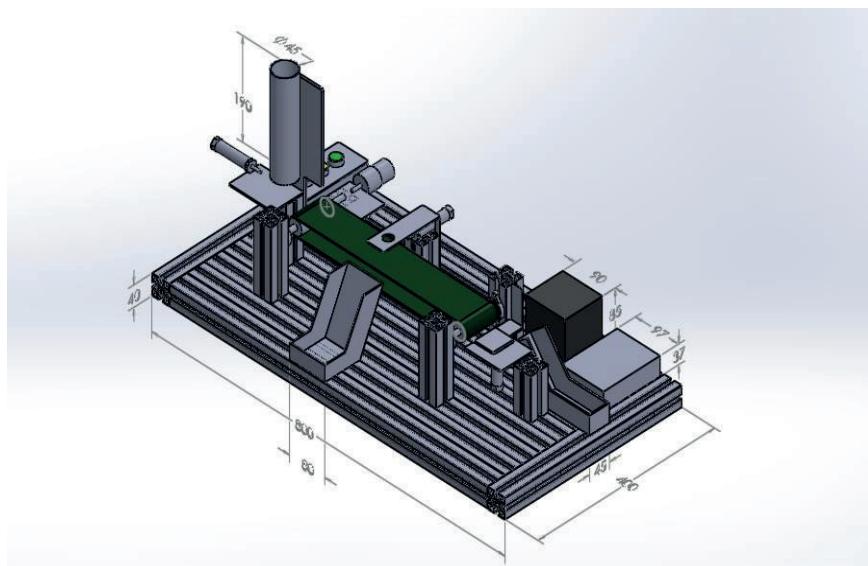


Fig 1. Project Design and Dimensions

2. METHODOLOGY

This project has been completed according to the design process shown in Fig. 2.

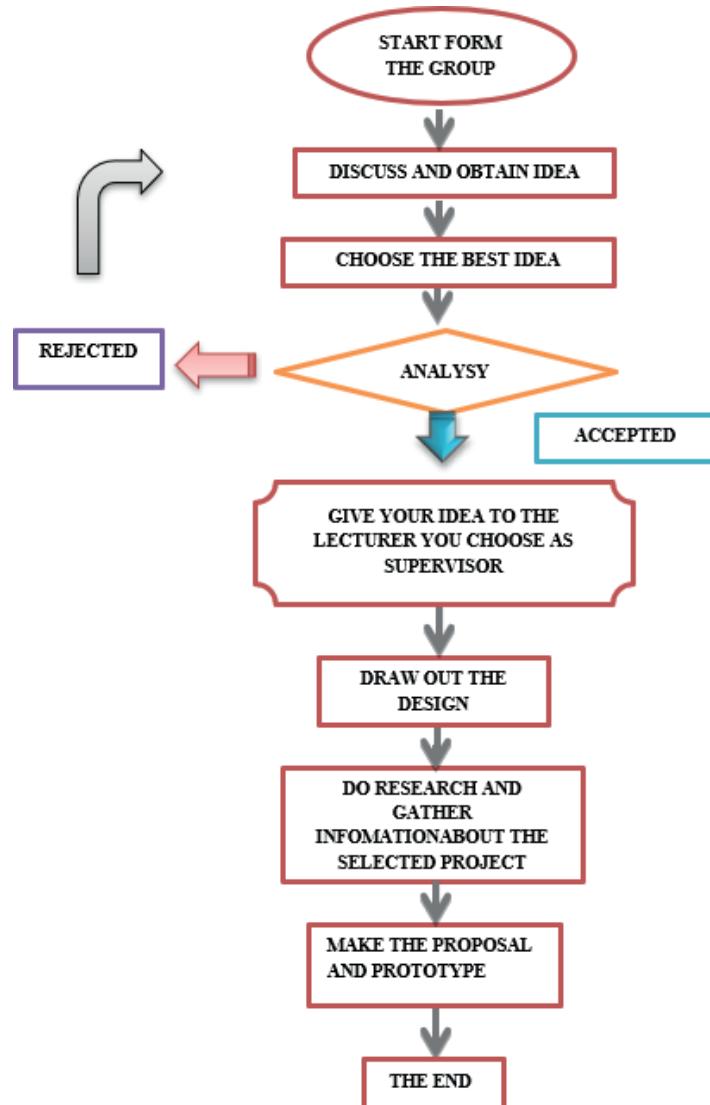


Fig. 2. Design and development process

Several design parts were put forward to realize the idea. Subsequently, a design analysis was conducted to test the appropriate and safe design. In this part, Autodesk Inventor software was used and successfully decided the most suitable and safe design to use as shown in Fig. 3 to 4 below.

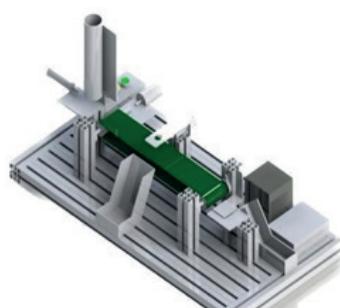


Fig. 3. Isometric view

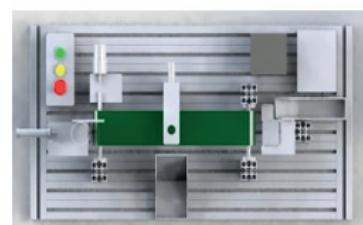


Fig. 4. Top view

Once the design was completed, the fabrication process was carried out as shown in Fig. 5 to 7 below.



Fig. 5. Base for Cylinder



Fig. 6. Roller Conveyor



Fig. 7. Sliding Plate

Firstly, all the wiring at the power supply and switches on the circuit of the project were identified. The PLC and assembled wirings need to be tested. All the wires were labelled using the colour of the switch box. The push button on the switch box needs to be tested. When pushing the switch button on the switch box, the solenoid and cylinder must be working. The solenoids are labelled using S1, S2 and S3 to differentiate the functional push button of the solenoid. The solenoids were tested as when we push a green button, there is a light up on solenoids. Finally, test runs on the project were carried out to determine whether there were any errors and to make improvements. A few minor adjustments and components were polished to cut down on dust. The component for the sensors were tested to detect objects easily after running test runs. Additionally, it facilitates the project's fluid motion and flow of materials. Wiring adjustments and position of the wiring were neatly placed. The completed project is shown in Fig. 8.

So, from the training kit, it contains a PLC system, a pneumatic system, and a sensor that were able to assist students in better understanding and visualizing the picture of PLC control and pneumatic movement. Students can use of the PLC control system to program the training kit in order to demonstrate their understandings of the movement of the cylinders controlled by the PLC system. As a result, this training kit is appropriate for use in teaching and learning and can assist students in studying PLC and electro-pneumatics.

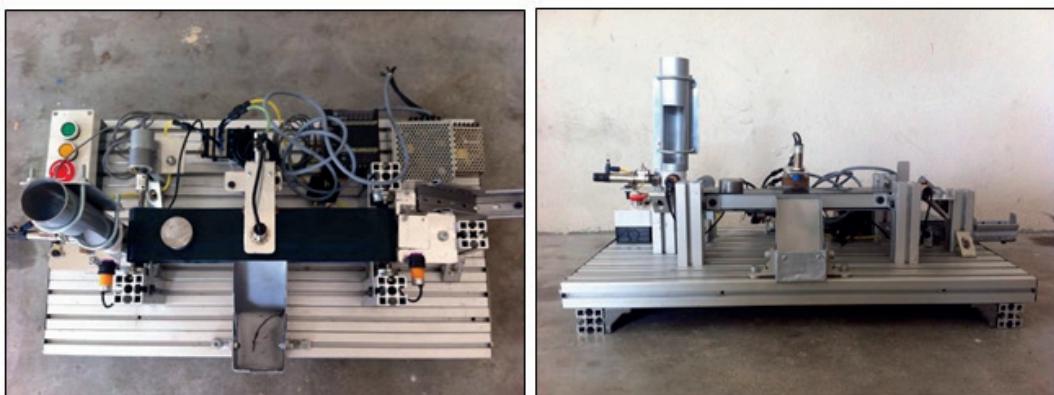


Fig. 8. Automated Conveyor System Training Kit

3. RESULTS AND DISCUSSIONS

A digital computer called a programmable controller, also known as a programmable logic controller (PLC), is used to automate and robotically operate electromechanical processes, such as the machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are employed in numerous equipment and industries. The PLC is made for diverse input and output configurations, wide temperature ranges, immunity to electrical noise, and tolerance to vibration and impact, unlike general-purpose computers. Typically, non-volatile, or battery-backed memory is where programs that regulate machine function are kept. A PLC is an illustration of a hard real-time system since it must deliver output results in response to input conditions within a finite amount of time to avoid undesired activity.

This project is using the PLC CP1E, with 20 I/O units, consisting of 12 inputs and 8 outputs. The user can maximize the use of all input and output to make more activities by creating them in CX- programmer. The objectives of the project are to make and achieve the teaching and learning for the students. To achieve the teaching and learning goals, a user module was created for the student.

The module was designed to provide students with more detailed applications of PLC and project information. The module also includes the activities in our project. With the information and knowledge where students can utilize the application and function of PLC in their learning. Ladder diagrams which consist of five different types of functions were created. The ladder diagram is designed using CX-programmer.

4. CONCLUSIONS

According to the results of the questionnaires, most students have theoretical knowledge of the training kit. When this training kit was introduced, students could put their PLC and pneumatic system knowledge to use. Students were able to learn how to program a ladder diagram using the CX-programmer after the training kit was introduced. Finally, the survey findings achieved the objectives of providing students with enhanced learning and understanding. As to improve the design shortcomings in the near future, the following suggestions were recommended:

- (i) By using a motor that can control its own speed instead of a speed control.
- (ii) By including additional components such as new materials and valves to make the idea more inventive and creative.
- (iii) Using a better PLC with more input and output.
- (iv) Change the sensor and solenoid to make a more innovative product.

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DESIGN AND ANALYSIS OF HANDY DRILLING MACHINE FOR EDUCATIONAL PURPOSE (WOODWORK)

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Abstract

A drilling machine is a very basic instrument that is still used today. The conventional drill press machines are cumbersome, bulky, and difficult to carry anywhere. Other issues include the extremely small distance between the drill bit and the work. The use of a 360° flexible drilling machine can help overcome this issue. This machine is straightforward, portable, and capable of rotating in all four directions—vertically, horizontally, up, and down. This project's platform is a scissor lift jack that can raise and lower the machine. The instruments used to construct this machine include a welding machine, soldering gun, grinder, drill, rubber hammer, etc. This project design was created utilizing Autodesk Inventor software. The finished arm or links produce an angular motion that moves up and down. Next, this drilling device can drill through materials including ceramic tiles, metal, plastic, and wood. Because the drill power and torque are sufficient, this project is not intended for use in heavy industry. Only light industry uses and small and medium-sized businesses are the focus of this project.

Keywords: drilling machine; flexible; linkages; angular movement

1. INTRODUCTION

This drill machine could spin radially on the x and z axes and drill graphically in any direction. Consequently, using rotating hinges and connectors, a motor mount, and a supporting framework, we designed and constructed a 360° drilling machine for practical drilling operations. The drill chuck, an electric motor, and the system for driving the chuck at various speeds were all connected on the upper arm's pinnacle. The drill received power from the electric motor. Drilling device operating principle: A direct current motor coupled to a complete wave rectifier was the first step in the operation of the flexible drilling device, which potential energy source the rectifier received energy from. The armed then turned 360 degrees and performed activities all over the place, with drilling taking up most of the armed length. As a result, the operation's setup time was shortened, and the worked setting operation was not complicated. It was also thought to be the most effective way to operate the drilling machine manually (Farande et. al, 2019).

The 360° drill configuration was made up of various connecting arms that helped the drilling machine move in horizontal, vertical, and upside-down directions when mounted on a flat surface such as a table with swivel wheels. The project's goal was to create and test a 360° drilling machine that was more efficient than traditional drilling machines. The connecting armed was the most important aspect of the researched because it must be light in weight and bear strong stresses induced by the drill machine's weight, and the arms must be proportional for even weight distribution (Sumit, et. al, 2022). During drilling operations, the connecting armed shall not be distorted or fail in any way. This could cause the drill bit to slip, resulting in non-functional holes in the workpiece. Hollow bars were better for joining arms because they resisted vibrations and were lighter than solid bars. The drilling machine's kinematic movements were critical to the drill setup's proper operation. This research aided us in determining the right proportions for the connecting arms. This made it easier to manoeuvre the drill setup and ensured that the arms did not collide. (Sawarkar et. al, 2021). The connecting arms' movements were depicted in Fig. 1.

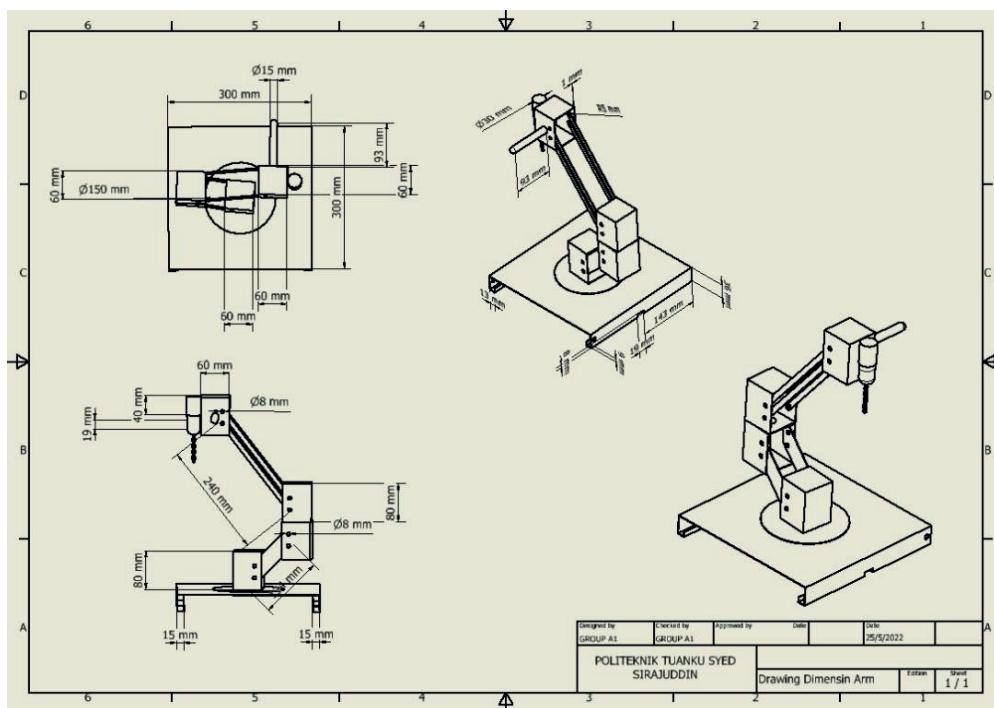


Fig1. Project Dimensions

2. METHODOLOGY

The process flow as in Fig. 2 shows the steps used to complete this project from the start until end.

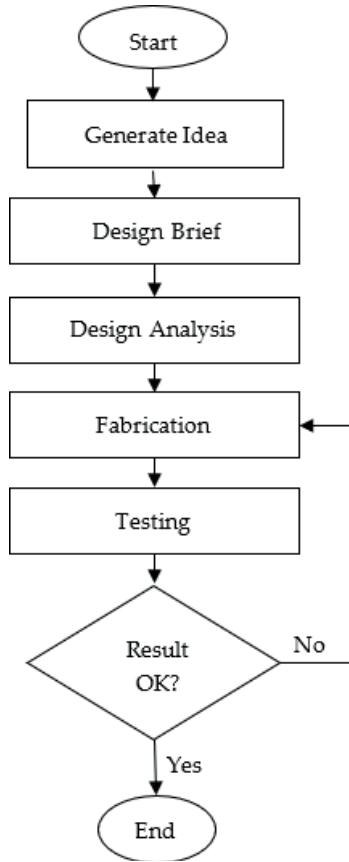


Fig. 2. Design and Development Process

Several design parts were put forward to realize the idea. Subsequently, a design analysis was conducted to test the appropriate and safe design. In this part, Autodesk Inventor software was used and successfully decided the most suitable and safe design to use as shown in Fig. 3 to 5 below.

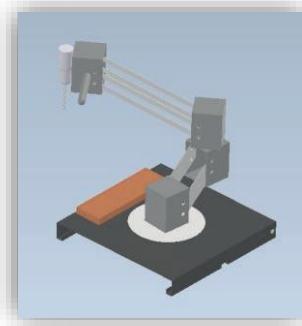


Fig. 3. Arm Linkages

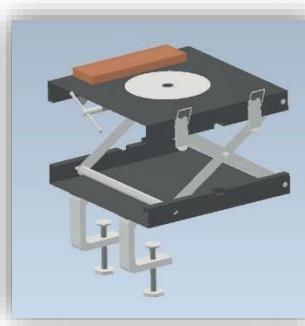


Fig. 4. Scissor Jack

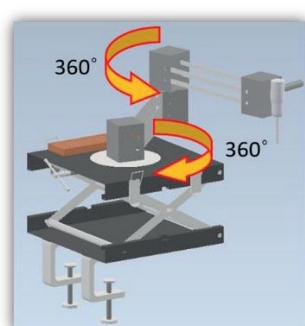


Fig. 5. Arm Movements

Once the design was completed, the fabrication process was carried out as shown in Fig. 6 to 8 below. The proposed 360° flexible drill may be mounted on a desk and additionally could be used to drill holes horizontally, vertically, or even the wrong way up. This drilling operation could also be carried out inside the lathe, wherein the drill was held within the tailstock and the painting was held by using the chuck.

The system might be capable of assisting the needy small-scale industries. This paper was about the design and fabrication of a 360° flexible drilling machine. This drill could get more flexibility to move in any route due to the linkages and its creation. 12 Volts and 20 Volts directcurrent motors were used to provide rotary motioned to the chucked and a battery and an on-on transfer manipulate contemporary and movement of the motor.

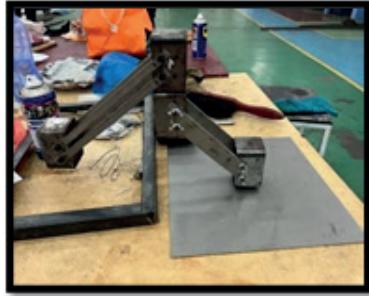


Fig. 6. Base Plate Fabrication

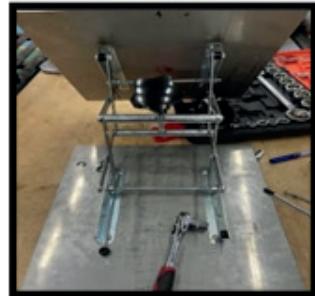


Fig. 7 Scissor Jack Fabrication



Fig. 8. Finalized Project

The design of 360° arm movement and drill were combined to drill on material become much easier. For the arm design, it is divided into two parts. The first part is the lower connecting arm that is locked in a 45° angle but can rotate 360° freely. The second part is the upper connecting arm which can move up and down freely and can also rotate 360° freely without any problem. This arm can reach a high object and can also be lowered to drill much shorter object. The drill is connected to a 20 Volts plug and are attached to the front end of the upper connecting arm. This drill can rotate at 1000 rpm and can penetrate through metal, plastic, and wood quite easily.

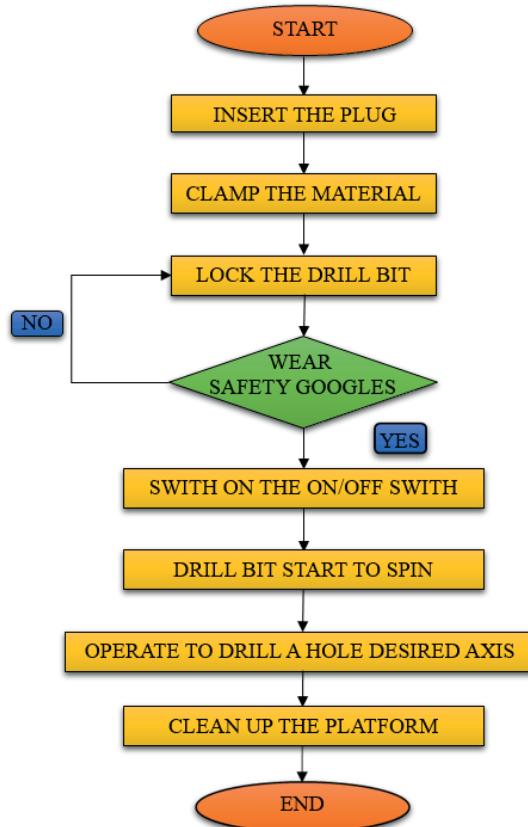


Fig. 9. Operation flow chart of the Flexible Drilling Machine

The theory of this project was to use a 360° flexible drilling machine to drill a hole on the designed material. The 360° flexible drilling machine was attached to multiple arms or linkages that allowed the drill to move freely. In theory, the higher the power, the higher the torque produces. Power supply can be changed according to the machine. Some machines cannot stand a high-power supply or voltage in because it can cause the machine to break or function incorrectly. It is better to follow the specifications provided by the machine's supplier to ensure good and long-term usage of the machine.

2.1. Cutting Speed (V)

The rate at which the drill bit removes metal in one second. The drilling action in the workpiece is represented by the cutting speed. As a result, the mathematical calculations have been completed.

$$V = \pi DN$$

$$N = 10,000 \text{ rpm}; D = 5 \text{ mm}, \text{ hence } V = 157079.63 \text{ mm/sec}$$

2.2. Feed Rate (f)

Inches per minute, inch per bit revolution, number of bit revolutions per inch of advance, or feet per hour are the rates at which a drilling bit is advanced into or penetrates the rock formation being drilled. Forward speed is also known as cutting rate.

$$F = s f n$$

$$F = 40 \text{ mm/min}$$

2.3. Depth of Cut (d)

It is the entire amount of metal removed by the cutting tool in one pass. It is measured in millimetres. It varies depending on the tool and the work material. Mathematically, it is equal to half of the diameter difference.

$$d = D/2, d = 2.5$$

2.4. Material Removal Rate

When conducting machining operations such as using a lathe or milling machine, the material removal rate (MRR) is the amount of material removed per time unit (typically per minute). The higher the material removal rate, the more material removed each minute.

$$MRR = (D^2/4) f N; MRR = 49,3602.75 \text{ mm/min}$$

2.5. Machining Time

Simply multiply the length of the machine motion in inches by the feed-rate in inches per minute. $t = L / f$

where,

L = length of the hole to be drilled

= 100 mm

f = feed of the drill

= 42 mm/min, hence, $t = 2.52 \text{ min}$

2.6. Torque

Torque is the amount of force produced by the drill as it turns an object, not the speed at which it turns. Torque ratings have continuously increased in recent years, far above what is really required to fulfil applications.

$$P = 20 \text{ watts}, N = 10,000 \text{ rpm} P = 2 \square NT/60$$

$$T = P \times 60/2 * N$$

$$T = 20 \times 60/2 \times 10000 \text{ T} = 6,000,000 \text{ N-mm}$$

3. RESULTS AND DISCUSSIONS

For a variety of purposes, drilling is a method that is used to create a hollow or expand an existing hollow. to show off bendable hand drilling tools. Drilling is a cutting method that entails using a drill bit to make a circular pass-section hole in solid materials. The drill bit frequently functions as a multipoint rotary cutting tool. The bit is rotated at speeds ranging from hundreds to thousands of revolutions per minute while being pressed on the workpiece. The reducing zone is pressed against the workpiece when the hole is drilled, reducing chips (swarf) that would otherwise come out of the hole. Even though the bit is typically circled, the hole is frequently formed by pounding a drill bit into the hole with quick, repeated motions as opposed to a circular slicing action. With a pinnacle-hammer drill, the hammering operation can be carried out either inside or outside the hole (down-the-hole drill, DTH). Drills used for horizontal drilling are known as drifter drills. Making holes in a workpiece with metallic slicing tools is known as drilling. Drilling is a type of machining operation, along with trepanning, counter dulling, reaming, and boring. Most of these methods combine a linear feed with a primary rotation motion. Drilling for short hollows and deep holes has different properties. The size of the hole determines how much can be machined; the larger the hole, the more difficult it is to control the process and throw away the chips; small holes are common on many materials and high cloth.

Certain components cannot be drilled with standard drills because of the generally constrained space between the bit and the drill bed. We must use hand drills in these circumstances, however drilling with a hand drill has alignment issues. Therefore, we advise using a 360° flexible drill that can be mounted on a desk or wall and used to drill holes in all directions. As a result, it is safe to drill even intricate foundation pieces and surfaces. As a result, design and construct a 360° flexible drilling machine with rotating hinges and connectors, a motor mount, and a supporting shape for precise drilling operations. An essential piece of workshop equipment is a drilling system. Drilling can be accomplished quickly, cheaply, and easily in a drilling machine. By removing metallic material with the rotating edges of a drill, one can create a cylindrical hollow with a predefined diameter and intensity. The spindle of the drilling system contains the drill slicing tool. The target location is marked with an indentation using a centre punch. Pressed into the work and fed into the indent is the rotating drill. You can drill the hole to the precise depth you want. Drilled holes can be distinguished by their burrs on the exit side and their sharp edges on the entrance side. On the interior of the hollow, there are typically feed markings as well. Drilling can also have an impact on the mechanical properties of the painting by leaving a very thin layer of highly confused and disturbed cloth on the freshly formed floor and lowering residual tension all around the opening. (Refer to Fig. 10).

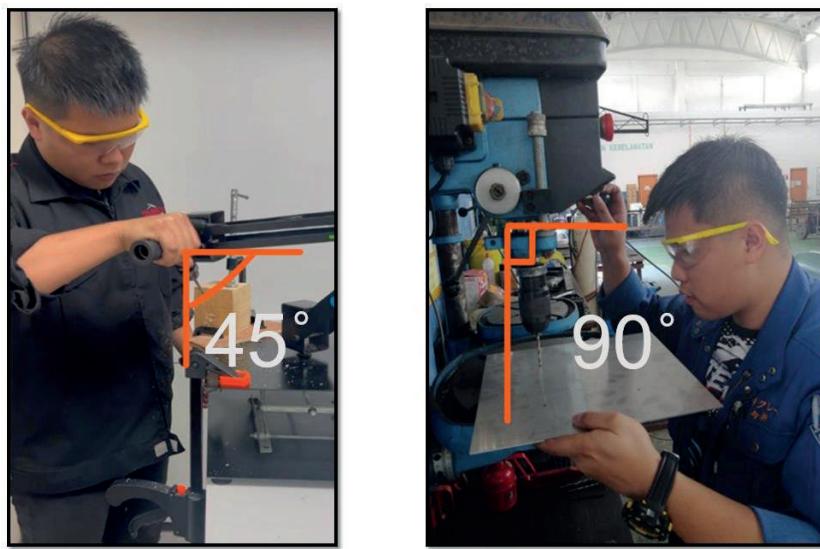


Fig. 10. Different drill machine and angle

For drilling machine of 12 Volts:

(i) Wood – 1.4 cm (Thick), 45°

Size Drill Bit (mm)	Time (s)
1 mm	4.65
1.5 mm	4.10
2 mm	5.51
3 mm	24.86
4 mm	53.87

(ii) Wood – 1.4 cm (Thick), 30°

Size Drill Bit (mm)	Time (s)
1 mm	2.99
1.5 mm	2.96
2 mm	3.67
3 mm	18.60
4 mm	33.63

(iii) Plastic – 0.3 cm (Thick), 65°

Size Drill Bit (mm)	Time (s)
1 mm	2
1.5 mm	2.71
2 mm	2.83
3 mm	4.61
4 mm	9.51

(iv) Plastic – 0.3 cm (Thick), 35°

Size Drill Bit (mm)	Time (s)
1 mm	1.59
1.5 mm	1.56
2 mm	1.41
3 mm	1.66
4 mm	6.90

(v) Steel – 0.2 cm (Thick), 60°

Size Drill Bit (mm)	Time (s)
1 mm	11.52
1.5 mm	52.47
2 mm	34.00
3 mm	0
4 mm	0

(vi) Steel – 0.2 cm (Thick), 45°

Size Drill Bit (mm)	Time (s)
1 mm	8.15
1.5 mm	50.92
2 mm	25.48
3 mm	0
4 mm	0

For drilling machine of 20 Volts:

(i) Wood – 1.4cm (Thick), 65° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	4.94
6 mm	6.18
7 mm	6.24
8 mm	7.23
9 mm	7.45
10 mm	7.94

(ii) Wood – 1.4cm (Thick), 30° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	2.66
6 mm	4.32
7 mm	4.69
8 mm	6.33
9 mm	6.52
10 mm	6.91

(iii) Steel – 0.2cm (Thick), 65° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	9.33
6 mm	20.55
7 mm	32.66
8 mm	45.78
9 mm	52.32
10 mm	64.12

(iv) Steel – 0.2cm (Thick), 30° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	8.43
6 mm	18.77
7 mm	27.36
8 mm	35.56
9 mm	44.88
10 mm	52.22

(v) Plastic – 0.3cm (Thick), 65° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	3.70
6 mm	4.08
7 mm	4.25
8 mm	4.64
9 mm	5.01
10 mm	5.23

(vi) Plastic – 0.3cm (Thick), 30° (Arm angle)

Size Drill Bit (mm)	Time (s)
5 mm	2.00
6 mm	3.45
7 mm	3.69
8 mm	4.00
9 mm	4.37
10 mm	5.01

4. CONCLUSIONS

The time taken to drill into the workpiece at 65° arm angle is greater than on 30° arm angle. This is caused by the placement of handler hand at 65° arm angle that is higher than at 30° arm angle. The thrust given by handler could be different because of the height difference thus producing different result on time taken to drill into the workpiece (Refer to Fig. 11).

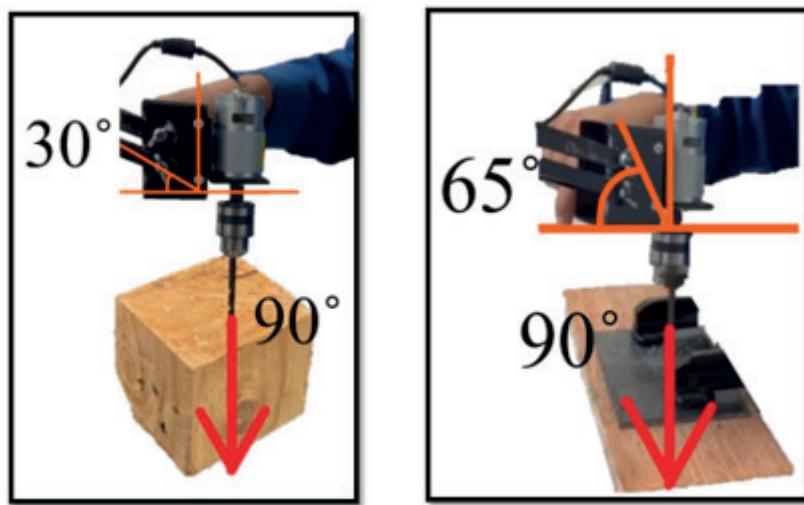


Fig. 11. Different arm angle on machine

In testing, there are two drill machines used which are 12 Volts and 20 Volts. The 12 Volts drill machine is used to test drill bits from size 1 mm to 4 mm while the 20 Volts drill machine is used to test drill bits from size 5 mm to 10 mm. The angle and position of workpiece is the same but the result of 12 Volts drill machine on steel is almost the same as the 20 Volts drill machine even the size of the drill bit is different. This is caused by the different power input into the motor. The higher the power input, the higher the speed of the motor. This causes a difference in torque produced by the drill hence produces a different result.

In conclusion, the results prove this drilling machine can be used at different angles and with different sizes of drill bit, from 1 mm to 10 mm. The time taken depends on the thickness of materials such as wood, steel, and others. It also depends on the size of the drill bit used. Besides, individuals who want to use this machine should pay full attention and identify the angle to be used carefully so as not to suffer injury. Therefore, this machine was easy to use and carried everywhere.

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EFFECTIVE MAINTENANCE ENGINEERING AND MANAGEMENT IN MANUFACTURING INDUSTRY

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Abstract

The analysis of the industrial sector's machine maintenance needs in this research attempts to offer suggestions for shortening downtime and preventing large losses. As a result, the paper addresses the computerized maintenance management system that is appropriate for the industrial sector as well as maintenance organization, strategy, system approach, planning, and scheduling. The organization must be considered initially in order to replicate an organization and plan upkeep properly. The next stage of the process entails selecting the optimal plan to implement inside the organization. The method is offered along with the system approach to maintenance, which calls for organized/secure planning and scheduling. A firm may be maintained better because everything is protected and organized on a computer system.

Keywords: *maintenance, approach, manufacturing industry*

1. INTRODUCTION

Maintenance is an important part of quality control and, in some cases, has an impact on a business' long-term existence. Unstable resources can stop production if they have not been maintained appropriately. For most firms, dealing with a machine malfunction or complete breakdown can be expensive. When a breakdown happens, the price of labor per unit rises gradually until the equipment is working again. In this situation, fixing the problems will result in unexpected costs, such as extra costs for repair facilities, technicians or repair team, preventative maintenance inspections, and spare parts. These are just a few problems that a company, even one that uses brand-new machines in its production operations, may run into overtime if a reliable maintenance management solution is not put in place.

The goal of maintenance is to guarantee the highest levels of productivity and availability of production tools, utilities, and related facilities at the most affordable prices possible while maintaining acceptable levels of quality, safety, and environmental protection. Long ago, maintenance was viewed as a secondary task that always resulted in financial waste. There was a propensity to group it with troubleshooting and maintaining worn-out or obsolete equipment. Yet, businesses nowadays are realizing that maintenance is a crucial component of production, not just a "partner" in it. Its connection to equipment performance is a high management level integrated strategy issue. As a result, management is now in charge of the maintenance function. The objective is to control expenses, schedule work effectively and efficiently, and guarantee that the business complies with all rules and regulations while preventing failures and reducing breakdowns through extensive studies and accurate reports.

The Facility Manager (FM) function in Fig. 1 is becoming more and more well-known for the significant contribution it can make to cost savings and workplace effectiveness. Managing support services to meet the needs of the organization, its core functions, and employees is FM's main responsibility. It focuses on the management of physical asset maintenance and includes the controlling services required for a successful business (Marco & Mangano, 2012).

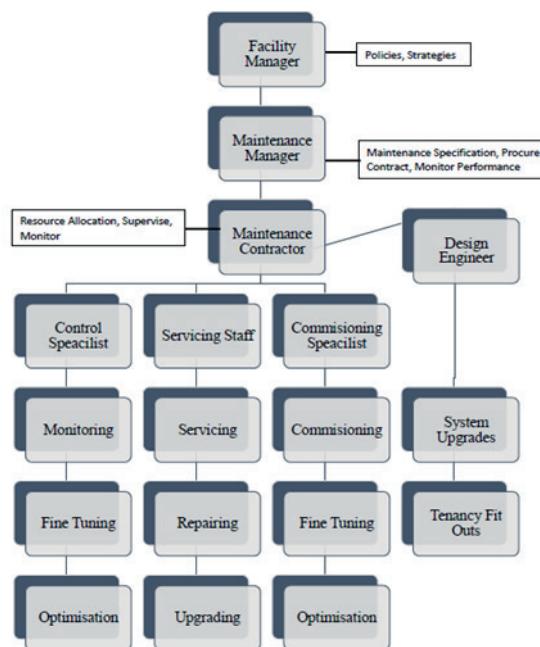


Fig1. A maintenance management structure proposed for Manufacturing Industry

A simple input/output system can be used to describe a maintenance system. Manpower, damaged equipment, materials and spare parts, tools, information, policies and procedures, and spares constitute the system's inputs. Equipment that is operational, dependable, and properly designed to carry out the planned function of

the plant is the output. The system is functional thanks to a number of actions. Planning, scheduling, execution, and control are among the tasks. According to the maintenance system's goals, the control is accomplished. Equipment availability, affordability, and quality are among the objectives, which are typically in line with those of the company. An essential component of this system that can be used to enhance performance is feedback and control.

2. METHODOLOGY

By performing routine inspections, replacing worn out parts, and cleaning equipment, a strong preventative maintenance program foresees and avoids equipment problems. Robotic systems, for instance, require a targeted, regular preventive maintenance program to ensure optimal operation and offer the longest possible in-service lifespan. An efficient program includes regular, systematic performance testing and analysis, software updates, and component replacement, adjustment, lubrication, and replacement.

In order to extend the life of industrial equipment, Total Productive Maintenance (TPM) can be implemented to improve productivity and reduce the operating costs (Ahuja & Khamba, 2008). TPM enables a company to:

- (i) Reduce waste and product defects;
- (ii) Empowering workers to set-up and take care of their equipment;
- (iii) Reduce operating costs;
- (iv) Minimize safety issues;
- (v) Increase productivity rates (less equipment breakdown); and
- (vi) Ensuring all systems and processes are production of high-quality products.

3. RESULTS AND DISCUSSIONS

The goal of the maintenance management control system is to improve profitability while reducing losses and waste while boosting productivity and efficiency. The goal of maintenance is to achieve the best level of personal safety and operational reliability while spending the least amount of money. Design modifications, better lubricants, an improved suspension system, calibration, alignment, etc. can be used to facilitate maintenance, for example:

- (i) Chips sorting machine maintenance

It is crucial to establish a scheduled preventive maintenance program to get the most efficiency out of the chipper and prevent unneeded downtime. The daily, weekly, and monthly maintenance checks must be planned out, and operators must adhere to them strictly. The operator's manual will provide specific guidelines for the equipment. On a daily basis, check the chipper to make sure it is operating correctly.

- (ii) Soldering machine maintenance

Cleaning the sensors and maintenance after 200 hours. Clean all the sensors on the conveyor with a cloth and some detergent. Other than that, do a maintenance heating zone (bottom and top). The cleaning plates should have some maintenance after 200 hours. Clean hole plates with reflow oven cleaner and cloth.

- (iii) Terminal hot press machine maintenance

It is typically strongly advised to use a Terminal Hot Press Maintenance checklist to help with memory and mark activities off as they are completed. Create check-sheets that are organized with each itemized task connected to a specific interval. It could be on a daily, monthly, or seasonal basis. It also may be according to machine time where particular hourly milestones demand specific attention. You can schedule upcoming activities by recording the maintenance of your machinery. This includes scheduling maintenance that needs

to be outsourced to a dealer if shop time is necessary or a dealer site visit is desired, as well as being reminded to order new parts, fluids, and filters.

While maintenance planning is exactly what it sounds like: the planning process, maintenance scheduling is the process of shifting responsibilities in a production or manufacturing process. Maintenance scheduling is used to plan human resources, industrial processes, allocate machinery and equipment resources, and acquire materials (Golub, 2021). Planning and scheduling are two of the simplest and most economical actions a business can take to boost output and availability. The dependability and efficiency of an asset are improved by good scheduling. Pool scheduling increases costs and complicates the process. Electronic component manufacturers need to embrace current technology more than ever to reduce the risk and expenses associated with maintaining their products because of globalization, fierce rivalry, and pressure to cut operational costs. Maintenance planning and scheduling should provide considerable benefits such as:

- (i) Monitoring expenses related to maintenance can assist in budgeting;
- (ii) Decreased equipment outages;
- (iii) A decrease in replacement components;
- (iv) Increased efficiency; and
- (v) Heightened effectiveness through less resource mobility between locations.

4. CONCLUSIONS

A Computerized Maintenance Management System (CMMS) software is recommended specially to make the work of maintenance teams more effective. The software's purpose is to distribute maintenance jobs more effectively among employees of a corporation. Software such as Fiix CMMS can be used in manufacturing industry to:

- (i) Control expenses;
- (ii) Gather and utilize data;
- (iii) Boost safety and health;
- (iv) Script work request; and
- (v) Make scheduling and do preventive maintenance.

In order to acquire sound maintenance management skills in the manufacturing sector, this study provided knowledge related keeping facilities and machine/equipment activities in good operating order.

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TURKISH VERSION OF CAREER COMPETENCIES QUESTIONNAIRE: A CROSS-CULTURAL VALIDATION STUDY

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Abstract

The 21st century is a world where individuals can craft their careers by entering different jobs or tasks in their current job. To craft their careers, individuals need career skills and competencies. Akkermans et al. integrated prominent theories into their career competencies model and defined six competencies: reflection on motivation, reflection on qualities, networking, self-profiling, work exploration, and career control. The current study aims to examine the validity and reliability of the Career Competencies Questionnaire in a Turkish undergraduate sample. The convenient sample consists of 333 undergraduate students (70.3% female and 29.7% male) from various departments and universities in Turkey. Data analysis was performed with the R programming language via RSTUDIO 1.4. Confirmatory factor analysis showed that the Turkish form has a similar construct to the English one. Measurement invariance for gender was found in both metric, scalar, and strict models. Pearson correlations showed that the career competencies dimensions related to career adaptability skills and career engagement. Therefore, criterion validity was also supported. The results claim that the Turkish form of the Career Competencies Scale can be used to assess undergraduate students' career skills. Moreover, career centers in universities can benefit from this scale for determining students' career needs.

Keywords: *career development, career competencies, career skills, scale adaptation, career counseling.*

1. INTRODUCTION

Career development in the 21st century offers people many job opportunities throughout their lives. Today, more and more people change jobs, tasks or even professions several times during their lives. The organizations that employed them have had limited influence on their careers. Once it was recognized that people have their own dynamic careers beyond the boundaries of their organizations (Defillippi & Arthur, 1994; Hall, 2004), the question of what skills and competencies need to be developed to build a successful career became one of the most remarkable questions. People need to be able to make appropriate decisions about different career options in order to control and direct their careers.

Career competencies were defined as the core skills and information central to developing a career (Akkermans et al., 2013). There are prominent theories and research to classify career competencies (Defillippi & Arthur, 1994; Francis-Smythe et al., 2012; Hall, 2004; Kuijpers & Scheerens, 2006). Akkermans et al. (2013) integrated prominent theories into their model and defined six competencies: reflection on motivation, reflection on qualities, networking, self-profiling, work exploration and career control. Accordingly, career competencies include skills and information such as knowing one's motivations, goals and abilities, knowing how to connect with others and show them one's qualities, and also knowing how to take action for one's career. The model of Akkermans et al. (2013) has been validated in different cultures and age groups (Akkermans et al., 2013; Grosemans & De Cuyper, 2022; Yamada et al., 2022).

Research provides evidence that career competencies are related to career success (Kuijpers et al., 2006; Talluri & Uppal, 2022) and career satisfaction (Çolakoğlu, 2011; Kong et al., 2012). Even though career competencies have been initially studied in employees, students can also benefit from these competencies to manage the school-to-work transition process (Grosemans & Cuyper, 2021; Presti et al., 2022; Stremersch et al., 2021). The present study aimed to test the career competence model (Akkermans et al., 2013) on a sample of Turkish undergraduate students. Accordingly, this study aimed to provide evidence of the validity and reliability of the career competencies questionnaire in a Turkish sample. We hope that this measure will help career practitioners to assess students' competencies, and also be used by researchers to contribute to the career literature.

2. METHOD

A. Participants

The current study is a scale adaptation study. The convenience sample consists of 333 Turkish undergraduate students (70.3% female and 29.7% male) from different departments of their universities. The data was collected through the online form at the end of 2022. The Ethics Committee of the Faculty of Education of Selcuk University confirmed that this study follows ethical standards.

B. Measurements

Akkermans et al.'s (2013) Career Competencies Questionnaire was translated and adapted to Turkish. The questionnaire has 21 items in the six factors. To assess criterion validity, the Short Form of Career Adaptability Skills Scale (developed by Savickas & Porfeli, 2012; adapted from İşık et al., 2018) and the Career Engagement Scale (developed by Hirschi et al., 2014; adapted from Korkmaz et al., 2020) were used. The Short Form of Career Adaptability Skills Scale has 12 items in four factors, which are concern, control, curiosity, and confidence. The Career Engagement Scale is composed of nine items.

C. Scale Adaptation Process

The scale adaptation process was carried out according to the recommendations of Behling and Law (2019). First, we contacted the authors who developed the career competencies scale to get their approval to use it in Turkish. Then, we started the first translation. Four academics from the fields of English language learning,

Turkish education, and psychology reviewed the initial translation and made revisions. After the translation process, the revised form was administered to undergraduate students from different departments.

D. Data Analysis

The data was analyzed to obtain validity and reliability proofs. Data analysis was performed with the R programming language via RSTUDIO 1.4 (RStudio Team, 2021). Confirmatory factor analysis (CFA) was performed with Lavaan (Rosseel, 2012) and SEM Tools (Jorgensen et al., 20-21) packages for construct validity, and LTM (Rizopoulos, 2006) package for reliability analysis. The package stats (R Core Team, 2022) was used for regression analyses.

3. RESULTS

Confirmatory factor analysis (CFA) with the WLSMV estimator showed that the Turkish form has a similar construct to the English one. After two modifications, the fit indices were as follows: $\chi^2 = 710.766$, $df = 172$, $p < .001$, $RMSEA = 0.097$, 90% CI [0.09, 0.10], $SRMR = .04$, $CFI = .97$, $TLI = .97$. Factor loadings varied within the range of .74 to .94. Factor loadings varied between coefficients .68 and .96. Then, four models were formed by grouping according to gender to assess measurement invariance (van de Schoot et al., 2012). As a result of comparisons among the models, there were no significant differences (model 1 vs. model 2: $\Delta\chi^2 = 16.26$, $df = 15$, $p = 0.36$; model 2 vs. model 3 $\Delta\chi^2 = 9.54$, $df = 15$, $p = 0.85$; model 3 vs. model 4: $\Delta\chi^2 = 13.38$, $df = 21$, $p = 0.89$). Therefore, metric, scalar, and strict invariance were provided.

Pearson correlations were examined for criterion validity. Accordingly, the relationships among career competencies dimensions, career adaptability, and career engagement varied between $r = .39$ and $.76$. Pearson correlation coefficients concentrated between $.60$ and $.70$. Moreover, hierarchical regression analysis revealed that career competencies dimensions and career adaptability skills with gender and perceived socioeconomic status explained 66% of the total variance of career engagement ($F(12, 320) = 54.37$). Career competencies dimensions explained 13% of the total variance of career engagement after controlling career adaptability skills and demographics.

Lastly, Cronbach alpha coefficients were calculated to examine the reliability. Cronbach's alpha varied between .86 and .94.

4. DISCUSSION

This study investigated the validity and reliability of the Turkish version of the Career Competencies Questionnaire. The results showed that the data of the Turkish form fit the six-dimensional structure proposed by Akkermans et al. (2013). The CFA fit indices were sufficiently good (Hu & Bentler, 1999). Comparing validation studies of the Career Competencies Questionnaire from different cultures and age groups (Akkermans et al., 2013; Grosemans & De Cuyper, 2022; Yamada et al., 2022), it can be suggested that the fit coefficients are similar to those in this study. Therefore, there was sufficient evidence of construct validity.

The findings show that correlations among career competencies, career adaptabilities, and career engagement were of medium to high size (Cohen, 1992). Further, career competencies significantly predicted career engagement. These findings are compatible with the other studies that reported correlations among career competencies, career adaptabilities, and career engagement (Akkermans et al., 2018; AlKhemeiri et al., 2021; Nilforooshan ve Salimi, 2016; Saraswati vd., 2021; Sou vd., 2022). Thus, there was sufficient evidence for criterion validity. The results claim that the Career Competencies Questionnaire provides psychometric standards adequately for the Turkish undergraduate student sample.

This study can be noteworthy in terms of adapting the Career Competencies Questionnaire into Turkish. The career practitioners in university career centers may benefit from this measurement to identify students career needs. Further, future research may use the Career Competencies Questionnaire to understand university

students' career skills. However, this study has some limitations regarding its convenient sample and cross-sectional nature. Considering the limitations, the results should be interpreted with caution.

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PERSONALITY TRAITS AND ORAL PRESENTATION ANXIETY AMONG ESL LEARNERS

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Abstract

Oral presentation skills are regarded as one of the most essential skills for higher education and future career development. However, many students experienced oral communication apprehension when delivering oral presentations in class. Second language scholars believe that there are many factors that could influence oral presentation anxiety. In view of this, the present study intends to investigate the role of five broad personality traits: Extraversion, Agreeableness, Openness, Conscientiousness, and Neuroticism and their relationship with Oral Presentation Anxiety. A descriptive-correlational research design was employed to investigate these relationships. Using a simple random sampling method, a total of 97 Communicative English 1 (DUE10012) students from Politeknik Sultan Idris Shah were selected as the respondents of the study. They were asked to answer a set of questionnaires comprising 55 items adapted from the Big Five Inventory by Goldberg (1993) and Oral Presentation Anxiety by Razawi, Zulkornain, & Mohd Razlan (2019). Findings from the quantitative data indicated that there was a negatively significant relationship between extraversion and oral presentation anxiety level. Furthermore, there was a positively significant relationship between neuroticism and oral presentation anxiety level. Whereas there was no significant relationship between agreeableness, conscientiousness, openness, and oral presentation anxiety level.

Keywords: *Big five. Oral presentation anxiety. Personality traits. ESL*

1. INTRODUCTION

To prepare undergraduates with the necessary skills for real work situations, they are often required to deliver oral presentations individually or in groups as their assessment. Ahmad, Rahmat, & Shahabani (2022) mentioned that students' ability to speak to an audience in their target language must be polished through oral presentations. This is done to prepare them to speak in the target language more effectively and confidently. However, delivering oral presentations might be difficult for students who need to acquire and use English in the classroom to speak or convey ideas in front of others (Arumugam, Hashim, Selvanayagam, & Krishnan, 2021).

Oral Presentation Anxiety

During oral presentations, students are expected to participate in discussing and presenting their thoughts actively. Mahmud & Osman (2017) added that lecturers expect that students will be comfortable elaborating on and defending their answers to questions. However, when lecturers assign oral presentations, they will either be met with total silence or concerns from students who find giving an oral presentation challenging. The students could become too anxious and begin to believe that they would never be able pronounce a word or deliver a compelling presentation correctly. They will lose attention and become restless during the presentation because they worry that they won't perform well in the oral presentation. Previous scholars defined these feelings as oral presentation anxiety. Kadir@Shahar & Abdul Raof (2021) asserted that it is undeniable that oral presentations cause anxiety in ESL students regardless of their level of proficiency. A study conducted by Mohamad (2020) showed that polytechnic students are fearful of being judged since assessments focus more on speaking abilities, such as presentations, role plays, group discussions, and mock interviews. They thought that they will be evaluated by their classmates and the language lecturer when they are delivering oral presentations. Hence, they must be conscious of their speaking abilities and grammatical mistakes in order to use the language in class. In addition, anxiety is the focus of Hadi, Lidiyatul, & Mareena's (2020) study because it causes negative impacts on language learners who are likely to withdraw themselves from classroom interactions.

Big Five Personality Traits

Darmawan (2017) refers personality as a person's traits regarding their routine behaviour, attitude, and actions. The "big five personalities" are five different types of personalities namely Extraversion, conscientiousness, openness, neuroticism, and agreeableness are the personalities. People that are extroverted like interacting with and talking to others. They enjoy attracting attention and being among people (Putri, Aswadi, & Marleni, 2022).

Vural (2019) asserted that it would be wise to look at the reasons behind students' lack of enthusiasm for speaking English and their uneasiness when doing so. The foreign language speaking skills (FLSA) may be determined and influenced by student personality qualities, which could have a negative or beneficial impact on their English proficiency and communication skills. The various personalities themselves have an impact on the students' ability to communicate. Each person has a variety of characteristics that can help them learn a language, including intelligence, aptitude, learning style and techniques, personality, and anxiety. It can be inferred that a variety of factors affect students' ability to speak (Putri, Aswadi, & Marleni, 2022). Marpaung & Widyanotoro (2020) believed that the personality does have relationship with educational context. Moreover, they also believed that behaviour in the language learning process can be led by personality. Numerous personality traits have been discovered to be foreign language anxiety predictors of interpersonal variation. More specifically, extraversion, neuroticism, and conscientiousness were the main topics of the investigations on the link between the Big Five personality traits and foreign language anxiety (Babakhouya, 2019).

In view with the above literatures, it seems that there is a need for an investigation to determine how

personality traits can affect students' oral presentation anxiety level. Hence, the objectives of this study are as follow.

Research objective:

1. To investigate the oral presentation anxiety level among DUE10012 students.
2. To investigate the correlation between extraversion, agreeableness, conscientiousness, neuroticism, openness and oral presentation anxiety level.

2. METHODOLOGY

A quantitative descriptive method was employed for this study. Using a simple random sampling method, a total of 97 Communicative English 1 (DUE10012) students from Politeknik Sultan Idris Shah were selected as the respondents of the study. They were asked to answer a set of questionnaires which consists 55 items using 4 Likert-scale (1-strongly disagree, 2-disagree, 3-agree and 4-strongly agree). The instrument was divided into three sections which are;

- i. Section 1: Demographic section
- ii. Section 2: Adapted Big Five Inventory by Goldberg (1993) and
- iii. Section 3: Adapted Oral Presentation Anxiety by Razawi, Zulkornain, & Mohd Razlan, (2019).

In order to suit the local setting of the study, some of the items from the original questionnaires were revised and removed. The findings were analysed using Statistical Package for Social Sciences, SPSS version 24.

3. RESULT AND DISCUSSION

Descriptive analysis, mean score and standard deviation were employed to interpret the overall mean score of the oral presentation anxiety level among ESL learners. Table 1 shows the overall mean score of oral presentation anxiety level among ESL learners ($M= 2.88$, $SD= .53$). Generally, the findings showed that most of the respondents responded agree upon all items and rated high level of communication apprehension in English language.

Table 1. Overall mean score Oral Presentation Anxiety level among ESL learners

	N	Mean	Std. Deviation
Oral Presentation anxiety level	97	2.8845	.52941

*1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree

Correlation Statistical Test was employed to examine relationship between extraversion and oral presentation anxiety level. For the purpose of the analysis, the Pearson r value and two-tailed probability (Sig.) were used to interpret the relationship between Big Five personality traits and oral presentation anxiety level.

Table 2 shows there was a significant negative correlation ($r= -.30$) between extraversion and oral presentation anxiety level. This relationship was significant ($p = .00$) at 0.05 level. This simply means that the higher their score on extraversion, the lower their oral presentation anxiety level is.

Table 2. Correlations of Extraversion and oral presentation anxiety level among ESL learners

		Extraversion	Oral presentation anxiety level
Extraversion	Pearson Correlation	1	-.304**
	Sig. (2-tailed)		.002
	N	97	97
Oral presentation anxiety level	Pearson Correlation	-.304**	1
	Sig. (2-tailed)	.002	
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows there was no correlation ($r = -.057$) between agreeableness and oral presentation anxiety level. This relationship was not significant ($p = .59$) at 0.05 level. This indicates that the independent variable agreeableness has no relationship with the dependent variable of oral presentation anxiety level.

Table 3. Correlation between Agreeableness and oral presentation anxiety level among ESL learners

		Oral presentation anxiety level	Agreeableness
Oral presentation anxiety level	Pearson Correlation	1	-.057
	Sig. (2-tailed)		.579
	N	97	97
Agreeableness	Pearson Correlation	-.057	1
	Sig. (2-tailed)	.579	
	N	97	97

Table 4 shows there was no correlation ($r = -.129$) between conscientiousness and communication apprehension level. This relationship was not significant ($p = .209$) at 0.05 level. This indicates that the independent variable conscientiousness has no relationship with the dependent variable of oral presentation anxiety level.

Table 4. Correlation between Agreeableness and oral presentation anxiety level among ESL learners

		Conscientiousness	Oral presentation anxiety level
Conscientiousness	Pearson Correlation	1	-.129
	Sig. (2-tailed)		.209
	N	97	97
Oral presentation anxiety level	Pearson Correlation	-.129	1
	Sig. (2-tailed)	.209	
	N	97	97

Table 5 shows there was a significant positive correlation ($r = .337$) between neuroticism and oral presentation anxiety level. This relationship was significant ($p = .001$) at 0.05 level. This simply means that the higher their score on neuroticism, the higher their oral presentation anxiety level is.

Table 5. Correlation between Neuroticism and oral presentation anxiety level among ESL learners

		Neuroticism	Oral presentation anxiety level
Neuroticism	Pearson Correlation	1	.337**
	Sig. (2-tailed)		.001
	N	97	97
Oral presentation anxiety level	Pearson Correlation	.337**	1
	Sig. (2-tailed)	.001	
	N	97	97

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6 shows there was no correlation ($r = -.044$) between agreeableness and oral presentation anxiety level. This relationship was not significant ($p = .667$) at 0.05 level. This indicates that the independent variable openness has no relationship with the dependent variable of oral presentation anxiety level.

Table 6. Correlation between Openness and oral presentation anxiety level among ESL learners

		Openness	Oral presentation anxiety level
Openness	Pearson Correlation	1	-.044
	Sig. (2-tailed)		.667
	N	97	97
Oral presentation anxiety level	Pearson Correlation	-.044	1
	Sig. (2-tailed)	.667	
	N	97	97

4. CONCLUSION

The main aim of this study is to investigate the relationship between Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism and openness) and oral presentation anxiety level among Semester one ESL learners in Politeknik Sultan Idris Shah. The findings showed that most of the respondents rated agree (Mean=2.88) upon oral presentation anxiety level in learning English as second language items. This indicates that they were negative towards oral presentation. This result concurs with Kadir@Shahar & Abdul Raof (2021) where there was an existence of anxiety in oral presentation among the participants of their study.

Next, in the view of the relationship between Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism and openness), the findings showed that there was a significant negative relationship between extraversion and oral presentation anxiety level. This indicates that the higher their score on extraversion, the lower their oral presentation anxiety level is. This finding however, opposed the finding from Marpaung & Widyanotoro, (2020) where there was no correlation between extraversion and

speaking skills.

Further, the current study also found that there were no significant relationship between the agreeableness, conscientiousness, openness and oral presentation anxiety level. Hence, the hard work, orderliness, friendliness, respectful, artistic, imaginative and intellectual interest personality (Marpaung & Widyanotoro, 20 (Placeholder1)20) were not affecting one's oral presentation anxiety level. This result was somehow similar to a study conducted by Babakhouya (2019) where the findings indicate that there was no correlation between agreeableness, conscientiousness and speaking skills. However, in a study conducted by Babakhouya (2019), there was a correlation between openness and speaking skills.

Subsequently, the findings of this study also indicate that there was a significant positive correlation between neuroticism and oral presentation anxiety. The result was in line with a study by Khouya (2018) where neuroticism showed positive correlations with both Communication Apprehension and Anxiety of English Class. Learners with high scores on neuroticism may avoid holding a conversation in the English language as they usually have extreme worry.

All in all, this study affirms that students' personality does affect oral presentation anxiety level. Therefore, it is advised that future research focus on the relationship between English proficiency level and speaking anxiety as well as other factors that affect speaking anxiety. Focusing on pedagogical strategies for lowering speaking anxiety among ESL students is another option (Dellah, Zabidin, Nordin, Amanah, & Atan, 2020).

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A SUSTAINABLE INNOVATIVE CONGKAK BOARD

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Abstract

Congkak has been a popular pastime in Malaysia for many years. Sadly, it has lost its popularity among young people who spend a lot of time on gaming, especially mobile gaming. Mobile gaming addiction is becoming a public concern. As a result, there is a need to redesign traditional Congkak to attract the younger generation to appreciate and play Congkak before it goes extinct. The traditional Congkak board is heavy and relatively large, resulting in transportation inefficiency. Conversely, other widely available plastic Congkak boards are relatively light and small but lack collection value. This project presents a Congkak board that has ownership value, which not only preserves its traditional values but is also light, portable, and environmentally friendly for both domestic and foreign tourists. Bamboo is employed as an alternative raw material in this project since it is widely available in tropical countries. The advantages of using bamboo in today's products have been ignored and bamboo is one of Malaysia's abundant natural resources. Compared to wood, bamboo is a flexible and weather-resistant material. Bamboo also grows quicker than trees; thus, it can aid in sustaining the environment. The innovative design of Congkak is made up of 4 pieces: 2 bamboo halves that can be joined together by a fastening cap ("rumah") on either end, which also functions as a chamber for storing tokens ("buah Congkak"). An added advantage of this Congkak board is the ease of manufacture, whereby small and medium-sized businesses (SMEs) can easily mass produce this design without the need for sophisticated and expensive technology.

Keywords: Congkak, board game, sustainability

1. INTRODUCTION

Congkak, also known as Jongkak (Hellier, 1907) or Chongkak (Tan, 2010), is a traditional board game played by Malaysians, especially among Malays, Indians, and Baba-Nyonyas (Azlida Jamil, 2020). This two-player strategy game has many versions around the world; they are called Warri or Awari in the Caribbean, Congklak in Indonesia, Sungka in the Philippines (Azlida Jamil, 2020), and Mancala in most other parts of the world (Arjun & Shekher, 2014; Tan, 2010). However, Congkak has gradually lost its popularity in the current world, particularly among younger generations as a result of technological advancements (Noraziah ChePa et al., 2014; Siti Hajar Maizan, 2018).

In the current technological era, smartphone ownership has grown rapidly around the world, especially among younger generations (Silver, 2019; Statista, 2023); at the same time, the functionalities of smartphones continue to improve and excel (Tecno, 2020). In addition, the latest mobile networks with high downloading and streaming speeds also provide online games with a better and faster gaming experience (Li et al., 2022). All these factors have contributed to the rise of mobile gaming. As a result, digital games are now surpassing physical traditional games (Noraziah ChePa et al., 2014). Online gaming can be fun, but there are a few negative effects on some gamers when they are addicted. Amongst them are poor academic performance (Li et al., 2022; Shiers, 2020); interpersonal relationship issues (Müezzin, 2015; Shiers, 2020); as well as mental and physical health problems (Shiers, 2020). Some studies also found that online games with antisocial content (violence) have led to aggressive emotions and destructive behavior among gamers (Li et al., 2022; Shiers, 2020).

Besides the threat of digital games, other reasons are the size and weight of traditional Congkak boards, which make them difficult to transport (as illustrated in Fig. 1). Most of the traditional Congkak boards are too heavy to be carried around, especially for young children (Siti Hajar Maizan, 2018). Traditional Congkak boards are made from solid wood, and many of them have rich and elegant carvings. These collectible boards are hardly available in shops nowadays.



Fig 1. A circa 1960 traditional Congkak board. This Congkak board, which measures 124 cm in length and weighs 7.2 kg, was crafted from Borneo Ironwood and decorated with dragon features.

In order to address these issues, modern physical Congkak boards are designed to be lighter than the traditional ones, for ease of carrying and storage. These boards are commonly made from plastic and some boards are decorated or colored with eye-catching, appealing hues (Siti Hajar Maizan, 2018). Although they are smaller and lighter, they serve no collectible value because the traditional aesthetic values are absent. Examples of these modern boards are shown in Fig. 2 and Fig. 3.

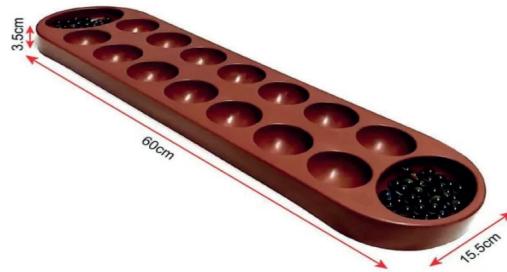


Fig 2. A modern plastic Congkak board (15.5 cm x 60.7 cm x 3.5 cm)



Fig 3. A 16-hole edition SPM® Congkak (SPM-109). With dimensions of 14 cm x 71.5 cm x 4.25 cm, this contemporary plastic Congkak board can be folded (with dimensions of 14 cm x 39.5 cm x 8.5 cm) for easier storage and portability. From *Congkak - 16 Holes Multi Colour (SPM-109)* [Photograph], by SPM Games, n.d., <https://spmgames.com.my/spm109>

In order to preserve and promote the Congkak game, a few researchers had digitized the game (Noraziah ChePa et al., 2014). However, the outcome was not impressive. The electronic Congkak is yet to be popular among online gamers. Nur Azzah Abu Bakar and Noraziah ChePa (2016) suggest that the usability of the electronic Congkak needs to be improved to encourage greater user game engagement. Meanwhile, Amir Faqihuddin Hafizan et al. (2018) developed a version of the electronic Congkak that looks nothing like the traditional Congkak. They also amended the rules of the traditional Congkak game. They claim that their version of Congkak was preferred to the traditional ones by their participants, but no reasons were given. Besides, the number of their participants, which is 30 primary 2 students, is too small to conclude the findings.

Although there are many different versions of the modern Congkak board design, no product has yet been developed that can meet the proposed specifications, which are sustainability, low weight, portability, and collectability. Therefore, the aim of this study is to develop a Congkak board that not only meets the specified specifications but is also easy to produce.

A. Bamboo as an Alternative Material

Based on desk research of current available contemporary Congkak boards, almost all are made from either wood or plastic. A more sustainable material, such as bamboo, can be an alternative material for Congkak. At the time this paper was written, there were no commercial Congkak boards made from bamboo. Bamboo grows quickly even in areas where it is difficult for other crops to grow, making it a sustainable and environmentally friendly material (Chaowana, 2013; de Ruijter-Luken, n.d.; Poppens et al., 2013; Schröder, 2022).

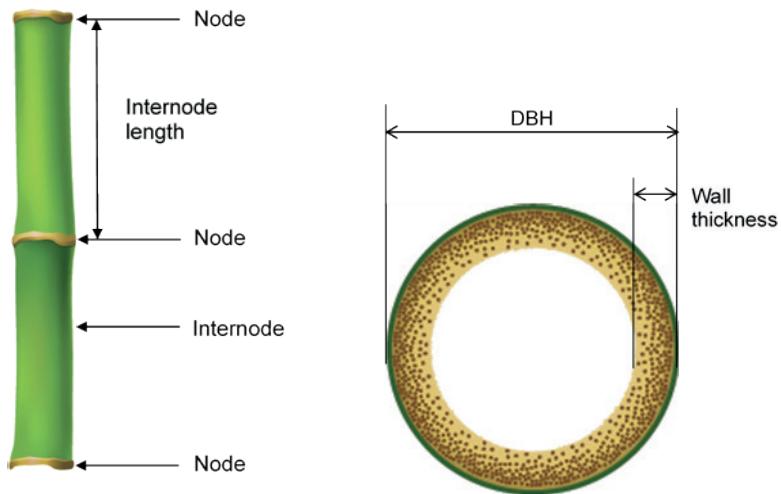


Fig 4. Bamboo culm (left) and cross-section of a bamboo culm (right). The following bamboo terminologies are stated by Durai and Trinh, 2019, p.2: a bamboo culm or stem is an individual bamboo pole; a bamboo internode is the portion of bamboo between two nodes; and a bamboo node is a join of two internodes.

As recommended by Guadua Bamboo (n.d.) and de Ruijter-Luken (n.d.), bamboo can be used for everything that can be made from wood; therefore, it is highly likely that Congkak boards can be made from bamboo too. In comparison to wood, bamboo has several benefits. Amongst those advantages are:

- (i) bamboo continues to grow after its stem has been harvested; while a tree dies after being harvested (de Ruijter-Luken, n.d.);
- (ii) bamboo can grow rapidly and mature in a shorter amount of time (Azmy Hj. Mohamed & Appanah, 1999; de Ruijter-Luken, n.d.) and some species can grow faster than 1 meter per day (Poppens et al., 2013);
- (iii) bamboo is hardy and grows well even on less fertile lands (de Ruijter-Luken, n.d.; Poppens et al., 2013); and
- (iv) bamboo stems are hollow, so they are lighter (Ruijter-Luken, n.d.).

Bamboo belongs to the grasses (Poaceae) family (Azmy Hj. Mohamed & Appanah, 1999; Chaowana, 2013; de Ruijter-Luken, n.d.; Poppens et al., 2013). The number of species of bamboo in the world is approximately 1600 (de Ruijter-Luken, n.d.). There were approximately 70 species in Malaysia in 1999 (Azmy Hj. Mohamed & Appanah, 1999); however, there is no current information on the number of species that exist today in Malaysia. Most bamboo species in Malaysia grow naturally in forests and are also grown by locals in rural areas. Varied species of bamboo have different culm characteristics, including variations in height, internode length, diameter at breast height (DBH), and wall thickness (Azmy Hj. Mohamed & Appanah, 1999). Untreated bamboo has a lifespan of less than 2 years, but some species can last 4–7 years if they are stored under cover (Schröder, 2021). Schröder (2021) also states that there are a few factors that affect the durability of harvested bamboo; these include the species, the length of the culm, the thickness of the wall, as well as the time of harvesting. Consequently, it is important to research the characteristics of each bamboo species before making it a replacement material.

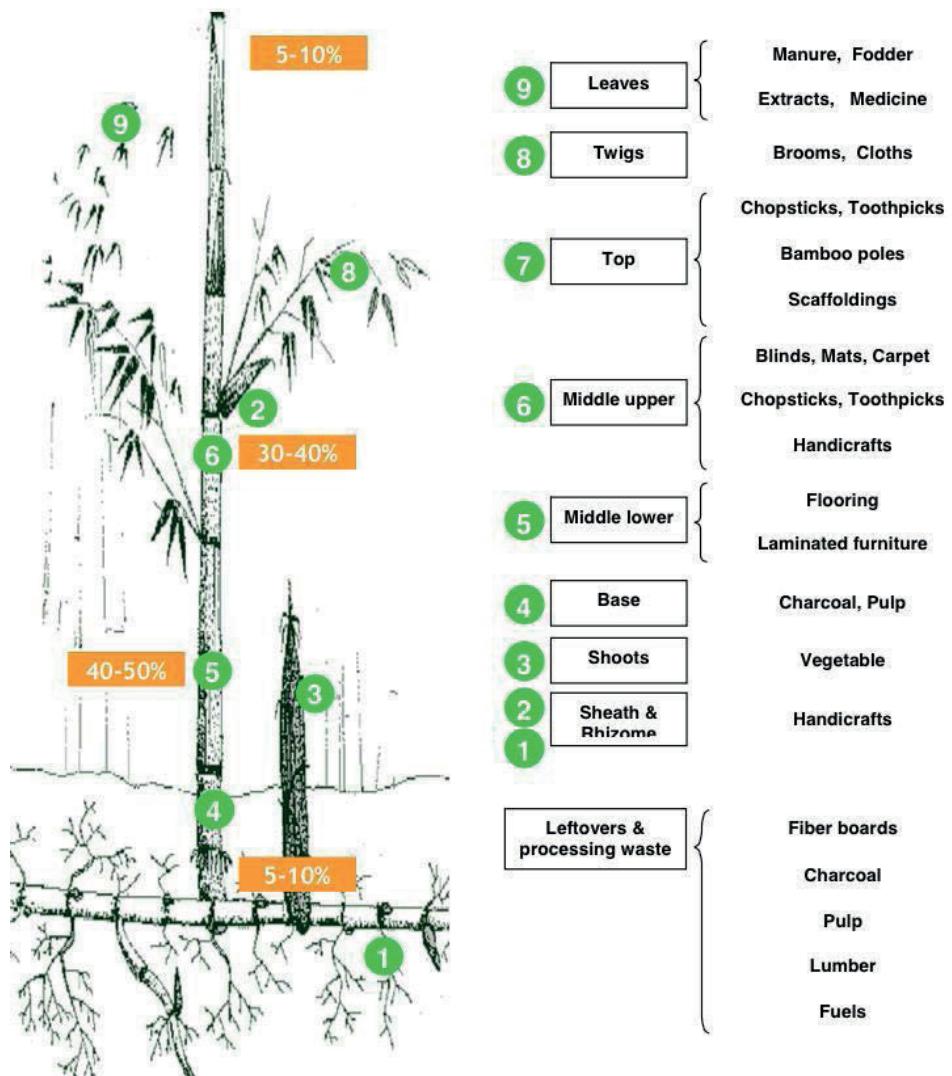


Fig 5. Potential uses of bamboo in Sarawak. Reprinted from *Feasibility study on bamboo plantations and opportunities for its utilisation in Sarawak, Malaysia, 2016* (p. 31), by Subramony, T., Li, J., Muralidharan, E., & Parekh, B., 2016, International Bamboo and Rattan Organisation (INBAR) and Sarawak Timber Industry Development Corporation (STIDC). Retrieved from <https://www.inbar.int/wp-content/uploads/2020/05/1499156135.pdf>

Since this study is limited to the physical use of bamboo and does not encompass bamboo as food and fuel, the findings related to food and fuel as a product will not be discussed in this paper. Bamboo is widely used in Malaysia to produce a diverse array of products, such as chopsticks, home utility items, rafts, bridges, handicrafts, musical instruments, vegetable baskets, toothpicks, joss papers, and a myriad of other items (Azmy Hj. Mohamed & Appanah, 1999; Wong, 1989). In Sarawak, bamboo is particularly important for the ethnic Iban, Bidayuh, and Melanau, because bamboo not only fulfills their needs but also symbolizes their identity, especially in handicraft items (Durin, 2004; Mohd Zaihidee Arshad et al., 2014). However, lately, bamboo as a material in everyday life has been gradually replaced by other materials, especially plastic (Durin, 2004). As an effort to promote bamboo usage, the Sarawak Timber Industry Development Corporation (STIDC) has commissioned a study to identify the market opportunities for Sarawak bamboo (Subramony et al., 2016). The findings (referring to Figure 5) inform that the following products can be produced: furniture, building materials, craft items, musical instruments, flooring, etc. (Subramony et al., 2016). Since the Sarawak government intends to promote handicrafts made from bamboo, the proposed

Congkak will use Sarawak motifs in line with their direction. Indirectly, the Congkak helps to promote the Malaysian tourism sector, especially in Sarawak; as well as the economy of indigenous ethnic groups in Sarawak.

In Durin's (2004) study, out of the 13 species of Bamboo in Sarawak, the following three species have potential as the alternative material for the Congkak board based on their internode length, wall thickness, and diameter at breast height (DBH): *Gigantochloa levis*, *Bambusa vulgaris* var. *striata*, and *Schizostachyum brachycladum*; while based on Azmy Hj. Mohamed and Appanah's (1999) research, besides those three species mentioned above, another three possible bamboo species are *Gigantochloa scorchedinii*, *Gigantochloa wrayi*, and *Schizostachyum zollingeri*. Table 1 presents the summary of the findings of the culm characteristics of the selected bamboo species. The appropriate internode length of the culm is between 35 to 55 cm; the DBH should be around 7 to 10 cm; meanwhile, the wall thickness should be around 5 to 10mm. Any bamboo species with a wall thickness that are more than 10 mm is considered not suitable. It will be very bulky to carry around.

Table 1. The Culm Characteristics of Selected Bamboo Species

Species	Height (m)	Internode Length (cm)	DBH (cm)	Wall Thickness (mm)
<i>Bambusa vulgaris</i> var. <i>striata</i>	8-18	35	5-10 (10-13)	8-16 (11-15)
<i>Gigantochloa levis</i>	18-23	35	11-13 (10-13)	11-15
<i>Gigantochloa scorchedinii</i>	17-20	42	9-11	7-12
<i>Gigantochloa way</i>	15-18	40	8.5-10	6-10
<i>Schizostachyum brachycladum</i>	12	58	6-7 (7-10)	3-5
<i>Schizostachyum zollingeri</i>	12-15	55	5-7	4-7

Note. These are the potential bamboo species that could be used to make the Congkak board. The numbers in brackets are obtained from Durin (2004); the rest of the information comes from Azmy Hj. Mohamed and Appanah (1999). There are a few minor differences between these two sets of data.

Apart from the pros, it is equally important to understand the cons. The only drawback of bamboo compared to wood and plastics is that it decays rapidly after being harvested, especially in tropical environments, so it should be limited to short transportation distances and stored for the shortest amount of time possible (Poppens et al., 2013). However, with proper treatment such as with chemical preservatives, the shelf-life as well as durability of bamboo can be prolonged to 50 years or more (Schröder, 2021).

B. Sarawak Motifs as a Value-Added Element

In this section, all the discussion will only be closely related to the bamboo crafts as well as Sarawak motifs and patterns. Bamboo handicrafts have a long history in Sarawak; most of the bamboo craft items, for example, baskets, flutes, and containers, are decorated with art motifs. These motifs are unique and heavily influenced by the crafter's surroundings, beliefs, character, and mind. The craft persons are mostly indigenous people from rural areas, namely Iban, Melanau, and Bidayuh tribes, who are known as Dayak. The term "Dayak" was first used by Europeans to refer to the non-Malay inhabitants of Borneo (WWF, n.d.) and this term will be used throughout the whole paper to refer to Sarawak indigenous people.

The Dayak motif is a representation of the Dayaks' distinctive identity in current society and each motif is displayed in a unique way that embodies the recognizable winding, curving, coiling tendrils and stripes of the Dayak people (Kanyan & Zainurul Aniza A Rahman, 2015). The primary subjects of Dayak motifs include mythical beings (e.g., dragons), anamorphic animals (e.g., hornbills, dogs, and reptiles), plants and flowers (e.g., wild ferns, flowers), celestial and cosmic objects (e.g., stars and suns), spiritual beings (e.g., giants and ghosts), Latin letters (e.g., J, C, V, W, and S), and occasionally just abstract shapes (Durin, 2004; Kanyan & Zainurul Aniza A Rahman, 2015, Patrick Padri et al., 2015). These motifs are frequently inspired by elements of nature, such as plants and animals as well as various faith symbols (Kanyan & Zainurul Aniza A Rahman, 2015). Some Dayak motifs are shown in Fig. 6 and Fig. 7.

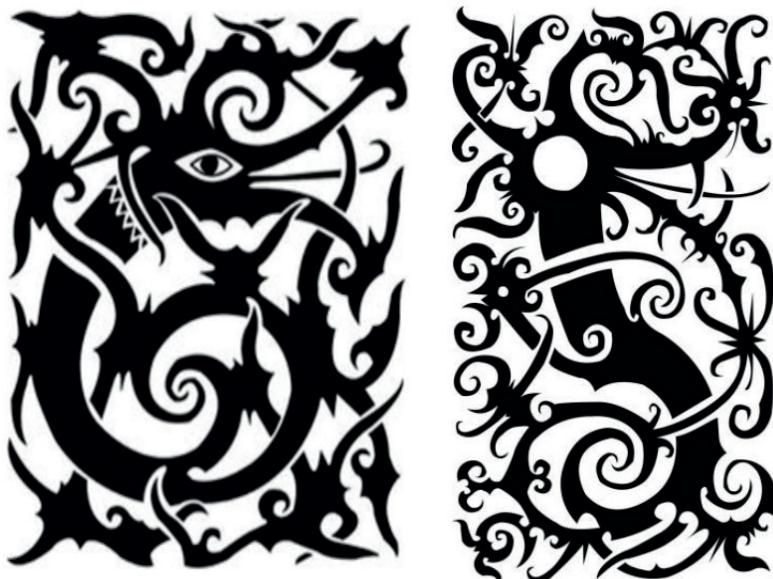


Fig 6. Dayak motifs (animal). The motif on the left illustrates a dragon (nabau), a sacred creature for the Iban community in the past (Saging & Baco, 2022). Retrieved from <https://doi.org/10.51200/jba.v7i1.4137>. The motif on the right illustrates a dog (aso) with elaborated curls swirling towards pointy ends (Kanyan & Zainurul Aniza A Rahman, 2015).

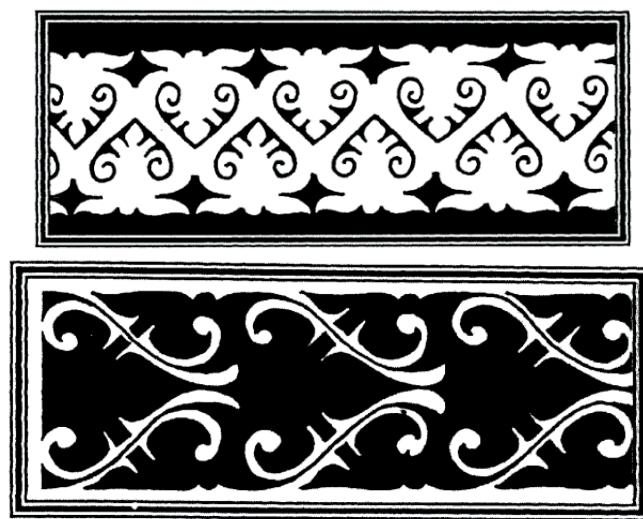


Fig 7. Dayak motifs (letters). The motif on the left was crafted based on the letter “V”; meanwhile, the motif on the right was crafted based on the letter “S” (Ganjing, 1991, as cited in Durin).

According to Mohd Zaihidee Arshad et al. (2014), bamboo craft items are the main source of income for many Dayaks. Besides, Kanyan and Zainurul Aniza A Rahman (2015) also highlight that Borneo Dayak-inspired handicrafts are a crucial part of the tourism-based industry, and these crafts are available in most souvenir shops, tourism information centers, airports as well as local craft fairs. Therefore, the Dayak motifs will be a value-added element for our Congkak that would further increase its collectible value. Some examples of Sarawak bamboo handicrafts are shown in Fig. 8.



Fig 8. Sarawak bamboo craft items. From top left to bottom right:

a bamboo flute (retrieved from <https://www.malaysiadesignarchive.org/crafts-of-the-bidayuh/?print=print>); a bamboo container (retrieved from <https://www.michaelbackmanltd.com/object/dayak-etched-bamboo-container/>); a pen holder (retrieved from <https://www.gumtree.com/p/hobbies-collectibles/dayak-iban-sarawak-borneo-east-malaysia-bamboo-carving-pen-holder-1960/1456777333>); a bamboo container (retrieved from <https://www.pinterest.com/pin/500884789779740105/>); a seed planting basket (retrieved from <https://rugrabbit.com/node/214030>); and an ‘Ajat’ Orang Ulu’s Bag (retrieved from <https://sarawakhandicraft.com.my/product/ajat-orang-ulu-s-bag/>).

2. METHODOLOGY

The design and development process for the Congkak is shown in Fig. 9. The design and development process consists of four stages, and it is adapted from the design process that was introduced by Chicago Architecture Center (n.d.). The four stages are analysis, idea generation, modeling, and modification.

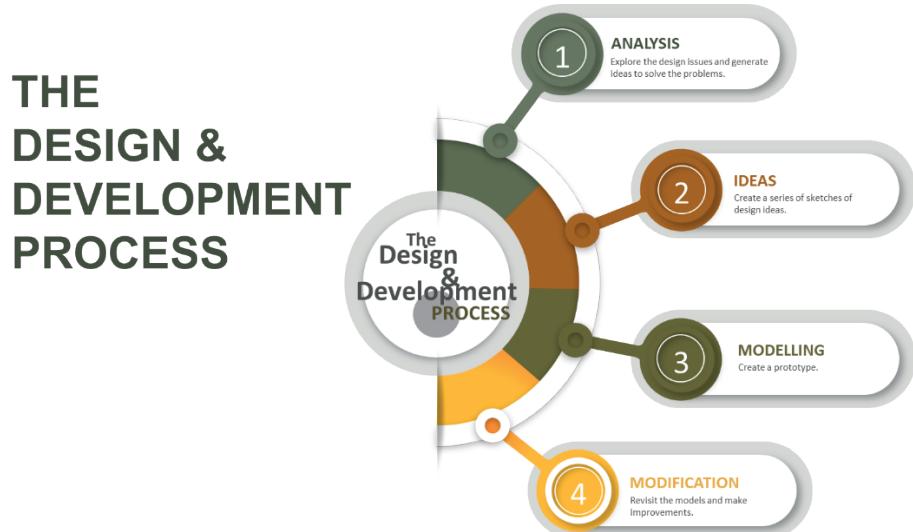


Fig 9. The design and development process.

First, we defined the problems of the current Congkak. The first step was carried out by studying the available Congkak boards via both field and desk research. We studied traditional Congkak boards, as well as contemporary ones. Photographs and sketches were collected. We learned how to play Congkak so that we could figure out the issue on our own. Then, we identified our target audiences. A few scenarios were defined based on users' experience, for example, how players travel with their Congkak board, how they keep the board, etc. We also collected information related to materials, such as wood, bamboo, and plastics. We visited bamboo plantations to observe and study a few bamboo species that are available in Malaysia. We also did research on Sarawak craft and motifs. We identified the potential motifs that could be used for our Congkak. Fig. 10 illustrates our project analysis.

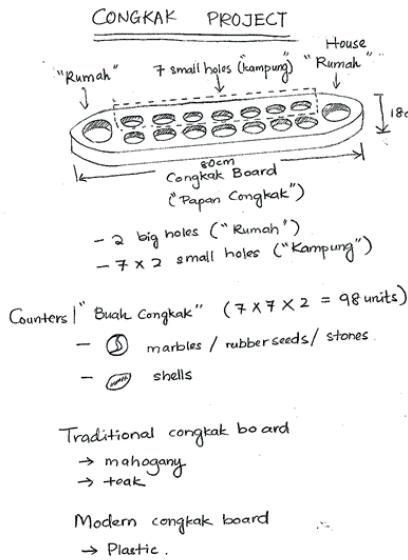


Fig 10. Project analysis.

Next, we had a brainstorming session to gather more ideas. We came up with the concept of using bamboo as our Congkak main material during this session, which is based on our sustainable concept. Several ideas were generated, and five sketches were produced. Initial ideas are shown in Fig. 11. We investigated and evaluated each idea to determine which one would best meet the needs of the players. Further analysis and refinement were made, and lastly, a concept was chosen. More sketches were drawn based on the chosen concept. After several iterations, the sketches in Fig. 12 were proposed.

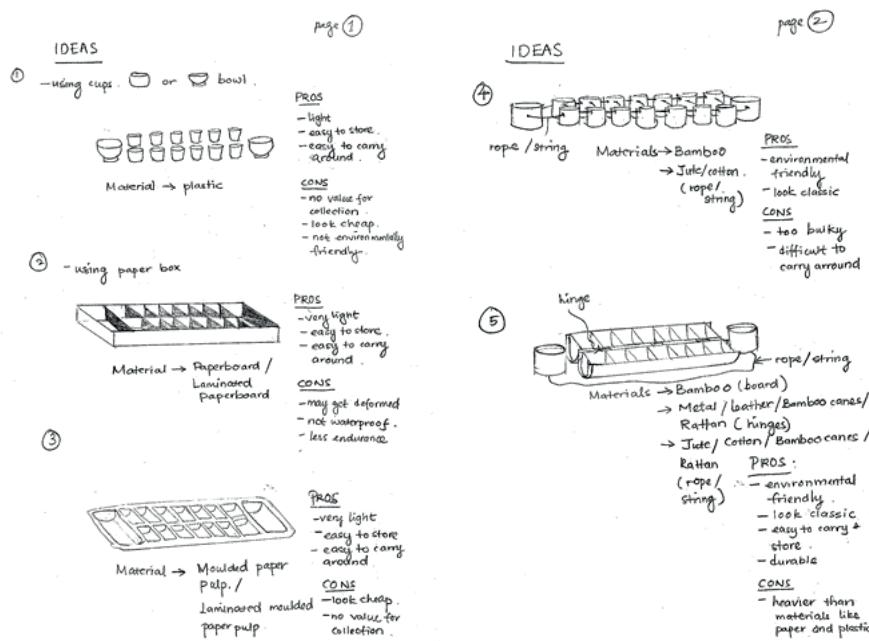


Fig 11. Idea development (initial sketches).

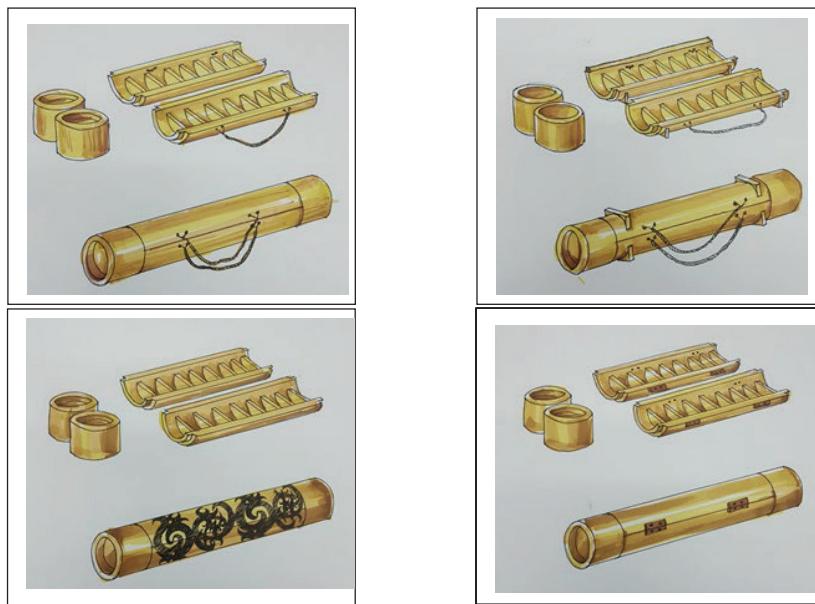


Fig 12. Idea development (refined sketches).

After further discussion and listing out the strengths and weakness of each concept in Figure 12, a choice was made based on group opinion. A computer-aided design (CAD) was drawn to visualize the actual product (as shown in Fig. 13). Later, a prototype was made according to the proposed dimensions. The finalized prototype is shown in Fig. 14. Performance tests were done using the prototype. Five players were invited to test the product and feedbacks were documented. Further refinement was identified.

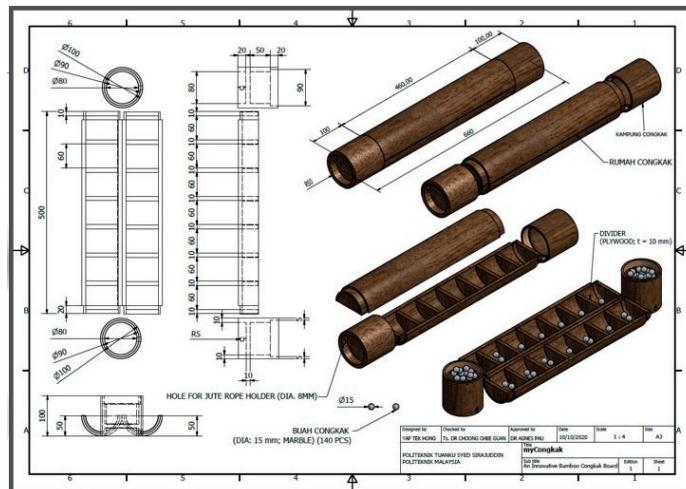


Fig 13. A finalized Congkak board drawn using CAD.



Fig 14. A completed prototype.

3. RESULTS AND DISCUSSIONS

The prototype features and specifications are listed as follows:

- i) The size of the product: 100 mm diameter, 660 mm length, and weight ± 1.5 kg.
- ii) The Congkak board is made from bamboo (80%), plywood (8%), jute rope (2%), and marble balls (10%).
- iii) The Congkak consists of 4 parts, 2 cylinder-shaped fastening caps as the “rumah” Congkak; and 2 bamboo halves as the “kampung” Congkak (14 holes).
- iv) A pouch holds 140 tokens (“buah Congkak”).

Table 2. Summary of the Prototype

a. Specifications	Product Length	660 mm
	Product Diameter	± 100 mm
	Product Weight	± 1500 gram
b. Material	Species of Bamboo	Betung / Semeliang
	Dimension of bamboo	Diameter (cm): 9-13 Segment Length (cm): 40-50 Thickness (mm): 10-14
	Plywood	Thickness: 10 mm (as a divider of “rumah” Congkak)
	Jute rope	Diameter: 8 mm (as a handle of Congkak)
	Token of Congkak	140 units of Marble balls Diameter: 15 mm
c. Manufacturing Techniques	Raw Bamboo	Cutting / Sawing of a bamboo segment 4 parts: 2 parts - “kampung” Congkak and 2 part - “rumah” Congkak
	Bamboo Segment	Sanding of “kampung” Congkak & “rumah” Congkak
	“Kampung” Congkak	Cutting the middle part of bamboo into two halves as “kampung” Congkak Threading at both ends of bamboo (external: M90 x 6) with rotating thread.

	“Rumah” Congkak	Threading inside of bamboo as Congkak covers (internal: M90 x 6) with rotating thread.
	Finishing	Shellac / Varnish
	Joining	Assembly of “rumah” Congkak and “kampung” Congkak
	Handle	Assembling the jute rope at both ends of “rumah” Congkak as a handle of Congkak

Based on the results of the performance tests, it was found that a few improvements needed to be made. The jute ropes for joining the halves of the “kampung” Congkak can be replaced by 3 small stainless-steel hinges to overcome the Congkak’s instability while playing. In addition, the Dayak motifs can be crafted on the Congkak to increase its collectible value.

4. CONCLUSIONS

This Congkak board has a few promising benefits: low weight, sustainability, portability, and ease of manufacture. Compared to wood used for traditional boards, bamboo is lighter and grows faster, so it can aid in reducing deforestation. As a handle for the board, the jute rope allows for easy portability. Additionally, this version of the Congkak board can be produced in bulk at a low cost by small and medium-sized businesses (SMEs) without the use of sophisticated technology. Bamboo as a material for local products may also strengthen local economies by boosting wages and employment possibilities and contributing to socio-economic benefits (Poppens et al., 2013).

Furthermore, this Congkak board has a higher economic value than plastic Congkak boards: the Dayak motifs contribute to a better collectible value by increasing the authenticity of the product while preserving and promoting the Dayak cultural heritage. Therefore, it can be sold as a gift or memento. Souvenirs are known to be highly valued in the tourism industry. Thus, it can be advertised and sold at tourist hotspots, such as handicraft stores, art fairs, hotels, and airports, as well as online using social media or e-shops. Additionally, organizations like the International Bamboo and Rattan Organization or the Malaysian Ministry of Tourism, Arts, and Culture may be able to assist in promoting this Congkak board. As a Malaysian handicraft, this Congkak board would not only boost the economy but also promote the country to foreigners.

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TEACHER COMPETENCIES

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Abstract

In an information-intensive economic system, it is more crucial than ever to be employable, able to handle global competition and equipped with the necessary tools and abilities for the professions of the future. It has been crucial to consider how education would work in managing and organizing knowledge while also adjusting to the new work order. This article's goal is to discuss and make clear the overall structure of teacher competencies in nine different dimensions—field competencies, research competencies, curriculum competencies, lifelong learning competencies, social-cultural competencies, emotional competencies, communication competencies, information and technological competencies, and environmental competencies. The values, actions, communication, goals, and practices of teachers in the classroom are influenced by their competences, which also promote their professional growth and academic studies.

Keywords: *Learning, competencies, teacher competencies, curriculum*

1. INTRODUCTION

To upgrade, refine, and explore their teaching methods, teachers must develop their knowledge and abilities. Studies on teachers' competences frequently place more emphasis on the role that teachers play in the classroom as teachers than on the competencies of teachers. Regarding education reform research, the advancement of teacher education, the scientific findings of educational science, and other sectors, teachers' skills have been expanding. The rationale of redefining teacher professional development for sustainability can be understood using Kress' theories. Depending on the demands of the time that call for more competence, educational objectives might change quite quickly. The educational system is directly impacted by these needs. Teachers must possess strong and effective professional abilities because they are in charge of running the educational system. It is necessary to examine teachers' competencies in order to redefine them in light of how education and human development as a whole are progressing.

2. COMPETENCIES

Competencies are defined as "the set of knowledge, skills, and experience necessary for future, which manifests in activities" (Katane et. al. 44). The three primary categories of field competences, pedagogical competencies, and cultural competencies make up the common notion of teachers' competencies. The professional competencies of English Language Teachers were the subject of a study conducted by Selvi (The English Language 4). In order to develop the skills of new teachers based on the opinions of teachers and teacher educators, the conventional Delphi Technique was used. After the third round of gathering expert responses, the Delphi process was finished, and subsequent rounds of the procedure were conducted until a group consensus was reached.

According to the study's findings, there are four primary subcategories that make up a teacher's professional competencies: curriculum competencies, lifelong learning competencies, social-cultural competencies, and emotional competencies. The findings indicated that a fresh perspective had to be taken when talking about instructors' competencies. In this context, the literature on teachers' competencies was examined, and new teacher competency areas were created as seen below, trying to reinterpret them in light of many characteristics of teachers' professional competencies. These competencies can be viewed: Field Competencies, Research Competencies, Curriculum Competencies, Lifelong Learning Competencies, Social-Cultural Competencies, Emotional Competencies, Communication Competencies, Information and Communication Technologies (ICT) Competencies, Environmental Competencies.

The primary areas of teacher competences that involve academic topic studies are called field competencies. The field competencies are those that instructors need to practice their vocation. Regarding the subjects that teachers will teach or that students will learn, they are the teacher competencies. The idea that teachers were the only ones responsible for delivering the content led to the notion that field competences were the most crucial competency area. The idea that the teacher is the one who is accountable for students' learning in the classroom has evolved over time. Due to the shift in the teacher's function from content transmitter to facilitator, allowing pupils to engage with the subject, the value placed on teachers' field competencies dropped within the framework of this change.

The ability to develop and conduct research in the disciplines of teachers is included in the category of research competencies. They encourage collaboration with coworkers, experts, and those with an interest in curriculum studies and education. Teachers who are proficient in research can track trends in their professions and shape their own professional development accordingly. Additionally, teachers' research skills are crucial for helping pupils develop their scientific method and thinking abilities. The research competencies assist research-based teacher education, a novel approach to teacher education, and they also

aid in the improvement of all teachers' competencies.

Curriculum development competencies and curriculum implementation competencies are two sub competencies that fall under the umbrella of the curriculum competencies. The knowledge of curriculum philosophies, skills in curriculum design, elements of curriculum development, models of curriculum development, approaches to designing curriculum development, the curriculum development process, the selection and organization of content, the planning of the teaching as well as testing conditions and the preparation of research for curriculum development are all included in the curriculum competencies. Understanding the plans for the teaching and learning in the curriculum is related to curriculum skills. Teachers' curriculum competencies are skills geared toward helping them perform their teaching duties more successfully. Both theoretical and practical competencies are related to these competencies. The framework of the information and abilities that teachers will acquire is determined by these competencies, which are referred to as learning-teaching associated competencies. It is quite difficult to develop an efficient education service in schools without curriculum capabilities. The curriculum skills can be broken down into two sub-competencies for easier discussion and an explanation of why teachers require them.

The lifelong learning process demands that students take ownership of their education. Teachers take personal responsibility for their own learning in the process of lifelong learning. Learning-to-learn skills and teachers' obligations to their own professional growth are examples of lifelong learning competences. The ability to learn and the ability to use the methods or instruments of learning to enhance learning throughout a person's life are related to lifelong learning competences. The term "lifelong learning competencies" refers to the obligation's teachers have to continue their own education and help pupils develop their own lifelong learning capabilities. It implies that there are two key competencies in lifetime learning. The first one has to do with instructors' capacity for lifelong learning, while the second one has to do with their obligation to help pupils acquire such capacity.

Teachers' and students' values, morals, beliefs, attitudes, worries, motivation, empathy, and other characteristics make up their emotional competencies. They have to do with the implementation of the school's guidance curriculum and psychological counseling. If teachers know how to enhance the emotional component of students' learning, they can aid students in learning and increase students' motivation to study. While keeping an eye on the students' progress, emotional competencies also assist teachers in becoming effective instructors. Emotional supports that foster a positive learning environment are necessary for learning and teaching. Teachers take on the roles of learning mentors and consultants for their students.

The knowledge of local, national, and worldwide values, democracy and human rights issues, team and collaborative work with others, and social studies are all examples of social-cultural competences. Each of these promotes learning while giving teachers and students independence in the teaching-learning process. In social existence, people develop social and cultural beings. As a result, there is a significant connection between students' social and cultural backgrounds and their learning. Some learning theories talked about how social and cultural context affects learning and how instructors' social and cultural competence might help students learn. Teachers' social-cultural abilities can be used to implement the humanistic approach and social theories in the classroom.

The social setting, learning themes, and interactions between teachers and students are all examples of communication competencies. Teachers are also proficient in their domains when it comes to using oral, body, and professional language. They involve listening, observing, speaking, asking questions, analyzing, and assessing communication skills in both intrapersonal and interpersonal processes.

Competencies in information and communication technologies (ICT) are based on the use of tools and technical equipment for acquiring, disseminating, and transferring knowledge. They comprise all information-related technologies, such as those used to create, manage, store, communicate, and/or disseminate information. All technologies for manipulating and communicating information are included

in ICT competencies, which are concerned with the use of technology in managing and processing the information. This indicates that in order to enhance communication during the teaching and learning process, ICT competency is crucial.

Competencies for ecological and environmental safety are known as environmental competencies. The ecological/environmental aspect is a component of teachers' sustainable development, according to Salite and Pipere (16). Environmental competencies are knowledge, attitudes, and abilities about ecological systems and the environment, such as maintaining a clean and accessible environment, managing ecological resources, understanding ecosystems, practical applications for natural resources, and the availability of natural resources.

3. DISCUSSION

The goal of the discipline of education is to present methodical and scientific findings that will help to meet the needs of both people and society. In order to meet all demands and expectations, research must be done to create all connected educational subsystems. The sub-system of teacher preparation is one of the educational system's sub-systems and is to a large extent in charge of controlling this system. By providing teachers with specific competencies, teacher training's primary goal is to ensure that the planning, management, development, and administration of the educational system are all done effectively. The idea of teachers' skills is frequently discussed in relation to very specific aspects such curriculum preparation, implementation, assessment, standards for the curriculum, or the school. These are associated with teachers' in-school teaching responsibilities. In order to develop teachers, it is important to talk about teachers' competencies from a variety of perspectives, including those related to the classroom, research, curriculum, lifelong learning, social and cultural competencies, emotional competencies, communication, information and communication technologies, and environmental competencies.

In addition to the changes taking place in other disciplines, the changes in human existence also provide certain challenges for identifying and acquiring teacher competences. For instance, it's unlikely that environmental abilities were mentioned as a teacher competency area 25 or 30 years ago. However, the issues that individuals have had with the environment have stoked interest in the subject. This attention has led to a connection between environmental challenges and teaching and learning. As a result, the still-debated subject of the environment has been suggested as a new area of expertise for teachers. To put it briefly, daily life and all advances arising from human needs have an impact on the teaching profession and, consequently, teacher competencies. The curriculum competences should be redefined as part of the teacher's professional competencies. Since the curriculum competencies are fundamental skills for teachers to learn, Teachers struggle with the creation and implementation of curriculum in their professions because the abilities required for curriculum development are unclear, poorly defined, or simply ignored. The most undervalued components of teachers' curricular competences are their understanding of curriculum philosophy, curriculum theory, and curriculum development models, as well as learning and teaching methodologies and models. The creation, development, and implementation of curriculum at the micro and macro levels are tied to teachers' subject matter expertise. For collaborations between instructors and the curriculum development team during the curriculum studies, teachers' curricular competencies are essential. Teachers and the curriculum development team each play a specific role in the process (Shkedi).

In the near future, the strategy of teacher-regulated curriculum will be crucial. Thus, research and implementation by teachers should support school-based curricula. Additionally, this will motivate instructors to take a more active role in the procedures involved in developing curricula. Because of this, curriculum theorists and teachers should jointly develop curriculum studies. It is alleged that curricular studies have made instructors' jobs harder (Bulajeva 41). Thus, for teachers to effectively practice their job, teacher competences related to curriculum are quite important. Teachers' competencies cover both the theoretical and practical aspects of the programme.

The competences of teachers have also been impacted by developments in science and the educational system. The other sciences and the social systems are closely related, and they have an impact on the educational system and teacher competencies. The scientific findings in educational sciences, psychology, the economy, technology, sociology, and other fields can be used to inform educational policy. Unless teachers' competences are developed, any type of change and reform study in other systems or science damages teachers' professional competencies (Carlgren 49-50). To perform better on the job, educators must adhere to all of these changes. The evolution of teachers' competences is based on developments in other sciences and society, and it is linked to both professional and personal development.

We are discussing the internationalization of curriculum studies today. A type of reform study is the internationalization of curriculum concepts, and teachers ensure changes by adopting new concepts. Teachers now need to possess greater competencies than they had in the past in this regard. The teaching competences should be discussed and revised while taking into account global trends. In order to properly apply the existing curricula and prepare students for the future by creating these curricula, teachers' competences are crucial. Teachers who are in charge of educating future generations must have the necessary tools to carry out their duties. The development of teacher competences should involve ongoing study, analysis, and upgrading. Therefore, knowledge and use of teachers' skills should be a primary focus of both pre-service and in-service teacher education. The majority of changes in instructors' skills are not gradual processes, but occasionally some changes can happen by accident. The effectiveness of the teachers should be continuously assessed in tandem with modifications and reform studies through scientific investigations. The primary responsibility of teachers is to effectively implement reforms into the educational system. In some ways, the future will be different from the past and the present (Avery 442). As a result, it is vital to redefine the competencies of instructors in order to provide them with the new skills they need to adapt to these changes.

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POLLUTION HAVENS HYPOTHESIS: SMOOTH QUANTILE EVIDENCE FROM BRICS

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Abstract

Pollution, like everything else, can be carried along with globalization. This approach, which refers to the pollution carried by the capital, is the pollution haven hypothesis. This study investigates the effects of foreign direct investment (FDI) on carbon dioxide (Co2) emissions from 1995 to 2021 in BRICS countries. We employed the instrumental variables smooth quantile regression (SIV-QR) method, which is novel in panel econometry. Our findings indicate the negative effects of FDI flows on Co2 in low quantiles and the positive effects of economic growth. However, the FDI flow plot estimates of the instrumental variables' smooth quantile regression show that this effect turns positive. This can help uncover possible relationships between the routes of money and carbon dioxide emissions.

Keywords: *Pollution havens, carbon dioxide emission, smooth quantile regression*

I. INTRODUCTION

Global warming and the resulting climate crisis are leading global problems in the 21st century. One of the mother-lode feedings in the climate crisis is greenhouse gas and carbon dioxide emissions. Carbon dioxide emissions, which are closely related to the consumption of fossil fuels, are also the subject of trade between regions and countries. It is a cap-and-trade system or an emissions trading system. On the one hand, economic growth is of core importance for the markets. Environmental measures implemented by countries or regional associations can also determine the route of carbon emissions. Globalization has not only mobilized capital but also activated carbon emissions.

One of the issues emphasized in recent years is economic growth, energy consumption, and pollution (Muhammad, 2019; Chang & Li, 2018). While most studies focus on economic growth, energy consumption, and pollution, the effects of foreign direct investment flow on pollution have been relatively less researched (Bakhsh et al., 2017). To fill this gap, our study aimed to discover the relationship between foreign direct investment, Co2, and economic growth.

“Increased” environmental awareness in developed countries may affect the location or amount of production geographically. Environmentally friendly policies of developed countries or clean production (Cole, 2004) affect the profitability of production processes more or less through various factors. One of the ways to prevent a possible decline in profit rates may be to shift production centers to developing countries with relatively weak environmental policies (Cole, 2004). Apart from this, costs per unit can be reduced with environmentally friendly technologies, and for this, developing environmentally friendly production relations with intensive technology is among the possibilities. The second possibility emphasizes the reducing effects of investments in technology on pollution. In other words, this effect is an approach known as the technological effect in which direct foreign investment flows reduce pollution (Chang & Li, 2018). The first possibility is referred to as the pollution havens hypothesis or the race to the bottom concept (Dean et al., 2009; Khan & Öztürk, 2020). While both can be observed in modern economies, this study focuses on the first possibility.

While foreign direct investment increases economic growth, it can also increase environmental pollution through industrial activity (Aslan et al., 2021; Khan & Öztürk, 2020; Koçak & Şargüneş, 2018). Foreign direct investment (FDI) flow, which is currently considered one of the driving forces of economic growth, can also be the driving force of an insidious result. Among mainstream approaches, studies such as French (1998), Cole (2004), and Dean et al. (2009), Pao and Tsai (2011), and Omri et al. (2014) are pioneering studies that draw attention to the effects of foreign direct investments on pollution.

Today, as in the past (Pao & Tsai, 2011), BRICS countries are pioneers of investment destinations in the world. These countries also have a large share of the world economy in terms of economic growth, energy exports, technology exports, and trade. In addition, since 2006, China has surpassed the USA in terms of Co2 from fossil fuels and industry (OWD, 2023a).

Based on these explanations, this study examines the effects of FDI flows on carbon emissions in BRICS countries. We employed the instrumental variable smooth quantile regression method developed by Kaplan and Sun (2017), which can be considered a novel method in panel econometrics. This method smooths the tool function rather than the goal, thereby increasing its reliability relative to other instrumental methods. While our findings indicate the negative effects of FDI flows on Co2 in low quantiles, the quantile plot estimates show that this effect turns positive.

This manuscript is organized as follows: Section 2 presents the most recent studies. Section 3 provides information on the dataset, method, and model. Section 4 concludes and provides policy recommendations after presenting a robustness check of the main findings.

II. LITERATURE REVIEW

Many empirical studies have been conducted on the direction and magnitude of the relationship between Co2 emissions and macroeconomic variables. In addition to carbon dioxide emissions and foreign direct investment, some studies have focused on variables such as economic growth (Xiong & Xu, 2021), exports (Li et al., 2023), foreign trade (Kander & Lindmark, 2006), imports, and debt (Boly et al., 2022). Some studies on the relationship between FDI flows and Co2 emissions are listed in Table 1.

Table 1. Literature Review

Author/s	Sample	Variables	Methods	Findings
Keho (2015)	12 ECOWAS countries 1970-2010	Co ₂ , FDI, pop, pGDP	ARDL	FDI, + and – effects on Co ₂
Tang and Tan (2015)	Vietnam 1976-2009	Co ₂ , EU, FDI, Eg	VECM Granger causality	FDI, – effects on Co ₂
Peng et al. (2016)	Provinces of China 1985-2012	Co ₂ , FDI, Eg	OLS, panel VAR	FDI, + and – effects on Co ₂
Ali et al. (2017)	Malaysia 1971-2012	Co ₂ , Eu, pGDP, FDI, Tr, Fd	ARDL	FDI, + and – effects on Co ₂
Bakhsh et al. (2017)	Pakistan 1980-2014	FDI, Co ₂ , Ec	3SLS	FDI, + effects on Co ₂
Behera and Dash (2017)	17 South and Southeast Asian countries 1980-2012	Co ₂ , FDI, Eu, Ub	FMOLS and DOLS	FDI, + effects on Co ₂
Sapkota and Bastola (2017)	14 Latin America countries 1980-2010	FDI, Eg, Co ₂	FE, RE	FDI, + effects on Co ₂
Chang and Li (2018)	84 countries 1996-2005	FDI, Co ₂	Threshold Effects	FDI, + effects on Co ₂
Koçak and Şarkgunesi (2018)	Türkiye 1974-2013	FDI, Co ₂	Causality	FDI, + effects on Co ₂
Salahuddin et al. (2018)	Kuwait 1980-2013	FDI, Co ₂ , Eg, Eu, Fd	ARDL, VECM	FDI, + effects on Co ₂
Haug and Ucal (2019)	Türkiye 1974-2014	Foreign trade, FDI, Co ₂	ARDL	FDI has no statistically significant effects.
Muhammad and Khan (2019)	34 host countries of Asia and 115 source countries 2001-2012	FDI, Eu, Co ₂ , Eg	GMM	FDI, + effects on Co ₂
Esendoh et al. (2020)	52 countries 1991-2014	Tr, FDI, economic integration, Co ₂	PMG-ARDL	FDI, + effects on Co ₂
Khan and Öztürk (2020)	17 Asia countries 1980-2014	Co ₂ , FDI, Gdp	FMOLS	FDI, + effects on Co ₂
Aslan et al. (2021)	N11 countries 1980-2018	Air pollution, Eg, Eu, Tr FDI, Fd	PVAR	FDI, + effects on Co ₂

Notes: CO₂; CO₂ emissions, FDI; foreign direct investment, Pop; population, Gross domestic per capita; pGDP, Eu; Energy use, EG; Economic Growth, Tr; Trade, financial development; Fd, Urbanization; Ub, + ; positive, – ; negative.

III. SAMPLE, DATA AND MODEL AND METHODOLOGY

This study investigates the effects of FDI flow on carbon dioxide emissions in five emerging economies (Brazil, Russia, India, China, and South Africa (BRICS)). BRIC was first introduced by O'Neill (2001), and South Africa was joined in 2011 (Chatterjee & Naka, 2022). We consider three aspects of BRICS when determining the sample. The first was their attitudes towards carbon emissions, the second was their relatively weak environmental policies compared to Europe, and the last was their stability in foreign direct investment inflows.

We were inspired by the model developed by Omir et al. (2014), Shahbaz et al. (2019), and Salahuddin et al. (2018). We adopted the Bakhsh et al. (2017) time-series model for the panel estimation. The functional definition is as follows and Equation 2:

$$Co_2 = f(GDP, FDI) \quad (1)$$

$$\ln Co_{2it} = a_0 + \beta_1 \ln Gdp_{it} + \beta_2 \ln Fdi_{it} + \varepsilon_{it} \quad (2)$$

Equation 2 is a double-log model and where Co_2 is carbon dioxide emissions per capita, Gdp is gross domestic product per capita, Fdi is foreign direct investment, net inflow (% of GDP), and ε is the error term in Equation 2. In addition, we added two control variables (electricity consumption and population density) to our model. The definitions, abbreviations, and sources of variables are listed in Table 2.

Table 2. Data Information

Variable	Definition	Unit	Data source
Co_2	Carbon dioxide emissions	Co_2 per capita	OWD, 2023a
Eu	Energy consumptions	Primary energy consumption per capita (kWh/person)	OWD, 2023b
Gdp	Gross Domestic Product	GDP per capita (constant 2015 US\$)	WDI, 2023
Fdi	Foreign direct investment	Foreign direct investment, net inflows (% of GDP)	
Pop	Population density	Population density (people per sq. km of land area)	

In the economic approach, one of the main issues in creating a model is the use of exogenous and instrumental variables. In a model, some variables can be explained by other variables, while others cannot. To take this into account, we assume that our model is GDP endogenous and FDI exogenous. Considering that GDP can be explained by different variables, instrumental variables are also included in the model. These are Energy consumption and population density.

In the current study, which is based on foreign direct investments and economic growth, we use an effective method that theoretically considers endogenous and exogenous. For this purpose, we prefer the novel method developed recently for panel econometrics. Kaplan & Sun (2017) developed smoothed quantile estimating equations, a quantile method that allows instrumental data to be used. In this method, instrumental variables quantile regression was added, and the authors developed it to smooth the indicator function (namely, SIV-QR).

SIV-QR has some advantages as a kernel-based nonparametric conditional quantile estimator. i) This method can be easily calculated using a standard iterative algorithm that requires smoothness; ii) owing to the smoothing estimator of SIV-QR, the method has high-order properties; iii) SIV-QR is a flexible set of estimators that includes IV/OLS mean regression estimators and median and quantitative regression estimators; and iv) SIV-QR reduces the mean square error, which creates more powerful tests (see for detail Kaplan & Sun (2017)).

IV. EMPIRICAL FINDINGS AND ROBUSTNESS CHECK

Table 3 presents descriptive statistics. Eu and Gdp means are higher than others respectively. The standard divisions of Co₂ and Fd₁ are lower than the rest. Skewness shows that only Gdp is positively skewed, while the others are negatively skewed.

Table 3. Descriptive Statistics

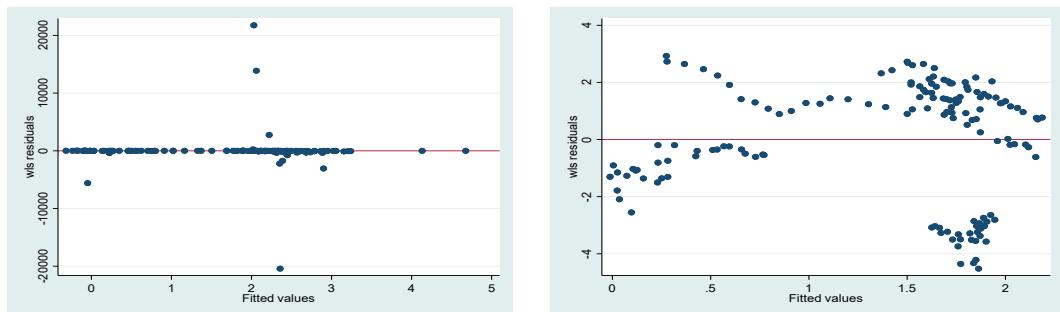
	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
Co ₂	5.52	3.88	.72	13.2	.262	1.50
Gdp	5254.0	2923.1	546.4	10358.2	-.16	1.83
Fd ₁	2.11	1.45	.002	6.18	.55	2.42
Pop	120.5	145.2	8.71	469.65	1.25	3.08
Eu	23135.2	17312.9	2812.7	64323.9	.84	2.51

While the kurtosis value belonging to Pop is about mesokurtic (normal distribution), Co₂, Gdp, and Eu are leptokurtic (T-distributions) and platykurtic (uniform distributions). Therefore, most variables did not have a normal distribution. Therefore, nonparametric methods may be more effective for our estimations.

Table 4. Partial Correlations of Carbon Dioxide Emission

	Partial Corr.	Semi partial	Partial Corr ²	Significance Value
lnGdp	-0.59	-0.11	0.35	0.0000
lnFd ₁	-0.17	-0.02	0.03	0.0382
lnEu	0.97	0.681	0.95	0.0000
lnPop	0.80	0.208	0.65	0.0000

While the partial correlation results provide some proof of the effects of Gdp and FDI flow on Co₂, the fact that we received confirmed findings with the semi-partial results provides key information about the explanatory power of the control variables. Graph 2 shows the estimation results of the function in Equation 1 by weighted least-squares regression, with the weighted versions of lnFd₁ (left) and lnGdp (right).



Grafik 2. Weighted least squares estimate plots

Accordingly, the correlation between lnFd₁ (left) and Co₂ appears strong. On the other hand, lnGdp (right) indicates a relatively weak and volatile relationship.

Table 5. Siv-qr and iv-2sls Results.

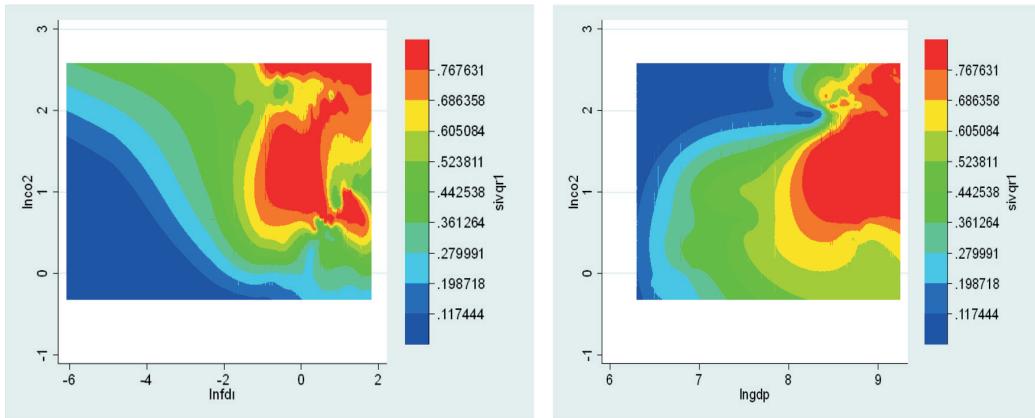
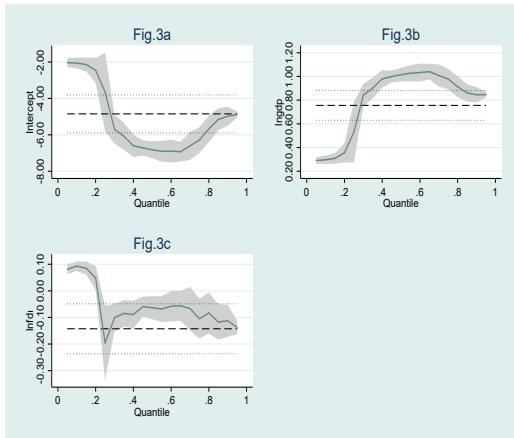
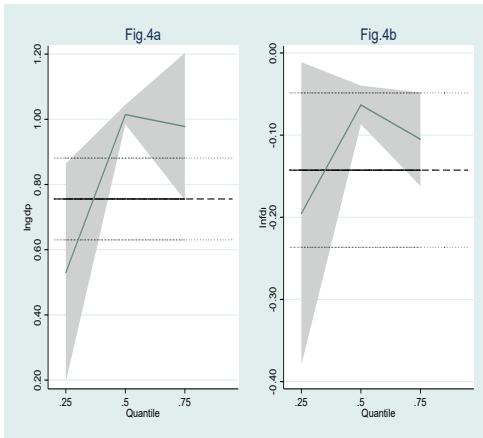
	2SLS	SIV-QR			
		Q10	Q25	Q50	Q75
lnGdp	1.07 ^a	.68	.96 ^a	1.09 ^a	1.16 ^a
lnFd1	-.17 ^a	-.20	-.16	-.09 ^b	-.09 ^a
Constant	-7.49 ^a	-5.24	-6.74 ^a	-7.45 ^a	-7.79 ^a
R ²	0.4130	---	---	---	---
Robust score chi2	59.16 [0.0000]	---	---	---	---
Robust regression F	181.32 [0.0000]	---	---	---	---
Endogenous R ²	0.7630 [0.0000]	---	---	---	---
Score chi2	27.202 [0.0000]	---	---	---	---

Notes: Q indicates quantiles. a, b, and c indicate $p < 0.05$, and $p < 0.01$, respectively. Employed for each estimator are exogenous regressors: lnfd1, endogenous regressor; lngdp, excluded instruments; lnpop lneu. We also used a robust version of the 2SLS, the VCE version, which confirmed the 2SLS results.

Table 5 presents the estimated coefficients. The SIV-QR findings show that for lnGdp, coefficients are intervals of 0.96 and 1.16 and positive and significant in all last three quantiles. Therefore, per capita income (lnGdp) leads to an increase in lnCo₂. On the other hand, the lnFd1 coefficient is -0.09, which is negative and significant in the last two quantiles, indicating that lnFd1 leads to a decrease in lnCo₂. We used the 2SLS method to check the robustness of the SIV-QR findings. The 2SLS results confirm the SIV-QR findings. We also run several tests to determine the accuracy of our endogenous variables in the model. All the tests yielded similar results, so lnGdp is endogenous to the model and is instrumented with lneu and lnpop.

Figure 2 shows the plots for the quantiles. When we move from left to right on the horizontal axis, it can be observed that for higher values. Sivqr1(SIV-QR) values are shown in red, indicating high values, and when we move toward the right, the graph indicates a transition into increasingly higher values. We can say the same for both the variables.

While lnFd1 has a negative effect in low quantiles, this effect is reversed in high quantiles. Therefore, the pollution haven hypothesis is valid for our sample. For the robustness of the SIV-QR graphical representation, we estimated the model again without using instrumental variables with two different quantile techniques and drew graphs for this. This can be observed in Figures 3 and 4. The results confirmed the SIV-QR graphical representation. In other words, the high-quantile coefficients of lnFd1 are positive.

**Figure 2.** SIV-QR plots**Figure 3.** Quantile estimate plots**Figure 4.** Simultaneous-quantile estimate plots

V. CONCLUSION AND POLICY IMPLICATIONS

While “increased” environmental awareness in developed countries affects the location or amount of production geographically, the relatively weak environmental policies of developing countries attract pollution from other countries as well as domestically produced pollution. The realization of this process with foreign direct investment flows is expressed by the pollution haven hypothesis. This study investigated the effects of foreign direct investment flows and economic growth on carbon emissions based on 1992–2020 annual data. Population density and electricity consumption were used as the control variables.

As a research method, we used the instrumental variables smooth quantile regression method, which is a novel method in panel econometrics. Our findings indicate the negative effects of FDI flows on Co_2 in low quantiles and the positive effects of economic growth. We validated these findings using the instrumental variables of the two-stage least squares estimation. However, the plot estimates of the instrumental variables’ smooth quantile regression show that the effect of FDI flow becomes positive. These findings show that in BRICS countries, the technological impact may be negative in the short run, but the pollution havens hypothesis is valid in the long run.

Based on our findings, we make two recommendations: one for policymakers and one for researchers. Policymakers should focus on long-term environmental policies rather than short-term growth plans. Second, our instrumental variables’ smooth quantile regression plot findings show a threshold value. Researchers may focus on this threshold value using threshold methods that consider nonparametric and instrumental relationships between the variables.

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THE IMPACT OF CORRUPTION ON TAX REVENUES: EVIDENCE FROM CENTRAL AFRICAN COUNTRIES

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Abstract

While corruption is a waste of public resources, it also causes a decline in tax revenues due to various socioeconomic effects. Within the scope of this study, we aim to reveal the effects of corruption on tax revenues for Central African countries by using data for the period 2002-2020. While exploring the possible corrosive effects of corruption on tax revenues, variables such as inflation, income, and industry-added value were also considered. In this study, the effects of the independent variables on tax revenues were investigated using the conditional quantile regression method. The findings can serve as a guide for policymakers to make decisions in the field of political economy. Potential reforms to the revenue system and administration are expected to yield positive results.

Keywords: *Corruption, Central African countries, Conditional quantile regression*

1. INTRODUCTION

In all countries where political elections can be held in a free and democratic environment, corruption and poverty, which are two important phenomena that the parties claiming to prevent or eliminate, directly or indirectly affect a large part of society in developed, developing or poor countries. It is also noteworthy that corruption plays an important role in the political agenda. It is a common notion that corruption occurs when public power is “inappropriately” used for certain interests. However, poverty may arise when public resources, which are considered the driving force in capitalist economies, are not distributed fairly and equitably.

Although it varies from country to country, 80-90% of public revenue consists of tax revenue. While the ineffective and efficient use of public resources can be considered one of the underlying factors of poverty, corruption in the declaration and collection of taxes can lead to further deepening of poverty.

There are various definitions of corruption, and it should be noted that the acceptance of any phenomenon as corruption varies from society to society, whether small or large. In other words, there are differences in the contexts of social norms. While Tanzi (1998) states that corruption is related to the monopoly and discretion of the state, Stapenhurst (2000) defines it as the abuse of public power for one's own or the group's interests. Sen (2004) defined corruption as the violation of applicable rules for personal profit, and Huntington (2006) defined it as the behavior of public officials outside the generally accepted rules to achieve their personal goals. Finally, according to Berkman (2009), the unlawful use of authority by individuals to obtain financial or personal benefits is corruption.

Various indices have been used to measure the perception of corruption. These are the Global Corruption Barometer (GCB), Bribery Index (BPI), International Country Risk Guide (ICRG), Corruption Perceptions Index (CPI) and Corruption Control (CC) Index. Not all of these indices are based on concrete data and some are scaled as a result of personal perceptions, thoughts, foresights and judgments.

It is difficult to reach a definition that everyone agrees on, and it is controversial which attitude or behavior will be considered corrupt. However, the existence of some corrupt species has been accepted.

For example, extortion occurs when a public official uses his authority to put pressure on the person requesting the service in order to obtain personal benefits. The criminal element is pressure (Kahraman, 2019). Nepotism is defined as prioritizing members of one's own social group in job placement, contracting, and use of resources (Bramoullé and Goyal, 2016). Although it is accepted as a legal activity in some countries, lobbying, which conflicts with ethical values because of its consequences, can be defined as the competition of individuals or groups to influence public policies for their own interests (Begovic, 2005). Vote trading is basically one type of political corruption; it can be expressed as the support of each other in the bills and proposals that the political parties present to the parliament and protect their own interests (Gür, 2014). Rent seeking is the use of public resources by public officials and politicians by taking into account their personal interests and prioritizing interest and pressure groups in the distribution of public resources (Ata, 2009). Bribery is an extra fee applied by public officials who are obliged to fulfill a certain duty to people who request services to obtain annuity (del Monte and Papagni, 2001). Embezzlement is the unlawful individual use of resources given to public officials to perform their duties (Nye, 1967).

The effect of corruption on tax revenues can be evaluated in the context of financial corruption. Fiscal corruption can be associated with three main indicators: tax evasion, tax legislation, and informal economy in tax. According to Bağdigen and Dökmen (2006), the effects of corruption on tax revenues can be listed as follows: i) informality increases, causing a narrowing of the tax base and a decline in tax revenues; ii) reducing investments, negatively affecting economic growth and shrinking the tax base; iii) unwillingness of taxpayers to meet the illegal demands of some malicious public employees, the shift of their commercial activities to the informal, economy or causing it to cease operations and tax revenues may decrease.

Starting with the objective effects of corruption and the possible theoretical context of poverty, this study investigates the effects of corruption on total tax revenues in selected Central African countries. In this study, we preferred the conditional quantile regression estimator, which has been widely used in panel data methods. Our findings show that increases in control of corruption at low quantile levels increase tax revenue. We strengthened the accuracy of our findings by using non-parametric methods.

The remainder of this paper is organized as follows. In the second part, following the introduction, the literature contains summary information about some studies focusing on corruption and tax revenues. In the third part, information about the data, sample, and method, in the fourth part, the findings and the accuracy of the findings were checked, and the results are presented and the conclusion section.

2. LITERATURE REVIEW

Many studies have examined the effects of corruption on various economic factors. Much of this work has focused on growth. Other factors considered are foreign direct investments, inflation, exports, imports, government expenditures, government revenues, and tax revenues.

In studies dealing with the corruption-growth relationship, it has been found that the relationship is generally negative (seen for detail Mo (2001), del Monte and Papagni (2001), Neanidis et. al. (2017)), and in some (seen for detail Swalehen and Stansel (2007), Podobnik et. al. (2008)) concluded that corruption positively affects growth. The general effect of corruption is to harms FDI flows (Zander, 2021). The literacy rate, GDP growth, and economic integration have a negative effect on corruption, whereas inflation has positive effect on corruption (Uroos et. al., 2022).

Table 1. Literature Table

Author(s)	Country(s) / Years	Variables	Result
Ajaz and Ahmad (2010)	Developing countries (25) 1990-2005	Cor, Gov, Tr	Cor has a negative impact on Tr.
Potanlar et. al. (2010)	Developing countries (27) 2002-2006	Cor, Tr	Cor has a negative impact on Tr.
Monteiro et. al. (2011)	EU countries (27) 1998- 2009	Ctr, Unp, Cor, debt, Trade	Cor has a negative impact on Ctr.
Dökmen (2012)	OECD countries (25) 1984-2007	Cor, Tr	Cor has a negative impact on Ctr.
Binaj (2015)	50 countries 1995-2011	Cor, tax burden, Gdp, Tae	The vicious circle between tax evasion and political corruption is often seen in developing and sometimes developed countries.
Huňady and Orviská (2015)	OECD and Latin America countries (46) 1998-2013	Cor, Tr	Cor has a negative impact on Tr.
Litina and Palivos (2015)	45 countries 1994-1999/2005-2007 and 16 countries 1972-2012	Pcor, Te	Cor has a positive impact on Te.
Timmons and Garfias (2015)	Brazilian municipalities 2001-2008	Cor, Audit, Pop, Ptr	Cor has a negative impact on Ptr.
Özmen 2016	BRIC-T 1996-2013	Ctr, Cor, pGDP per capita, Trade, Ef	Cor has a negative impact on Tr.
Arif and Rawat (2018)	10 EAGLE countries 2001-2015	Cor, Gov, Tr	Corruption has a positive and significant impact on the tax revenue collection of the emerging economies.
Tunç (2018)	EU Member Transition Economies 2003-2015	Cor, Tr	There is a bidirectional causality relationship between tax revenues and corruption.
Dramane (2022)	WAEMU Countries 1996-2017	Cor, Gov, Tr	Cor has a negative impact on Tr.

Notes; Corruption: Cor, Govern: Gov, Tax revenue: Tr, Corporate tax revenues: Ctr, Property tax revenue: Ptr, Unemployment: Unp, Trade: Tr, Tax administration efficiency: Tae, Political corruption: Pcor, Tax evasion: Te, Population, Pop, Inflation: Cpi, Economic freedoms: Ef, Gross domestic product: GDP, GDP per capita: pGDP

3. SAMPLE, DATA and METHODOLOGY

As mentioned in the introduction, we investigated the effects of corruption on tax revenues in selected Central African Countries. Although there are many countries in this geographical definition accepted by the United Nations (Wikipedia, 2023), we chose seven countries from which we could access the dataset to create a balanced panel among them. Table 2 lists these countries.

Table 2. Countries List

Angola	Gabon ¹
Burundi	Republic of the Congo (or Congo Rep. (in WDI))
Cameron	Rwanda
Chad	

To investigate the effect of corruption on tax revenues, we start with the panel model suggested by Arif and Rawat (2018). Based on the following functional definition, we set up the model given in Equation 2:

$$Tr = f(GDP, CC, Ind, CPI) \quad (1)$$

$$\ln Tr_{it} = \alpha_0 + \beta_1 \ln GDP_{it} + \beta_2 CC_{it} + \beta_3 \ln Ind_{it} + \beta_4 \ln CPI_{it} + \varepsilon_{it} \quad (2)$$

Where Tr represents total tax revenues, GDP indicates gross domestic per capita income, CC represents control of corruption, Ind , Industrial value-added, CPI is the consumer price index, and ε is the error term.

We used logarithms for all variables, except control of corruption. \ln is the natural logarithm of the series. The data consisted of 140 observations from seven countries between 2002-2021. Detailed information on the data is provided in Table 3.

Table 3. Data Information

Variable	Definition	Unit	Data source
Tr	Total Tax Revenue	Tax Revenue (% of GDP)	IMF, 2023
GDP	Gross Domestic Product	GDP per capita (constant 2015 US\$)	WDI, 2023
Ind	Industry value added	Industry (including construction), value added (% of GDP)	
CPI	Consumer price index	Consumer price index (2010 = 100)	WGI, 2023
CC	Control of Corruption	Control of Corruption	

Control of corruption index estimated by the World Governance Indicator (WGI) (2023). The index value interval was -2.5 to 2.5. The value indicates improvement as it moves towards the positive, that is, corruption is taken under control, and the corruption increases as it moves towards the other side, that is, the negative.

To estimate Equation 2, we employ the Conditional Quantile regression (CQR) estimator developed by Koenker and Bassett (1978). With this estimator, we used the Bofinger bandwidth method proposed by Koenker (2005). One of the main advantages of quantile regressions is that the effects in different quantiles can be interpreted differently at various points in the conditional distribution of the dependent variable. In a bivariate model, such as α and β , quantile regression parameterizes the quantiles of the distribution of α conditional on the independent variables b as βb , where β is a vector of the estimated parameters. The CQR estimator optimization estimate is as follows:

$$\min_{\beta} \sum_{i=1}^n \delta_{\tau}(\alpha_i - b_i \beta) \quad (3)$$

where α_i is the vector of the dependent variable, b_i is a matrix of independent regressors, β is the estimated vector of parameters and δ_{τ} is the absolute value function that yields the τ^{th} sample quantile as its solution.

¹ We obtained the 2021 CPI value for Gabon from "<https://www.economy.com/gabon/consumer-price-index-cpi>"

For the linear model of ϑ^{th} quantile ($0 < \vartheta < 1$) as is;

$$\min_{\beta} \frac{1}{n} \left\{ \sum_{i: \alpha_i > b_i' \beta} \vartheta |\alpha_i - b_i' \beta| + \sum_{i: \alpha_i < b_i' \beta} (1 - \vartheta) |\alpha_i - b_i' \beta| \right\} \quad (4)$$

Accordingly, as one keeps increasing α_i from zero to one, we can be traced the entire conditional distribution of the α_i , conditional on the set of regressors (Koenker, 2001; Foster, 2008). The main contribution of CQR to our research is that the entire conditional distribution of the dependent variable can be characterized using different values of τ .

The coefficient signs of the total tax revenues of the variables are as follows:

H_1 : In a fair taxation system, an increase in income increases the total tax revenue (+),
 H_2 : Increasing industrial production increases total tax revenue (+),
 H_3 : Consumer price index increases/decreases total tax revenues (+/-),
 H_4 : Control of Corruption increases total tax revenues (+).

4. EMPIRICAL FINDINGS and ROBUSTNESS CHECK

Table 4 presents some pioneering statistics for our variables. The GDP means are higher than the others. The standard divisions of Ind and CPI are higher than the rest. Skewness shows that each variable is positively skewed.

Table 4. Descriptive Statistics

	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	J-B
Tr	24.39	48.43	10.37	8.77	0.76	2.85	13.64 ^a
GDP	2083.57	7357.56	261.09	2132.21	1.47	3.90	55.82 ^a
Ind	32.85	66.17	9.23	18.79	0.37	1.53	15.75 ^a
CPI	116.52	583.67	15.34	67.74	4.00	24.11	2976.50 ^a
CC	-0.97	0.77	-1.58	0.56	1.78	5.33	106.39 ^a

Notes: ^a indicate 5% statistically significant.

Moreover, the kurtosis value revealed that Tr is mesokurtic (normal distribution), GDP, CPI, and CC are leptokurtic (T-distributions), and Ind is platykurtic (uniform distributions). Accordingly, it is difficult to say that the variables have a normal distribution. Therefore, nonparametric methods may be more effective for our estimation.

Table 5 presents the findings for the CQR and OLS estimators. We also employ the nonparametric kernel (Gaussian) regression (NKR) estimator to check the accuracy of our CQR findings. NKR has 100 bootstrap replications and an *imac* option is employed. This instrument, along with the improved AIC proposed by Hurvich et. al. (1998). The NKR approach minimizes the trade-off between bias and variance.

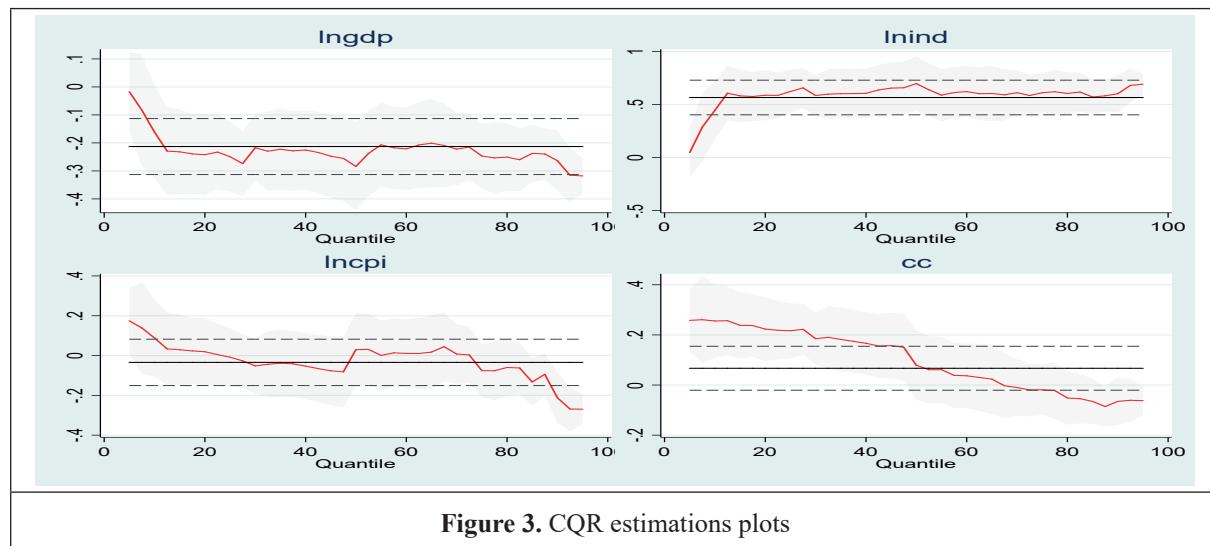
Table 5. CQR estimator and OLS, NKR results

	OLS	NKR	CQR			
			Q10	Q25	Q50	Q75
lndgp	-.21 ^a	-.22 ^a	-.16 ^c	-.24 ^a	-.28 ^a	-.24 ^a
lnInd	.56 ^a	.58 ^a	.44 ^a	.62 ^a	.69 ^a	.61 ^a
lncri	-.03	-.02	.08	-.008	.02	-.07
CC	.06	.06 ^c	.25 ^a	.21 ^a	.07	-.01
Constant	3.00 ^a	---	2.31 ^a	2.87 ^a	2.82 ^a	3.43 ^a
PseudoR ²	0.3192	0.6469	0.1632	0.2260	0.1833	0.2784

Notes: Q indicate quantile. a, b, cindicates $p < 0.10$; $p < 0.05$; $p < 0.01$ respectively. R^2 results for NKR and OLS have been reported.

The CQR findings show that for lndgp are -0.16 and -0.28 and negative and significant in all quantiles, implying that per capita income (lndgp) leads to a decrease in total tax revenue. lnInd coefficients are 0.44 and 0.69. These are positive and significant in all quantiles, implying that lnInd leads to an increase in the total tax revenue. Our main findings relate to the control of corruption (CC) coefficients. CQR findings show that CC are 0.25 and 0.21. These are positive and significant in the 10th and 25th quantiles, respectively. We used the OLS and NKR methods to check the robustness of the CQR findings. NKR findings confirmed CQR findings.

Graphical representation can be useful, as the results for the quantiles can be presented in a graph. The figures show that CQR provides clearer information.

**Figure 3.** CQR estimations plots

All coefficients for lndgp are negative and below -0.2, and this effect persists on average across all quantiles. For lnInd, the trend is similar, but the coefficients are positive and larger. We did not find a meaningful coefficient for lncri. Finally, the CC findings interval was 0.20 to -0.20. These findings indicate the existence of a threshold value for the sample.

5. CONCLUSION and POLICY IMPLICATIONS

In this study, we investigated the effects of corruption on total tax revenues in seven Central African countries span to 2002-2021. We add several variables to strengthen the research model and monitor the

robustness of the findings. In addition, we robustly validated our findings by using different estimators.

We categorized our findings into four headings. While the first relates to the control of corruption findings, the others belong to all the three variables.

i) According to the conditional quantile regression findings, a decrease in corruption in low quantiles increases total tax revenue, but this positive effect disappears in high quantiles. This finding was confirmed using a nonparametric kernel regression estimator.

ii) Contrary to expectations, increases in per capita income reduce total taxes. This phenomenon can be explained in two ways. If there is no tax tariff with increasing rates in a tax system, the increase in this income may not affect the total tax revenue, but a second scenario is also possible, which is the high level of loss or evasion in the tax system in question. Thus, the higher the earnings, the easier it is to get out of the tax. This is more likely in systems with high levels of corruption.

iii) As industrial value-added increases, total tax revenues increase, and these findings are valid for all quantiles.

iv) Inflation has no statistically significant effect on the total tax revenue.

All three findings were confirmed using a nonparametric kernel regression estimator. While hypotheses H_2 and H_4 are valid for the selected Central African country, hypothesis H_1 is invalid. Finally, H_3 could not be confirmed or falsified.

Further research should focus on the effects of corruption on indirect and direct tax revenues rather than on total tax revenues. In addition, the samples of the studies can be investigated using comparative sampling, as well as different country groups, different income and development levels, and whether the effects vary according to the development levels of the countries.

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THE USE OF THE DMAIC MODEL IN IDENTIFYING POTENTIAL DEFECTS IN MANUFACTURING INDUSTRY

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Abstract

This study is focusing in the use of the DMAIC model Lean Six Sigma in composite material manufacturing hand lay-up process improvement in order to identify potential Foreign Object Debris (FOD). Hand lay-up is a process in which individual layers of prepreg are laid up on a tool and then cured. Hand lay-up is a manual process that resulting in numbers of quality defects such as voids, delamination, voids, warpage and the Foreign Object Debris (FOD). This study exclusively deals with the FOD quality defect. In this study, the DMAIC model approach (Define, Measure, Analyze, Improve, Control) is applied and some appropriate quality tools are used in the hand-lay-up process to give way to companies on how to identify and reduce the number of FOD quality defects on composite panels to ensure the high-quality composite panels can be produced that finally fits the aircraft. As the result of this study, the main source of the cause of the problem is identified and some solutions were purposed. These solutions included, Kaizen, Standard Operation Process and SMED. With the use of the DMAIC model Lean Six Sigma and other quality tools, composite materials manufacturing companies can reduce the number of FOD defects and improve the overall performance of the hand-laying process.

Keywords: *Lean Six Sigma; DMAIC; Foreign Object Debris (FOD)*

1. INTRODUCTION (HEADING 1)

There are many problems that manufacturing companies face today, for instance, unreliable production processes, bad product quality, financial losses, delay in product delivery etc., but often, companies do not understand the root causes of these problems (Desai, 2008). As a result, this worsening may cause to non-fulfilment of customers 'expectations and consequently loss of position in the market. Therefore, in order to survive in the competitive market, companies should always be able to satisfy their customers by continuously improving their production processes and measure these improvements with the help of suitable Key Performance Indicator.

Since the study focuses on the aerospace manufacturing industry and the company individual involved in the various aspects of building, testing, selling, and shipping the aircraft part. The main manufacture process of the Company is hand lay-up. Hand lay-up is the basic processing procedure for composite material and it is a main material for aerospace contracture. There are lots of various types of defects able to be found in the hand lay-up process. The most significant defects in monolithic structure are porosity, cause by incorrect manufacture, and impact damage during in-service. Besides, there are still have another potential defect which can affect mechanical properties of the aircraft structure which is foreign object debris (FOD) defect. FOD is one of the potential defects that affect the quality of the aircraft. So, the detailed information of FOD will be discussed.

The Aerospace Composites Malaysia Sdn. Bhd. (ACM) is accounting larger defect in Foreign Object Debris, FOD. The data then collected from the target company through visiting and observation on the current situation of a production line. There were 58 pieces of FOD defect in 2014 and had dropped dramatically on 2015 which only had 28 pieces of defect on the product. But the FOD defect in 2017 (until September) is 23 pieces and forecast that the number of FOD defect will be maintained or will be no improved in following year. Thus, the research problem statement has been set up which is to improve the product quality through the reduction of the FOD defect.

At all time, foreign object defect FOD is a potential hazard to aircraft safety (Kedir, 2016). FOD cause damage and these costs are in millions of dollars every year. The type of FOD can be divided into two major part: FOD on the physical of aircraft and FOD on the structure of aircraft (Taneja, 2013). FOD on the structure of aircraft are focused on this research due to it affect the mechanical properties of the aircraft, and it is one of the defects of composite material that is difficult to detect and control. FOD can inadvertently be produced or involved in composite materials, either during the manufacturing process or others work process in the industry (Kim, S.Y, 2014). Thus, the research proposed to use Lean and Six sigma techniques in the manufacturing process to reduce the number of FOD defect.

2. LITERATURE REVIEW

Composite Materials

A composite material is formed by the combination of two or more different materials to form a new material with enhanced and improve the properties of material. A suitable combination of material not only can enhance the properties of the material, it can ease of fabrication, enhance the physical properties, chemical properties and also processing-related properties. Before selecting the material to be used to make the product and design of composite components, it requires extensive study of material properties. The material selection for the research are glass fibre reinforced composites with epoxy resin matrix reinforced (Barbero, 1998).

Thus, from their research states that fibre reinforcement is preferred because most material is much stronger in fibre form than in their bulk form. The main factors of the use of composite material are weight reduction, corrosion, resistance, and part-count. Other advantages that motivate some application which include electromagnetic transparency, wear resistance, enhance fatigue life, thermal insulation, low thermal

expansion, low or high thermal conductivity. Moreover, those research on composite materials moulding simulation for purpose of automotive industry show that composite material able to use in the car construction with the properties of the modern composite material such as reducing the weight of vehicles, the required strength and vibration damping characteristics (Grabowski, L, 2016). Since most of the car construction are made in metal material. Composite materials always synonym with the aircraft manufacturing industries as they are strong and stiff, yet very light in weight, so ratios of strength-to-weight and stiffness-to-weight are several times greater than steel or aluminum..

Foreign Object Debris (FOD)

FOD includes debris, substances or articles system. In other words, FOD can be defined line operations that does not belong there. FOD varies in sizes and it has to equipment or personnel. Another definition of FOD is the damage on aircraft, helicopters, launch vehicles, engines or other aviation equipment which takes place when a foreign object smash engine, flight controls, airframe and the other operating systems

In general, foreign object debris (FOD) is a kind of material, debris or foreign vehicles or system, may cause damage, especially in aerospace settings. FOD appeared in the airport's air operations area (AOA) constitute a major threat to the safety of air travel. FOD possible damage to the aircraft during the critical phase of flight, which could lead to miserable loss of life and fuselage, and also it can increase the maintenance and operating cost. Moreover, foreign object debris (FOD) can cause damage that costs airlines, airports, and airport and all these costs is in millions of dollars every year. FOD is any object that does not belong in or near airplanes and, as a result, can injure airport or airline personnel and damage airplanes (Kedir, 2016).

E. Six Sigma DMAIC

Six-sigma is a disciplined, data-driven methodology for eliminating defects in any process. To achieve six sigma quality, a process must produce no more than 3.4 defects per million opportunities. Six sigma's basic value proposition is that principles for process improvement, statistical methods, a customer focus, attention to processes, and a management system focusing on high-return improvement projects result in continuous improvement and significant financial gains

Six sigma is an enterprise management strategy, initially by MOTOROLA, today has widespread application in many fields of industry. It attempts to identify and eliminate defects and the cause of the error in the manufacturing and business processes and/or service delivery. It uses a set of management methods, including statistical methods, and create a dedicated infrastructure within the organization of expert at one of these methods.

Many of the research emphasized that the Design, Measure, Analyze, Improve, Control (DMAIC) and the Design for Six Sigma (DFSS) methods as the two most common methodologies to implement Six Sigma (Tjahjono, B, 2010). DMAIC is continuous improvement strategy organization find and eliminate the cause of the error, defect and delay the business organization process.

3. METHODOLOGY

This present study was structured base on the Six Sigma DMAIC framework, which have divided into five Stages; Define, Measure, Analyze, Improve, and control. The Six Sigma was used to reduce the variation of the output and quality of product (Stephens, 2007). Another method also has been utilized in this research which is Lean Manufacturing tools and techniques. While Lean Manufacturing tools and techniques was used to eliminate defect in order to improve quality of part (Thomas, 2009).

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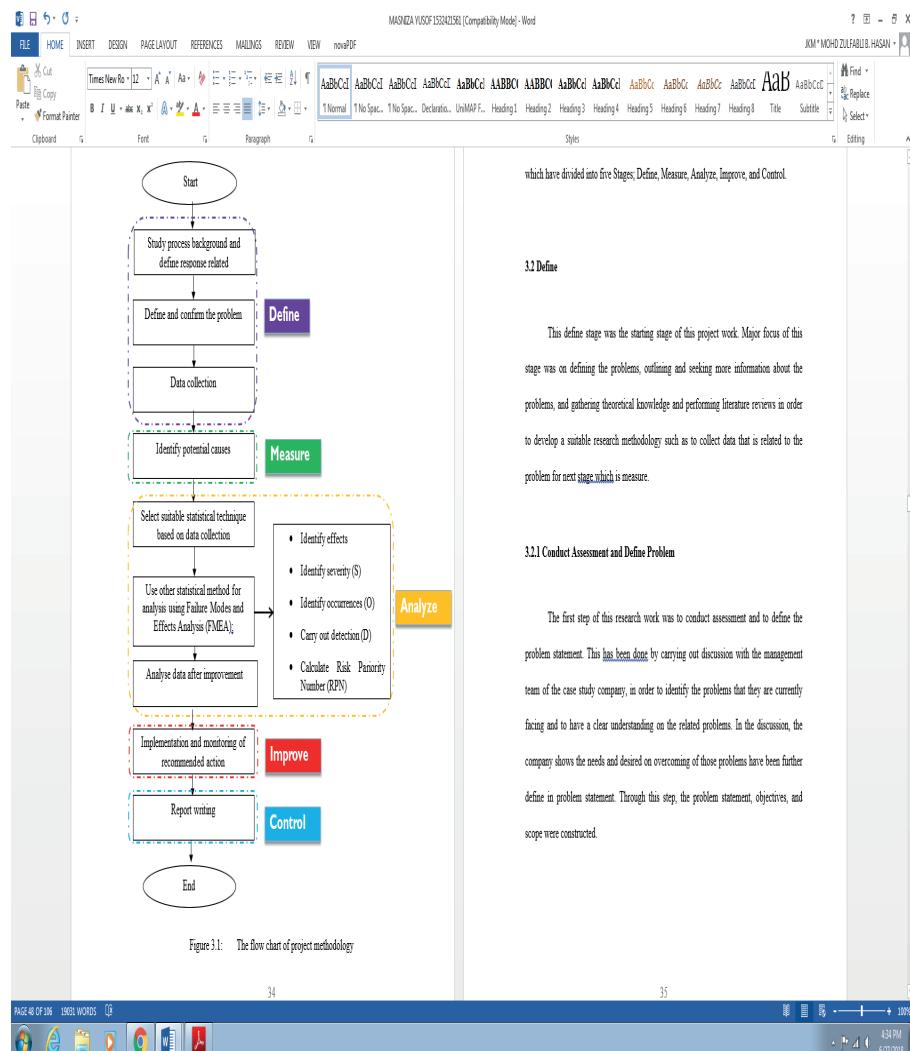


Fig.3. Methodology flowchart

From the flow chart this project was structured base on the Six Sigma DMAIC framework, which have divided into five Stages; Define, Measure, Analyze, Improve, and Control.

F. Define

This define stage was the starting stage of this project work. Major focus of this stage was on defining the problems, outlining and seeking more information about the problems, and gathering theoretical knowledge and performing literature reviews in order to develop a suitable research methodology such as to collect data that is related to the problem for next stage, which is measure.

G. Measure

Measure stage was after the define stage of this project work. Major focus of this stage was on data collection that is related with the problems Measure stage is very important stage, normally a lot of effort and time has to put in it to ensure the accuracy of data because it define the results at the end of the project. An accurate data is the heart of the DMAIC because without an accurate data the objectives of the project unable to be achieved. A suitable data collection plan was developing together with the management team by brainstorming technique this is because management team of the target company have more experience and they know the best way to carry out the data collection plan. Then the collection plan was executed, with the data collected sort out the relationship between them. The data collected will be used to compare with the

data collected in improve stage to determine whether significant improvement has been made in the project.

H. Analyze

The next stage is to analyze the data collected in previous stage and root cause for the defect of the product or process. First, the Pareto chart is used to highlight the Program/Panel that is highest occurring of defect. Secondly, the factors that cause the defect is classified into Personal, Technology, Management, Method, Working environment and other. Then, the Pareto chart will be applied on these factors and highlight out the most important factor. Besides, fish-bone diagram or as known as cause and effect diagram is used to sort out large potential of root cause. Lastly FMEA is used to further validate the root cause.

I. Improve

This stage is to improve the process by eliminate or reduce the defect and waste. With the root causes identified in previous stage, a set of solution presented on this stage. The defect is caused by different factors, by figuring the suitable Lean and Six sigma approach, the tool like brainstorming and 5 Why method is used. After the appropriate solution had been figure out, it will propose to the target company and discuss with the team member.

J. Control

As a result of the previous steps, the recommended solutions are now known as well as the positive and negative effects these solutions bring to the system. During the last step of the DMAIC process, the implementation responsibilities are given to the key personnel. In addition, measurement systems for the monitoring of these implementations are recommended. Important part of getting improvements approved is to convince the responsible persons of the implementation's superiority over the current practice. Other related persons are the production manager and process development manager who are responsible for many of the affected areas in the factory. This group of people has the authority to drive the change and the knowledge to ensure that the change is possible to execute from a practical point of view.

4. RESULTS AND DISCUSSIONS

According to the data given, there are 23 cases regarding the FOD defects from January 2017 until September 2017. The team of the company strongly agreed the number of this FOD defect is forecast increase until the end of the year. Most of the cases are caused by personal issues, followed by method, visual and lastly management. All the problems mostly required to the rework activities which is can cause the company to pay an extra income to the operators. There some case that company need to scrap the parts because of FOD defects. Harder to quantify are the indirect costs. When rework occurs regularly, schedules often allocate some capacity for rework, which quickly becomes a self-fulfilling prophecy. Looming over these costs though is the impact on customer satisfaction. Late deliveries and poor quality can mean losing business, and that can dwarf both direct and indirect costs.

There is variety type of the defects in the composite material, but Foreign Object Debris (FOD) defect is one of the defects which is hard to control. Most of the FOD defect cases happened during the Hand lay-up process because Hand lay-up process is high demanding on the human workforce.

5. CONCLUSION

The main objective for this project had been achieved since the potential FOD defects on the composite materials have been studied and analyzed by using the DMAIC Model Six Sigma. As the result, the personal behavior of operator was found as main root cause for the FOD defects and it reflected to the second objective of this study. This study also had proposed Lean Six Sigma approach as a method to reduce the FOD defects. When assessing the successfulness of a project, it is important to understand the total scope of the benefits.

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THE USAGE OF RICE HUSK ASH IN THE MATERIALIZATION OF CEMENT SAND BRICKS: IMPACT AND POTENTIAL

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Abstract

The population of Malaysia is expected to grow to 36.09 million in 2030 and to 40.55 million in 2050. Therefore, the increasing of population of people directly will increases the housing demand and also increases the demand of building material such as bricks. Thus, this study was conducted to study the mechanical and physical properties of cement brick from the disposal of rice husk ash (RHA) to produce environmentally friendly bricks. The composition of the cement, sand, and RHA by weight ratio varies from 1:6:0, 1:5:1, 1:4:2, 1:3:3, 1:2:4, 1:1:5 and 1:0:6 added to the arrangements. The mixture will leave at room temperature in 28 days to allow become dry at ambient temperature and mechanical and physical properties were conducted to evaluate the properties of these mixtures. The results showed that the replacement of RHA indicates an increasing compressive strength as the strength starts to increase from by weight ratio varies from 1:5:1, 1:4:2, 1:3:3 to 1:2:4 i.e. 15.73 MPa, 15.18 MPa, 12.15 MPa and 11.92 MPa respectively compared to original brick. The percent of water absorption range from 7.7 % to 69.4 % and started to increase as the weight ratio of RHA which show more permeable compared to control brick. The density of the brick was decrease from 1.705 g/cm³ to 0.474 g/cm³ with increasing of the RHA ratio. The finding shows that the density of RHA brick decrease while the water absorption and compression strength to increase as the RHA content is increased. Thus, the weight ratio of RHA in the composition significantly affect the properties of this RHA brick. Recycling RHA as a substitute for raw materials could help prevent the depletion of nonrenewable resources, reduce waste disposal, and prevent the exhaustion of natural resources.

Keywords: rice husk ash; cement sand bricks; housing; recycling material; waste

1. INTRODUCTION

The Malaysian development sector is quickly changing to keep up with the country's expanding population. The prediction states that there will be more people on the planet than 8.5 billion in 2030, 9.7 billion in 2050, and 11.1 billion in 2100. All of these commodities will see large increases in demand, including food, water and river supplies. (Sadigov, 2022). It is no secret that governments throughout the globe are concerned about housing growth, especially in developing nations. Thus, the building sector is growing as more individuals are looking for a home. Developers, especially contractors, have increased their need for building materials such as bricks to accommodate the growing demand for houses.

Since 8000 BC, bricks have been a common building and construction material, and burnt clay bricks date back to 4500 BC (Arshad & Pawade, 2014). Brick is one of the substances already known by the general public as a building material. This may be observed in the large number of people who buy bricks for the brick home business. Bricks are also commonly used to construct to solve community existence issues in building housing, buildings, retaining partitions, fences to solve the community living issues. Malaysian houses and structures are improving at an increasing rate. As a result, the need for construction materials is increasing every day. One of the most often used construction materials is clay brick, which is used to make home walls. Utilization of clay bricks in production how to plot, expand, and renovate a good method to tackle the problems of life desire. Currently, the production of brick able to be fabricated by others alternative material in with the addition of various materials. One method is to mix the basic components with rice husk ash, which is waste from the burning of rice husk.

Rice husk comes from industry or agriculture. The residual inorganic by-product known as rice husk ash (RHA), which is produced when the rice husk (hulls) from the milling process is burned within the boiler, contains highly reactive silica in its mass (Das et al., 2020). RHA, or rice husk ash, is a waste product that is dumped in vast quantities and causes serious pollution. As a result, a variety of agricultural and industrial wastes were put to use in place of cement, fine aggregate, coarse aggregate, and reinforcing materials in the construction industry (Jittin et al., 2020). In order to meet the growing demand for construction materials, particularly as an additive in the production of low-cost concrete blocks, rice husk ash is also employed in the cement and construction sectors (Mor V, 2013). Malaysia should decrease or stop the production of as much of these garbage as it is able to. The various varieties of rice husks can be seen in Fig. 1.

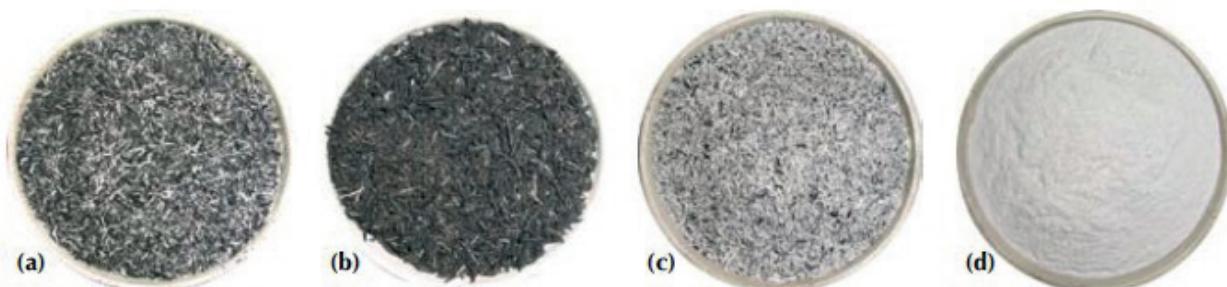


Fig 1. (a) Black chars suited for the production of activated carbon produced when rice husk is burned in a fluidized bed combustion engine, (b) Amorphous rice husk ash with 6 weight percent residual carbon appropriate for making sodium silicate (water glass), (c) Amorphous rice husk having a residual carbon content of 2.0 weight percent, (d) The siliceous rice husk ash product, which is pure, amorphous, and contains 0.2 weight percent of residual carbon and is suited for the synthesis of aerogel.

Besides that, the clay brick is limited due to the difficulty in obtaining clay and its high cost. This brick will be utilised in lieu of the clays brick and significantly less expensive. Further more, the application of the rice husk ash as a biodegradable materials have the opportunity to innovate in brick and to avoid harm to the

environment and human health. Recycling of wastes as natural aggregates is a practical business strategy that is also regarded as being environmentally friendly (Sadek, 2012). In order to create environmentally friendly brick, the goal of this research is to examine cement brick made from rice husk ash used for disposal. This study focuses on compositions with seven distinct weight ratios of cement, sand, and rice husk ash. The brick specimens underwent tests for compressive strength, water absorption, and density, and the results were quantified and characterised.

2. METHODOLOGY

The flow chart for design of experiment as in Fig. 1 shows the steps used to complete this project from the start until end (refer to Fig. 2).



Fig. 2. Process Design of Experiment

2.1 Raw Materials.

The rice husk ashes were collected from a local rice-milling company in Kangar, Perlis. After the collection, the rice husk ash were dried under the sun light until it is completely dried. Then, the rice husk ash then sieved using vibratory sieve shaker machine to identified sieving size in the British Metric series (BS410:1976). The rich husk ash was then stored in sealed plastic bags at room temperature until it was used in the experiments (refer to Fig. 3).

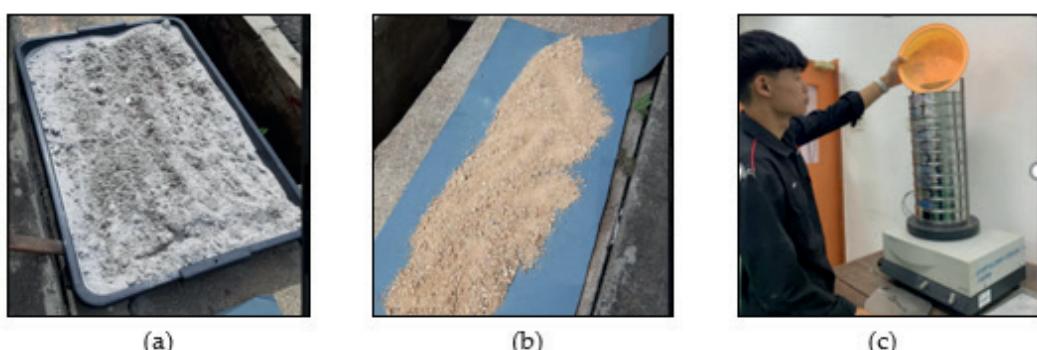


Fig. 3. Preparing of raw material for RHA brick (a) Rice Husk Ash (b) Silica Sand and (c) sieving process

2.2 Preparation of rice husk ash (RHA) bricks.

In the mixing process, hand mixing was used. The RHA brick was prepared using cement, sand and RHA. To ensure that the combinations are well mixed with the RHA, water is added. Sand and RHA were combined with cement in weight ratios ranging from 1:6:0 to 1:5:1, 1:4:2, 1:3:3, 1:2:4, 1:1:5, and 1:0:6. For ten minutes, the hand drill mixer was used to mix the ingredients (Bosch CSB 550 RE, Germany). Bricks are prepared using a moulding procedure that makes them uniformly sharp and reliable. A wooden mould was created to create RHA bricks that meet the specifications of MS 27 and have dimensions of 225 mm in length, 113 mm in breadth, 75 mm in thickness, and 50 mm in diameter and height (Jabatan Kerja Raya Malaysia, 2005). After that, the mixtures of cement, sand and RHA were poured into the brick mould. The mixtures were allowed to set and cure into solids at room temperature for a period of 28 days after the surface of the mould was completed with a trowel (refer to Fig. 4).

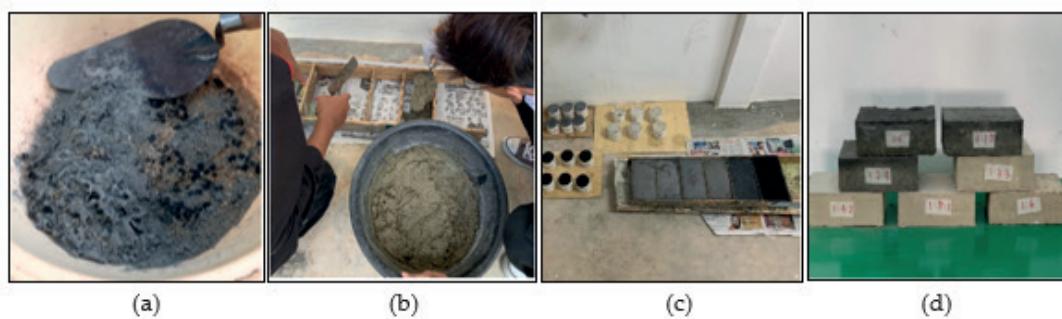


Fig. 4. Preparing of RHA brick (a) Mixing Process (b) Casting of Mixture into mould and (c) Shaping process (d) RHA brick samples

2.3 Compression testing of RHA brick samples.

To obtain the compressive behaviour of RHA brick, samples were prepared for the compression test. The compression test determines how a material reacts when it is compressed, squashed, crushed or flattened under a compressive load. The test was conducted using a Compact Motorised Concreta Compression Machine (ELE Compact-1500). Three samples are used to test each brick specimen individually, and the load upon crushing is recorded for each sample. Each sample's compressive strength was measured, and average values were calculated. The specimens' dimensions were examined in accordance with ASTM C67 (refer to Fig. 5).

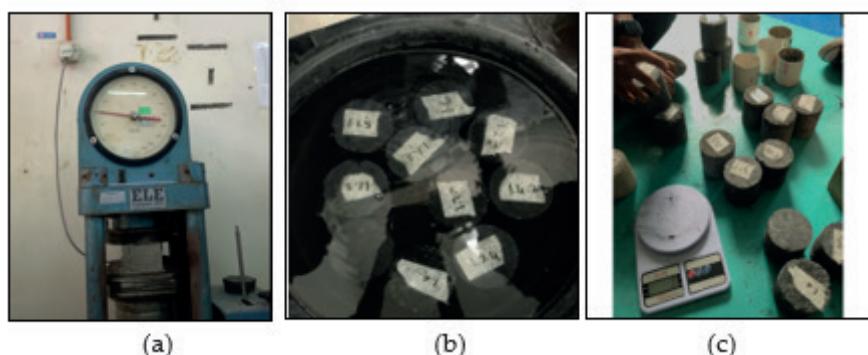


Fig. 5. Testing on brick (a) compressive strength through a Compact Motorised Concreta Compression Machine (b) water absorption test and (c) density test

2.4 Water absorption test.

The water absorption test calculates the percentage of water absorption for RHA bricks based on weight. Under the sun, the samples were dried. After that, use a digital balance to weigh the cool brick (W1). The dry brick was submerged in clean water for 24 hours for the test, which was conducted at room temperature. The brick was taken out and immediately protected from wet and weight with a cloth (W2). The water that the brick absorbed is what caused the weight difference. Calculations were made to determine the percentage difference between dry and wet bricks.

$$\text{Water absorption in percent (\%)} = (W2 - W1) \times 100\%$$

2.5 Density Test

The digital balance was used to determine the density test, which measures the mass per unit volume for RHA brick. A RHA brick's density is calculated using its weight in air (Wa) and water (Ww), where the densities of the two media are equal to 0.9975 g/cm³ and insignificant, respectively. The difference between the brick's weight in air and water and its weight in water is used to calculate the RHA brick's volume. Thus, the formula for calculating brick density, ρ_c , is:

$$\begin{aligned} \text{Brick density, } \rho_c \text{ (g/cm}^3\text{)} &= (W_a) / [(W_a - W_w) / \rho_w] \\ &= (\rho_w W_a) / (W_a - W_w) \end{aligned}$$

The design of 360° arm movement and drill were combined to drill on material become much easier. For the arm design, it is divided into two parts. The first part is the lower connecting arm that is locked in a 45° angle but can rotate 360° freely. The second part is the upper connecting arm which can move up and down freely and can also rotate 360° freely without any problem. This arm can reach a high object and can also be lowered to drill much shorter object. The drill is connected to a 20 Volts plug and are attached to the front end of the upper connecting arm. This drill can rotate at 1000 rpm and can penetrate through metal, plastic, and wood quite easily.

3. RESULTS AND DISCUSSIONS

The outcome of changing the compression stress for various RHA brick samples produced is depicted in Fig. 6(a). The results showed that when the RHA content rose, the compression stress decreased. As demonstrated, a significant weight percentage of RHA in reinforcement has the maximum compression stress and produces better results than RHA contents of 1:6:0, 1:3:3, 1:2:4, 1:1:5, and 1:0:6. This weight ratio is followed by 1:4:2. The compression strength for RHA brick with weight ratio of 1:1:5 and 1:0:6 started to decrease as the weight ratio of RHA increase. The bonding strength of the RHA in the brick are touch properly by the RHA and there are more bonding one another and as the same time reduce the density of the compositions. The results show that the weight ratio 1:5:1 RHA for the sample giving the best value of 15.73 MPa compared to the control sample by weight ratio 1:6:0 RHA with a value of 11.01 MPa. The additional of the RHA can improve the compression stress of the brick.

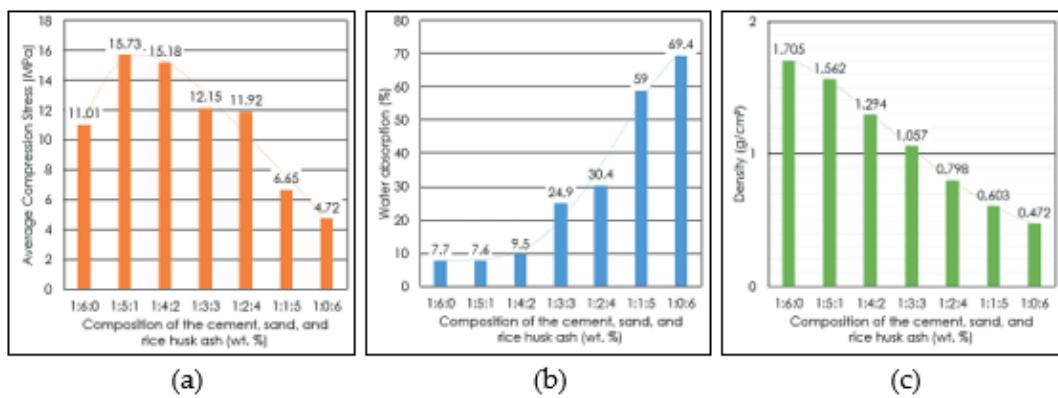


Fig. 6. Effect of rice husk ash on (a) Compression Stress, (b) Water absorption and (c) Density with different composition of cement, sand, and rice husk ash (wt. %)

The value of the percentage of water absorption of various weight percentages for the RHA brick specimens produced is shown in Figure 6(b). According to the findings of a water absorption test that measured the amount of water absorption in relation to the weight percentage of RHA, the level of water absorption ranges from 7.6% to 69.4%. Inversely, when RHA content rises, so does the proportion of water absorption. The weight ratio 1:0:6 RHA had the highest water absorption, while the weight ratio 1:5:1 RHA had the lowest, 7.6%. RHA brick is likely to draw moisture, which could compromise the brick's dimensional stability.

The value of density (g/cm³) for the brick specimens generated at various weight percentages of RHA is shown in Figure 6(c). The density test result made it crystal evident that when the RHA weight content rose, the density of RHA brick decreased. The RHA brick's density declined from 1:6:0 to 1:0:6 wt.%, as illustrated, and the lowest density ever measured was 0.47 g/cm³. When compared to a sample with the highest weight percentage of RHA in the composition, the 1:6:0 wt% of RHA brick had the maximum density. RHA has greater voids and room within the composites, which is why there is a reduction. Denser than the RHA bricks with more RHA was the RHA brick with more sand. According to the aforementioned findings, the RHA decreased the value of density of the brick.

4. CONCLUSIONS

This work was studied the mechanical properties mechanical and physical properties of cement brick from the rice husk ash were incorporated with sand and cement to produce environmental friendly bricks. According to the study's findings, the ideal composition for RHA was reached at a weight ratio of 1:5:1. The test result shown that the mixture that characterizes resistance to the mechanical load. The compression test showed that 1:5:1 weight ratio of RHA brick has the compression strength of 15.73 MPa with the lowest value water absorption level i.e. 7.6% and acceptable density value of 1.561 g/cm³ compared to the control sample from 1:6:0 with 1.561 g/cm³. The utilization of RHA with sand and cement significantly enhance the mechanical property of cement brick such as compression strength, besides that improved the water absorption level and density of the brick. This RHA when managed properly can be transformed into a beneficial material to become as environmentally friendly products, furthermore provides an alternative disposal method to reduce the agricultural waste. This reviewed approach of creating waste-derived bricks is helpful in offering a feasible and sustainable solution.

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THE ROLE OF THE HUMAN FACTOR IN THE ISLAMIC AND SCIENTIFIC APPROACH TO THE MANAGEMENT OF THE DIGITAL ECONOMY

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Summary

The main goal of the article is to examine the scientific-theoretical and practical approaches to the development of the digital economy in the management of human resources. The valuable contributions of Hazrat Muhammad (sallallahu alaihi wasallam) to the management of human resources are given a special place in the article. Azerbaijani scientists doctor of economic sciences, professor T.A. Guliyev, doctor of economic sciences, professor K.A. Shahbazov, doctor of economic sciences, professor H.S. Hasanov, doctor of economic sciences, professor I.M. Abbasov, doctor of philosophy in economics, Docent M.A. Aliyev I.M., doctor of philosophy in economics, associate professor H.I. Hamidov, doctor of philosophy in economics, associate professor R.F. Sadigov, doctor of philosophy in economics, associate professor M.H. Mammadov, E.D. Azizova, Z.I. Mustafayeva, S.R. Bayramova, R.A. Iskandarov's contributions to the development of the digital economy in the management of human resources. The main research methodology of the scientific article is to systematically and comprehensively examine the approaches of Azerbaijani and world scientists to the development of the digital economy in the management of human resources. Because these approaches have a great influence on the organization, management and development of the development of the digital economy in the management of human resources. All this will lead to the development of the digital economy in the management of human resources, innovative approach, systematic development and sustainable operation of this field. The main results of the scientific article - the development of the digital economy in the management of human resources, reflect conceptual and theoretical innovations in this field. The results of the research serve the application of the development of the digital economy in the management of human resources, the improvement and development of that field. The originality and scientific innovation of the scientific research is that the main scientific-theoretical directions of the development of the digital economy in the management of human resources have been studied, the theoretical-practical approaches and theories of the formation of this field as a scientific-practical direction have been studied and generalizations have been made and its necessary scientific-theoretical aspects were investigated. In this regard, the study of scientific approaches in the organization and management of the development of the digital economy in the management of human resources in a scientific article can be considered commendable.

Keywords: *Modern management system, human resource management, human resource management system, digital economy, digital economy management.*

INTRODUCTION

As it is known, no matter how advanced the management systems are in the world's steadily developing digital economy, human resources management will always be relevant. In the rapid development of industrial enterprises, in determining the goals and objectives of this development, in motivating its work system, in improving the organizational structure of the enterprise, the management of human resources in the organization has a special importance. In our modern world, educated, highly skilled innovators who can make good use of scientific and technical progress and information technologies and managers who know these issues in depth should be given special priority in the human resources management system. In the conditions of new economic relations, human resources management can be achieved by applying highly developed innovation processes and attracting young managers who can use technological and management communication tools, who are able to use all kinds of techniques together with computers and information technologies. For this, the impact of digitized human resource management practices on the performance of industrial enterprises should be investigated and analyzed. Also, the results of the conducted studies should be evaluated. Here, it should be determined that the digital economy has a positive effect on the management of human resources, and as a result, these studies have a positive effect on the organizational performance of employees. In this regard, human resource management studies will increase the organizational motivation of employees, create an effective relationship between the individual and the enterprise, and will have a great impact on the labor productivity of the industrial enterprise by acting in accordance with the main goals. Thus, the effective inclusion of human resource management practices in the processes in the digital economy will lead to the development of organizational motivation of people. With the results obtained in the scientific article and the suggestions put forward, we will achieve sustainable and dynamic development in the holy lands of Azerbaijan freed from occupation in Garabagh. The lands of independent Azerbaijan belong to the people and state of Azerbaijan. President of the Republic of Azerbaijan Mr. Ilham Aliyev: "Karabakh is Azerbaijan!"

1. Goals and principles of developing digital economy in human resources management

As is known, the objectives of the human resource management department in an industrial enterprise are more complex than the objectives of other departments. Because the human factor is at the basis of its field of activity. Therefore, the main objectives of human resource management are multifaceted. So, in a general sense, human resources management is aimed at meeting the various needs of people working in industrial enterprises. By meeting the needs of people working in industrial enterprises, it is ensured that the goals of the organization are achieved. From employment in industrial enterprises, training and development process, attachment to the workplace, salary adjustment, motivation assessment, meeting material and social needs, etc. All processes from jobs should be implemented within the framework of human resource management practices.

As we know, by making the strategic manpower plan necessary for the organization, human resources management aims to eliminate the lack of new knowledge in people as a result of the developing innovation changes, to ensure the development of the person and the organization. Thus, in the organizational management system, one of the main goals is to provide organizational development with a human-centered management style by considering the management of human resources as a whole.

Let's consider the main principles of human resources management in the modern management system. Thus, some principles are used to complete the work processes related to human resources management in industrial enterprises with certain stages, in a stable and systematic manner. (Yüksel, 2003). These principles mainly consist of the following:

1. The principle of efficiency. Labor productivity, which is one of the most important factors of human resource management in organizations, is an important issue that industrial enterprises should pay attention to. (Sabuncuoğlu, 2012, p. 20).

2. The principle of equality. Human resource management should evaluate employees in the organization equally, not based on their language, religion, political world view, gender, religion, race, ethnic origin, and make decisions in accordance with the adopted laws of the society and the country. (Yüksel, 2003).

3. Merit (Competence) principle. It is the concept of merit that we often use when talking about the management of human resources in the modern management system. Here the expressions of being worthy, suitable and competent are used. Thus, the word dignity is also used as “A person’s suitability for work, state of conformity, value”.

In industrial enterprises, the structure of organizational formation, skills and competence of employees, management’s behavior and approach to employees, scientific and cultural levels play a special role in increasing the image of organizations. In industrial enterprises, workplace trust, communication, dignity, cooperation, innovation management, strategic management, accountability, joint work and public relations management play a special role in the development of the organization. The principle of merit should cover not only the first entrants in industrial enterprises, but also the activities that will bring benefits later. Thus, language, religion, race, marital status, gender, and similar differences are not accepted as criteria for individuals’ entry into business or promotion. Here, attention should be paid only to the right and equality in the payment of wages and bonuses, taking into account skills and habits. (Yüksel, 2003, p. 23).

4. The principle of openness. All practices and principles play an important role in human resource management. However, the principle of openness is of great importance for the success of human resource management in the management of industrial enterprises. In terms of the practices of employers and companies in industrial enterprises, the principle of openness instills clear, transparent and detailed disclosure requirements to the employee. (Sabuncuoğlu, 2012, p. 22).

5. Confidentiality (confidentiality) principle. Based on the above-mentioned principle of openness, a great responsibility falls on the management of human resources to provide the organization with information in a transparent manner. He also has a serious responsibility to ensure the confidentiality of some important and necessary information towards the organization and its members. (Sabuncuoğlu, 2012, p. 21).

2. Hazrat Muhammad’s (sallallahu alaihi wasallam) scientific approach to human resource management

As it is known, the history of economic thought of mankind has explored the most optimal ways of socio-economic development of society in all periods. He created numerous fundamental socio-economic theories and economic management models that have stood the test of time. Thus, socio-economic theories and economic management models have always played a major role in meeting the needs of society at various stages of development in the history of economic thought. In this sense, the significance of the socio-economic principles in the Holy Quran, the formation of interest-free economic concepts, the establishment of the Islamic financial management system in the economy and the direction of ensuring the transition to it are among the most urgent problems of today.

When talking about the management of human resources in the modern management system, we must first consider the principles and managerial qualities that were inherent in the management system of Hazrat Muhammad (sallallahu alaihi wasallam), the founder and last prophet of this Islamic religion. The principles of the management system of Hazrat Muhammad (sallallahu alaihi wasallam) are as follows:

1. Adequately knowing the purpose.
2. Belief in the correctness of the goal.
3. Transparency of the goal and informing people about it.
4. Using correct and precise styles.
5. Science and sufficient information.

6. Strong intellect, sound thinking style and proper analytical ability.

7. Programmed movement and organization.

In addition to all this, Hazrat Muhammad (pbuh) has a number of managerial qualities, which mainly include the following:

1. Good manners;

2. Past transparent;

3. Justice;

4. Savings;

5. Charm, attraction;

6. Care, supervision and care;

7. Consultation;

8. To create social unity and inter-group unity;

9. Determination;

10. Fight against corruption;

11. Training and personnel training.

When we examine the life of Hazrat Muhammad (sallallahu alaihi wasallam) in terms of the principles of governance, we witness that he was a very strong political leader. As much as he is a religious, cultural and social figure, he is a political figure and an ideal leader. Islam was a universal school, as it applies to all areas of human life, it was also a caring teacher, an invincible commander, a strong politician, a scholar and a scholar. He founded and managed his state with precise methods based on humanistic principles, and managed to build a healthy society. His socio-political management is the most beautiful example for people and the most ideal model for social and political leaders. (The Quran)

2. Approaches of Azerbaijani scientists who contributed to the development of the digital economy in the management of human resources

In the modern management system, M.A. Aliyev, Ph.D. in economics, associate professor, and H.I. Hamidov, Ph.D. in economics, associate professor, write in the textbook "Management of human resources" that previously mentioned in the literature under the name of workforce management, with individuals related science, today is expressed under the name of Human Resource Management. (Aliyev and Hamidov, 2002, p.13). The textbook "Management of human resources in business" published by the mentioned authors in 2013 states that it covers all the work and processes related to people in the workplace. Planning human resources within the enterprise, determining the necessary job analyzes and responsibilities for this, issuing job announcements for selecting human resources, receiving job applicants, arranging meetings, job adaptation, education and career work, measuring success and work ability, promotion, coordinates job changes, dismissals, job evaluations, wages, discipline, social and cultural activities, medical care and other similar matters. (Aliyev and Hamidov, 2013, p.13).

The authors of the textbook "Economics and Sociology of Labor" in the management of human resources, candidates of economic sciences E.D.Azizova, Z.I.Mustafayeva and S.R.Bayramova believe that the labor force is a collection of physical and mental energy of a person used for the production of goods and services. Labor force is the leading productive force of society. Thus, the labor process can be defined as the process of their productive consumption and the combination of labor power with the means of production for the purpose of creating consumption values. (Azizova, Mustafayeva and Bayramova, 2010, p. 9).

In the modern management system, Professor Tofiq Guliyev's "Management of human resources" (Guliyev, 2013, p. 1) and "Labor economy" (Guliyev, 2003, p. 1) textbooks on personnel economics, personnel management, management in the sphere of human resources management, personnel management, politics in the sphere of human resources management, personnel management, digital economy, etc. such issues have been widely explained.

In the modern management system, professor I.M. Abbasov, associate professor R.F. Sadigov. "Management" (Abbasov and Sadigov, 2013, p. 1) and Professor Shahbazov K.A., Professor Hasanov H.S., Associate Professor Mammadov M.H., entitled "Management" (Shahbazov, Hasanov and Mammadov, 2005, p. 1) conceptual and systematic approaches to the issues of human resources management were made in the textbooks.

In the modern management system, R.A. Isgandarov in his book "Staff Management" talks about the efficient operation and execution of the functional divisions of management in the field of management, as the efficiency of work in enterprises and organizations depends on the economic nature of the hierarchical division of labor. (Isgandarov, 2009, p. 9). In this sentence, as in the rest of the book, staff management is equated with the administration of management staff, thereby contrasting it organizationally and functionally with all staff, describing the latter exclusively as a technocratic means to an end. (Isgandarov, 2009, p. 62-63).

3. The role of leadership in the development of human resources in the digital economy

As we know, in the changing and complex world of the 21st century, traditional methods of managing industrial enterprises are not enough. In the modern management system, corporate leaders and managers are in demand for newer methods and skills for effective management of organizations.

The development of new technologies in the modern management system has led to many changes in the management of human resources. So, such changes and transformations have had a rapid impact on industrial enterprises and their activities, as well as created a number of new problems and opportunities for their solution for these organizations. In this regard, industrial enterprises need new strategies to make the most of new opportunities and cope well with challenges. (Hıdıroğlu, 2009, p. 68-69). Because the importance of the activity of industrial enterprises is such that it can determine the development or bankruptcy of organizations in the age of digital economy with high competition.

The main functions of leadership in industrial enterprises mainly consist of the following:

- Increasing the behavioral skills of managers;
- Increasing the leadership skills of managers;
- Emphasis on creativity and innovation;
- Emphasis on organizational learning and change;
- Emphasis on strategic management;
- Total quality management;
- Giving importance to the development of education and human capital;
- Emphasis on organizational effectiveness;
- Attention to customer satisfaction;
- Emphasis on participative management and teamwork;
- Attention to the issue of leadership in business and market problems;
- Development of competitive organizational culture;

- Attention to the government's supportive policy;
- Emphasis on science in management and leadership.

It would be more appropriate to apply the following to conduct scientific research on the main functions of leadership in human resource management:

- Paying attention to increasing the powers of employees in the management of human resources;
- Emphasis on employee motivation in human resources management;
- Paying attention to the responsibilities of employees in the management of human resources;
- Emphasis on job satisfaction of employees in human resources management;
- Paying attention to the issue of leadership in change and transformation in human resources management;
- Emphasis on organizational effectiveness in human resources management;
- Forming a culture of trust in human resources management;
- Emphasis on in-service training in human resources management;
- Emphasis on organizational effectiveness in human resources management;
- Paying attention to the needs and expectations of customers in the management of human resources;
- Focusing on stability in the financial and economic system in the management of human resources;
- Paying attention to state-supported laws and principles in human resources management;
- Eliminating difficult rules in human resources management and giving importance to the application of innovative processes to new rules;
- Knowledge management;
- Attention to quality management in product production and service provision;
- Studying the attitude of employees and managers in human resources management and changing them according to new rules;
- Emphasis on increasing profits in industrial enterprises;
- Increasing customer trust and loyalty in human resources management;
- Reduction of financial and administrative corruption in human resources management;
- Giving importance to the export policy of improved products in industrial enterprises;
- Paying attention to changing and improving the laws of industrial enterprises;
- Emphasis on merit during the selection of managers in human resources management;
- Increasing communication skills of managers in industrial enterprises;
- Defining clear goals and missions in industrial enterprises;
- Changing interpersonal relations and behaviors in industrial enterprises according to ethical rules;
- Paying attention to the development of strategic thinking of managers in industrial enterprises;
- Paying attention to increasing the employment of workers in industrial enterprises;
- Paying attention to increasing the productivity of human resources in industrial enterprises;
- Emphasis on increasing financial skills in industrial enterprises;

- Supporting top management in industrial enterprises;
- Increasing the leadership knowledge of managers in industrial enterprises;
- Creation of effective activity in industrial enterprises, giving importance to the development of organizational relations;
- Determination of the overview of human resources management in industrial enterprises;
- Giving importance to the development of national and moral values in the management of human resources;
- Paying attention to ethical principles in human resources management;
- Changing bureaucratic structures in human resources management;
- Emphasis on strategic planning in human resources management;
- Focusing on meeting the open and confidential needs of clients in human resources management;
- Emphasis on cost management in industrial enterprises;
- Emphasis on Customer Relationship Management in human resources management;
- Giving importance to the opinions of employees during decision-making in human resources management;
- Giving importance to the development of business leadership in human resources management;
- Paying attention to the organizational structure of the human resources management system;
- Giving importance to the improvement of attitude and behavioral skills among employees in the human resources management system;
- Emphasis on supporting entrepreneurship in the human resources management system;
- Focusing on improving the use of new methods in the human resources management system;
- Paying attention to the grounds of creativity and participation in solving the problems of employees in human resources management;
- Paying attention to scientific leadership principles in human resources management;
- Management of group behavior in human resources management;
- Conflict management in human resources management;
- Emphasis on effective strategy implementation in the human resources management system;
- Increasing the role of control strategy in human resources management;
- Emphasis on increasing the importance of effective leadership in human resources management;
- Giving importance to the development of moral development in the human resources management system;
- Emphasis on changing strategy in human resources management. (Hıdıroğlu, 2009, p. 89-97).

CONCLUSION

The following results were obtained in the article:

1. Although labor platforms in human resource management have similar features in terms of multifaceted structure and activity, they have a complex structure within themselves. This is an important challenge in human resource management research in the digital economy. Thus, platform workers in the digital economy are also subject to skill levels, job control levels, wages, and more. it combines different features in many ways. To summarize briefly, it is appropriate to consider the following criteria:

- Responsible approach to one's work regardless of the orders and instructions of the provided service;
- Provision of necessary equipment to perform tasks in the work process;
- Determining whether the possibility of profit or loss in the work process depends on the individual's own management skills;
- The entrepreneur works harder than anyone else in his organization.

2. Justice, social-justice, social-equality, halal, transparent and humanistic approach to all issues and other scientific principles stood in the scientific approach of human resources management of Hazrat Muhammad (sallallahu alaihi wasallam).

3. The approaches of Azerbaijani scientists who contributed to the development of the digital economy occupy a special place in the management of human resources. In the development of the digital economy in the management of human resources, the Doctor of Sciences in Economics, Professor T.A. Guliyev, doctor of economics, professor K.A. Shahbazov, doctor of economics, professor H.S. Hasanov, doctor of economics, professor I.M. Abbasov, Ph.D. Doctor of Philosophy in Economics, Associate Professor M.H. Mammadov, E.D. Azizova, Z.I. Mustafayeva, S.R. Bayramova, R.A. Iskandarov, the role of scientific, theoretical and practical research is of great importance for the dynamic development of this field today and in the future.

4. As a result of the article, it was determined that the management should perform a number of functions in order to effectively manage human resources in industrial enterprises. These mainly consist of:

- Creation of perspectives and determination of efficient integration;
- Determination of emotional transformation;
- Determination of business manager leadership;
- Improvement of teamwork in industrial enterprises;
- Improvement of motivation in work with personnel in industrial enterprises;
- Increasing the powers of workers in industrial enterprises;
- Carrying out structural reforms in industrial enterprises;
- Organization and development of highly professional organizational culture;
- Setting effective mission and goals.

The following suggestions are made in the article:

1. During the development of the digital economy in the management of human resources, it is important to take into account the market conditions and the interests of the company's employees.
2. It is considered purposeful to use new methods for optimizing the digital economy in human resources management, as well as "Double Efficiency" and "Automation" methods.
3. In the management of human resources, the motivation system of the digital economy should be improved and more modern methods should be applied, taking into account modern competitive conditions, local and foreign experiences.
4. Along with the increasing role of the digital economy in the management of human resources, there are changes in its business activity. Therefore, fundamental changes should be made in the personnel service, from the traditional form of personnel work to a complex system of human resources management.
5. Qualification requirements for employees of the human resources management center in the digital economy are constantly changing. Employees of this center must have a complex system of knowledge in

sociology, psychology and law.

6. In connection with the transition to the digital economy in the management of human resources and the lack of practical knowledge in the field of personnel, it is of great importance to study and apply the experience of countries with developed market relations.
7. The digital economy in the management of human resources, the internal activity of the company and advertising companies should be aimed at improving the image of the enterprise.

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SOSYAL MEDYA İLETİŞİMİ VE İLETİŞİM HASTALIKLARI

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Özet

Hayatımızın her alanında yaşam tarzlarımızda hızlı dönüşümler yaşamaktayız. Özellikle teknolojinin gelişmesiyle birlikte yeni iletişim alanlarının açılmasına birlikte yeni iletişim araçları bizleri derinden etkilemeye başlamıştır. Değişim ve dönüşüm en büyük etkisi iletişim alanında yaşanmaktadır. İletişim insanlığın en önemli gereksinimlerinden birisidir. İnsanlık tarihi boyunca insanlar sürekli olarak iletişim kurmaya çalışmışlar ve bunun için farklı yol ve yöntemler geliştirmeye gayret etmişlerdir. İşimizi büyük oranda kolaylaştıran yeni iletişim teknolojileri yüz yüze iletişim kavramının yavaş yavaş ortadan kalkmasına ve insan ilişkilerin zayıflamasına sebep olmaya başlamıştır. İnsanlık tarihine bakıldığında 24 bin yılı aşan bir süre öncesine dayanan ve İspanya'nın kuzeýinde yer alan paleolitik çaglardan kaldığı belirtilen Altamaire mağarasındaki şekiller insanların görsel iletişim kurmak istediklerinin birer göstergesi olarak algılanmaktadır. Tarih boyunca yüz yüze iletişim kurmak istenirken artık durum değişmiş ve insanlar sanal alemlerde iletişim kurmayı tercih etmeye başlamışlardır.

Günümüzde iletişimim ilerlemesiyle birlikte özellikle akıllı cihazların geliştirilmesi iletişimde yeni boyutların açılmasına sebep olmuştur. Sanal iletişim araçları ile iletişim büyük oranda sekteye uğramış ve zayıflamıştır. Her geçen gün de zayıflamaya devam etmektedir. Ancak iletişimim sanallaşmasıyla birlikte başta bireyselleşme olmak üzere bilgi kirliliğindeki önlenemez artış, bağımlılığa varan uygulamalara karşı saplı tutum ve davranışların geliştirilmesi ve psikolojik sorunların yaşanması önmüzdeki yeni sorunlar olarak değerlendirilmektedir. Hastalık boyutuna gelen bu sorunların çözümü her geçen gün biraz daha zorlaşmaktadır. Bu çalışmada sanal iletişimim getirdiği yeni sorunlar ve hastalıklar incelenerek çözümü konusunda bazı öneriler getirilmeye çalışılmıştır.

Anahtar Kelimler: Sosyal medya, akıllı iletişim, bireyselleşme, iletişim hastalıkları

GİRİŞ

Sosyal ağlar, bireyler olarak bizi ailelere, gruplara, organizasyonlara ve toplumlara bağlayan bağları temsil etmenin bir yoludur. Zayıf sosyal bağların bile etkileme gücüne sahip olduğunun fark edilmesiyle sosyal ağ araştırmaları belirgin bir şekilde artış göstermiştir. Son on yılda, sağlık hizmetlerinde sosyal ağlarla ilgili literatürde %50'nin üzerinde bir büyümeye görülmüştür. Sosyal ağlar, doktorların birbirlerinden tavsiye alma ve yeni ilaçları benimseme biçimlerinin, kanıtların yayılma biçiminin, güvenlik ve kalite uygulamalarının yayılmasının temelini oluşturmaya başlamıştır. Ancak sosyal medya bağımlılığında son yillardaki aşırı bağımlılık ve sosyal medyadan uzak kalma korusu konunun farklı alanlarda ve boyutlarda araştırılması gerektiğini ortaya koymaya başlamıştır. Özellikle sosyal medya bağımlılığının hastalık boyutuna taşınmış olması konun tahmin edilenin ötesinde bir ciddiyet sahip olduğunu göstermeye başlamıştır.

Sosyal süreçler, yaşam tarzı seçimlerimizden sağlık kararlarımıza, sağlık hizmetlerinin tasarlanması ve sunulma şekline kadar her şeyin temelini oluşturur. Sosyal doğamızı hem sömuren hem de yücelten bilgi araçları olan sosyal medya hemen her alanda yoğun olarak kullanılmaya devam etmektedir. Özellikle sağlık hizmetlerinde kullanılmaya başlaması avantajlı yönlerinin olmasının dışında genel olarak zararlı etkilere sebep olduğu bilinmektedir. Yanlış bilgilendirme, gereksiz bilgilendirme ve bilgi kirliliği insanların ciddi yönde yanlış yönlendirebilmekte ve gereksiz telaş, kaygı ve ümitsizlik aşılayabilmektedir. Bununla birlikte, sosyal medya, obezite, depresyon, diyabet ve kalp hastalığı gibi toplumsal olarak şekillenen hastalıkları tedavi etmemizi sağlayarak daha da güçlü bir role sahip olabilir. Bu makalede, sosyal ağlar ve medya anlayışımızın sosyal olarak şekillendirilmiş hastalıkların neler olduğunu ve bunlardan kaçınabilmek için nelerin yapılması gereği hakkında kısa bilgiler verilecektir.

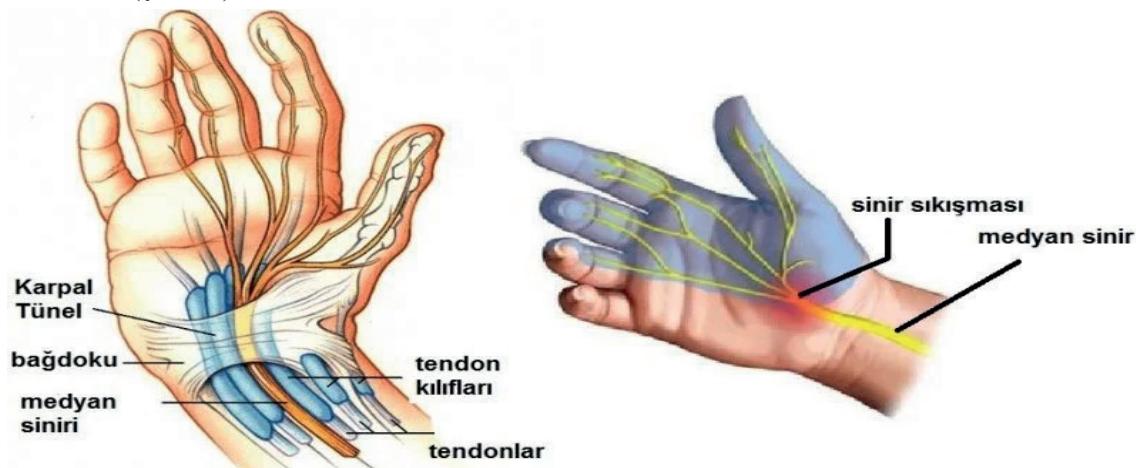
Dijitalleşme kavramının kullanımı sosyal medya iletişimini hızlanmıştır, Burada belirtilmek istenen ulaşılabilir bilgilerle birlikte elimizdeki kaynakların bilgisayar tarafından okunabilecek şekilde getirilmesi ve dijital ortama aktarılmasıdır. Her alanda dijitalleşme artarken özellikle medya bu konuda çok ilerlemiştir. Medya oldukça geniş bir kavramdır ve bünyesinde televizyon ve radyo başta olmak üzere gazeteler, dergiler ve internet kitle iletişim araçlarını barındırmaktadır. Bunlara günümüzde yeni medya adı da verilmektedir. Yeni medya artık hayatımıza şekillendirme konusunda belirgin şekilde söz sahibi olmuştur ve bunu her geçen gün daha etkili ve derinden belli etmektedir. Kitle iletişimdeki gelişimeler özellikle internetin kullanılmaya başlandığı Web 1.0, Web 2.0 ve Web 3.0 gibi dönemlerle başlamış ve günümüze kadar devam etmiştir. Gelecek yıllar içinde özellikle de teknolojinin gelişmesiyle konunun çok daha farklı boyutlara ve içeriklere taşınması beklenmektedir.

Toplum olarak dijitalleşme konusunda oldukça hevesli ve bir o kadarda başarılı olduğumuzu söyleyebiliriz. Bazı yanlışlıklar ve eksiklikler içerde de bunu derinde yaşadığımız gerçeklerdir. Çünkü sosyal medyanın insanlara sunduğu kolaylık, rahatlık ve mutluluk başka kaynaklarla karşılaşmadığı sürece dijitalleşme ve sosyal medya kullanımı devam edecektir. Yakın zaman içinde alternatif bir kaynağın bulunması beklenmemektedir. Çünkü bu kanal çok etkili olduğundan insanların yönlendirmesini ve yönetilmesini kolaylaşır açısında avantaj sağlamaktadır. Özellikle sanal kimliklerin oluşması, işlemlerin farklı boyutlarda yapılabilmesi ve sanal kimlikler ile farklı kimliklere sahip olunabilmesi bu alana yönelik artmaktadır.

Sosyal Medya Hastalıkları:

1. Fare Klavye Hastalığı (Whats Appitics): Özellikle gençlerin bilgisayar başında gereğinden çok zaman geçirdikleri bilinmektedir. Bilgisayar başında zaman geçirirken fare ya da klavye kullanımı nedeniyle ellerde ve bileklerde karpal tünel sendromu denilen hastalığa yakalanma oranı artmaktadır. Bu hastalık bileklerdeki sinirlerin sıkışması nedeniyle başparmak ile ikinci ve üçüncü parmaklarda ağrı ve uyuşmalar şeklinde görülmektedir. Gerekli tedbirlerin alınmaması durumunda ciddi sorunlara sebep olabildiği gibi cerrahi müdahaleye gerek duyulabilmekte ve ilerleyen dönemlerde kas erimesiyle birlikte kuvvet kayiplarına sebep olabilmektedir. Karpal tünel sendromu en yaygın görülen el-bilek hastalıkları arasında

yer almaktadır (Şekil 1).



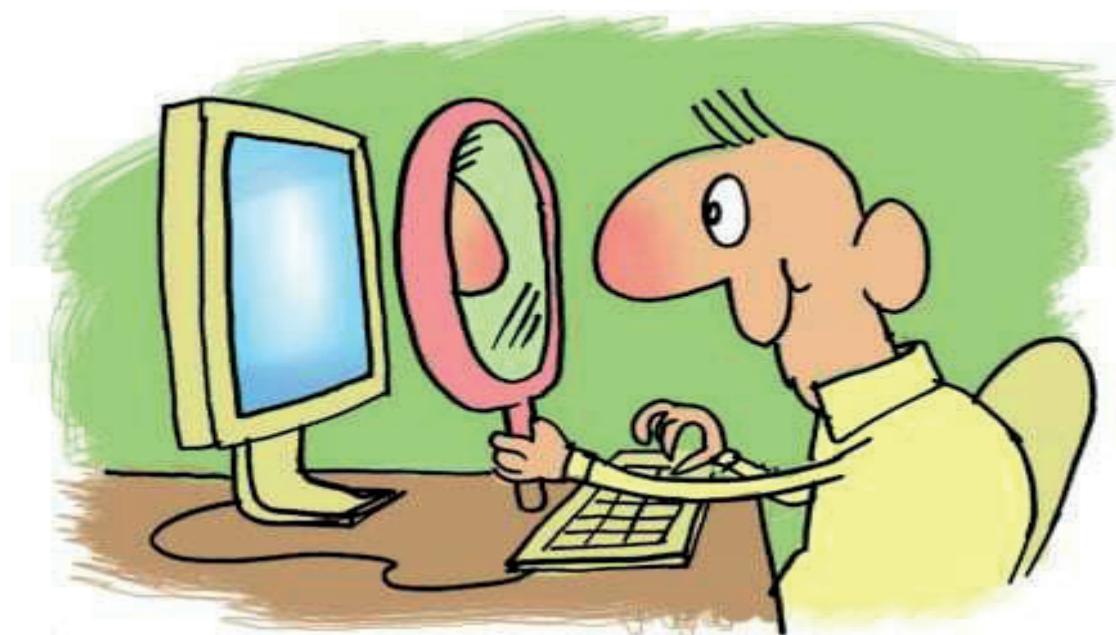
Şekil 1. Karpal Tünel Sendromu (Özdemir, 2019)

2. RSI (Tekrarlayıcı Gerilme Yaralanması= Ersi Volkitis): Çok kişinin bilmediği ancak yine çok kişini farkında olmadan yakalandığı bu tip hastalıklara masa başında yoğun olarak çalışanlarda sıkılıkla görülmektedir. RSI (Repetative Strain Injury) ellerde bilgisayar kullanımına bağlı olarak farkın olmadan oluşan gerginliklerin süreklilığı halinde oluşan sorunlardandır. Özellikle bazı hareketleri sürekli olarak yapmak, uygun olmayan hatta rahatsız edici denilebilecek pozisyonlarda uzun süre kalmak nedeniyle oluşan gerginlik hallerini ifade etmektedir. Ancak genel olarak bilgisayar, tablet ve cep telefonu kullanıcılarında çok görülmektedir. El ve ayak bileklerini etkileyerek karpal tunnel sendromu ve tendonit gibi bazı sorunların oluşmasına sebep olabilmektedir (Şekil 2). Bu hastalığa yakalanmak çok kolay olmasına rağmen kurtulmak çoğu zaman kolay olmaz. Bu tip hastalıklara yakalanmamak için el egzersizleri yapılması önerilmektedir.



Şekil 2. RSI (Repetative Strain Injury) belirtileri (Bilge, 2022).

3. Ego sörfü: Bu kavram ilk kez 1998 yılında kullanılmaya başlanmıştır. Kişinin kendisini internette armasını ifade etmektedir. Kişi kendisini internette nerede/ ne zaman/kimin tarafından kullanıldığını aramak için yapılan eylemleri kapsamaktadır. Bu kişiler farklı arama motorlarını kullanarak sürekli olarak kendilerini aratırlar. Kendileri hakkında bir şey bulamayınca bunalıma girmektedirler. Buna ego sörfü denilmektedir (Şekil 3).



Şekil 3. Ego sörfü gösterimi (Miessler, 2022).

4. Hikikomori: Terim olarak ilk kez Japonya'da kullanılmaya başlanmıştır. Japon gençleri arasında gözlenen sosyal izolasyonu araştıran uzmanlar bu şekilde adlandırdıkları bir hastalığı hayatımıza girdiğini belirtmişlerdir. Bu hastalık bireylerin kendilerini aşırı şekilde izole etmelerini vurgulamak için söylemiştir. Yalnızlık olarak ifade etmek yeterli değildir. Bireylerin çevrelerinde birileri olsa bile sosyal paylaşım yapamadıkları için kendilerini yalnız hissetmeleri duygusudur. İnsanlardan kaçmak, eve kapanma, sürekli artan stres ve psikolojik sorunlar başlıca semptomlar olarak görülmektedir (Şekil 4). Çevrenizde bu şekilde sorunlu olduğu düşünülen bireylerin hemen profesyonel yardım almaları önerilmektedir. Çünkü bu hastalığın tedavi edilememesi durumunda geriye dönüşü olmayan çok ağır travmaların yaşanmasına sebep olunabilmektedir.



Şekil 4. Hikikomori belirtileri (Capgras, 2016)

5. Blog ifşacılığı: Bu hastalıkta esas olan herkesin bilmesi istenilen konuların sürekli olarak yayında tutulmasıdır. Gerekliyorsa da yeni sosyal alanlarda yayinallyarak gündemde tutabilme çabasıdır. Özellikle kendisi ya da yakın çevresine ait bilgileri vurgu yaparak paylaşım yapanlar ileri boyutta ifşacı olarak

tanımlanabilmektedir. İfşa edecek bir bilgi bulunmadığında bilgi bulabilmek için gayret sarf edebilirler. Bunun sonucunda ise eğer küçükte olsa bazı bilgiler bulunursa mutlu olurlar, aksi durumda ise hastalık ilerlemeye devam eder (Şekil 5).



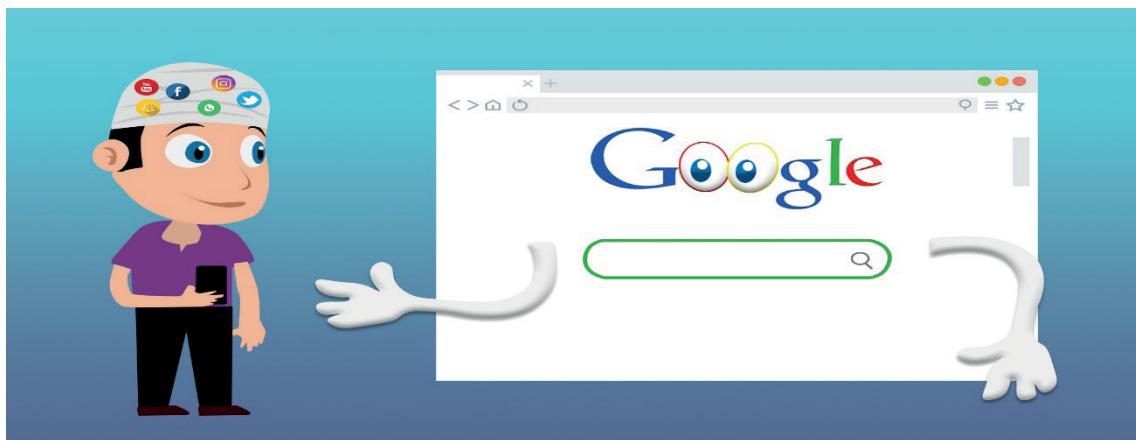
Şekil 5. Blog ifşacılığı hastalığı (Kiraz, 2023)

6. Video Narsizmi (Youtube Narsizmi): Son yıllarda gelişen sosyal medya hastalıklarından biridir. Blog ifşacılığına çok benzemektedir. Psikolojik bir bozukluk türüdür. Bireyin hazırlamış olduğu kendisine ait video görüntülerini yayımlama ve yayinallya bağımlılığı oluşur. Böylece video çekememe veya da yayinallyatamama durumunda psikolojisi bozulur ve ağır sorunlar yaşamaya başlar. Buna tanınma hastalığının da denilebilmektedir. Kendisini ne kadar üstte görürse o derece mutlu hisseder (Alpaslan ve Gürcan, 2022).



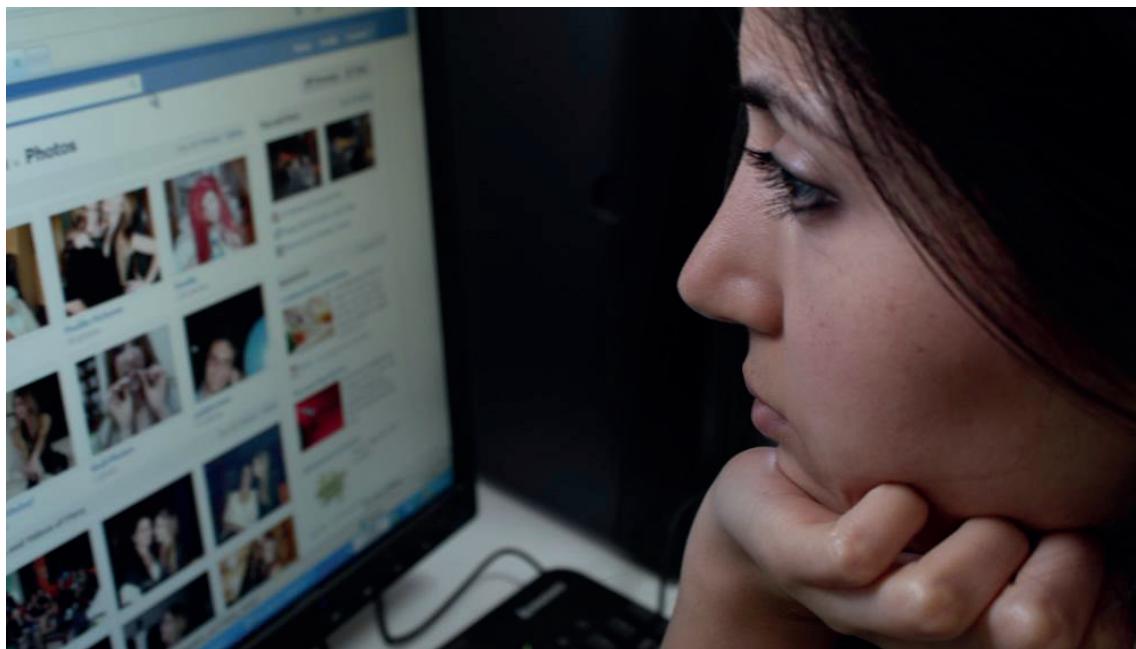
Şekil 6. Video Narsizmi (Alpaslan ve Gürcan, 2022).

7. Siberhondrik Bozukluk: İnternet doktorluğu olarak da tanımlanabilmektedir. Kişinin kendisinde var olduğunu düşündüğü hastalıklar ile ilgili sanal alemde araştırma yaparak bulduğu tedavi yöntemlerine göre kendisini tedavi etmeye çalışmasıdır. Bu tip insanlar hastaneye çok sık gitmelerine rağmen tedavi programlarından asla memnun olmazlar.



Şekil 7. Siberhondrik bozukluk gösterimi (Kiraz, 2023)

8. Fotoğraf izleme hastalığı (Photolurking): Fotoğraf izleme hastalığı özellikle Facebook gibi görsel ağırlıklı sitelerin ortaya çıkmasıyla gözlenmeye başlanmıştır. Kişi internet ortamında saatlerce başkalarının fotoğraflarına bakar ve kendine göre değerlendirmeler yapar. Hatta bazen fotoğrafları ezberlemek dahi yapılan işlemlerdir.



Şekil 8. Fotoğraf İzleme Hastalığı (Martı, 2022)

9. Ego Sörfü: Kişilerin sürekli olarak arama motorları başta olmak üzere sanal alemin bütün araçlarında kendisini ve kendi hakkında yapılanları aramasıdır. Bu bazen yapılrsa normal olarak karşılanabilir. Ancak takıntı haline gelirse psikolojik bozukluğun olduğunu ifade eder. Tedbir alınmazsa kişi kendi hakimiyetini kaybedebilir (Şekil 9).



Şekil 9. Ego sörfçülüğü (Işıklıdere, 2020)

10. Myspace Taklitçiliği: Bu hastalıkta kişi kendisini başka bir karakter olarak tanımlamaya başlar. Taklitçilik yeteneğini geliştirir. Başka biri gibi davranışarak sosyal medyada var olmaya çalışır. Bu hastalığa sahip olanlar sahte profil resmi kullanarak yorum ve değerlendirme yapmaktadır. Özellikle son yıllarda dillendirilen “trol” ya da “troliçe” kavramları taklitçiliğe benzer özellikler taşımaktadır.



Şekil 10. My Space Takipçiliği (Miessler, 2022)

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1)

HEMŞİRELERİN ÇOCUK İHMAL VE İSTİSMAR BELİRTİLERİ İLE İSTİSMAR RİSKLERİNİ TANILAMA DÜZEYLERİNİN BELİRLENMESİ

*DETERMINATION OF NURSES' LEVELS OF DIAGNOSING CHILD
NEGLECT AND ABUSE SYMPTOMS AND ABUSE RISKS*

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Özet

İstismar konusu hemen her topluma görülen ve maalesef engellenemeyen bir olgudur. Engellenmesi ve önüne geçilmesi için yoğun olarak çalışmalar yapılsa da yeterince başarılı olunmadığı anlaşılmaktadır. Elbette bunda insanların konu hakkındaki duyarsızlıklarının yanında yetkililerin konuya gerekli özeni ve önemi göstermemeleri de eklendiğinde boyut değişikliği olmaktadır. İstismar konusu özellikle çocukların üzerinde uygulanması hassasiyeti daha da artırmaktadır. Çocuk istismarı, çocukların ebeveynleri, koruyucu aile fertleri ya da yabancılar tarafından fiziksel ve/veya psikolojik sağlıklarına zarar veren, fiziksel, duygusal, cinsel veya zihinsel gelişimlerini engelleyen tutum ve davranışlar olarak tanımlanmaktadır. Bu tutum ve davranışlar çocuklarda derin izler bırakmakta ve onların zihin ve ruh sağlıklarını olumsuz etkilemektedir. DSÖ'ye göre her yıl 15 yaşın altındaki 41.000 çocuk istismar veya ihmal sonucu ölmektedir. İstismar ve ihmal yüzünden ölen çocuk sayısının bu kadar az olmasının nedeni hayatını kaybeden çocukların ölüm nedenlerinin farklı şekillerde bildirilmesidir. İstismarın eksik bildirilmesi, tanı koymadaki güçlükler, inkâr ve gizleme, sorunun ağırlığını ayrıca artırmaktadır. Bu çalışmada çocuklara yönelik olarak yoğun uygulanan istismar ve ihmal türleri hakkında bilgi verilmiş ve bunların engellenmesi için gerekli öneriler yapılmıştır. Ayrıca hemşirelerin gelen vakaları tanımlama yetenekleri üzerinde bilgiler verilmiştir. Hemşirelerin genel olarak konu hakkında bilgi sahibi olmalarına rağmen etkili olma konusunda yeterli olamadıkları tespit edilmiştir. Eğer gerekli ve yeterli tedbirler alınmazsa bunun boyutlarının önumüzdeki 20 yıl içinde günümüze göre en az %150 oranında artacağı hesaplanmıştır. Buna göre gerek istismar kaynaklı ölüm oranlarında ve gerekse de istismar sayılarındaki artışın yüksekliği bizleri tedirgin etmeli ve yetkililere bu konuda baskınlar kurulmalıdır.

Anahtar Kelimeler: Çocuklar, istismar, ebeveynler, tedbirler

Abstract

The subject of abuse is a phenomenon that is seen in almost every society and unfortunately cannot be prevented. Although intensive efforts are made to prevent and prevent it, it is understood that it has not been successful enough. Of course, there is a dimension change when people's insensitivity to the issue is added as well as the fact that the authorities do not show the necessary care and importance to the issue. The application of abuse, especially on children, increases the sensitivity even more. Child abuse is defined as the attitudes and behaviors of children's parents, foster family members or strangers that harm their physical and/or psychological health and prevent their physical, emotional, sexual or mental development. These attitudes and behaviors leave deep traces on children and negatively affect their mental and mental health. According to WHO, 41,000 children under the age of 15 die each year as a result of abuse or neglect. The reason why the number of children who died due to abuse and neglect is so low is that the causes of death of children who lost their lives are reported in different ways. Under-reporting of abuse, difficulties in diagnosis, denial and concealment further increase the gravity of the problem. In this study, information was given about the types of abuse and neglect applied to children and necessary suggestions were made to prevent them. In addition, information was given on the ability of nurses to identify incoming cases. It has been determined that although nurses are generally knowledgeable about the subject, they are not enough to be effective. If necessary and sufficient measures are not taken, it is calculated that its dimensions will increase by at least 150% in the next 20 years compared to today. Accordingly, the increase in both the death rates due to abuse and the increase in the number of abuse should make us uneasy and pressure should be put on the authorities in this regard.

Keywords: Children, abuse, parents, precautions

1. ÇOCUK İHMAL VE İSTISMARI

Çocuk istismarı, çocukların ebeveynleri, koruyucu aile fertleri ya da yabancılar tarafından fiziksel ve veya psikolojik sağlıklarına zarar veren, fiziksel, duygusal, cinsel veya zihinsel gelişimlerini engelleyen tutum ve davranışlardır. (Burç & Güdücü Tüfekçi, 2015). Bu tutum ve davranışlar çocukların derin izler bırakmakta ve onların zihin ve ruh sağlıklarını olumsuz etkilemektedir. (United Nations International Children's Emergency Fund [UNICEF], 2010). DSÖ'ye göre her yıl 15 yaşın altındaki 41.000 çocuk istismar veya ihmali sonucu ölmektedir. İstismar ve ihmali yüzünden ölen çocuk sayısının bu kadar az olmasının nedeni hayatını kaybeden çocukların ölüm nedenlerinin farklı şekillerde bildirilmesidir. İstismarın eksik bildirilmesi, tanı koymadaki güçlükler, inkar ve gizleme, sorunun ağırlığını ayrıca artırmaktadır. (World Health Organization [WHO], 2022).

Çocuk istismarını sadece istismar olarak düşünerek basite indirmek kabul edilebilir bir olgu değildir. Konuya yan etkileri ile bütünlük içinde değerlendirmek gerekmektedir. Çocuk istismarlarının sonucunda çocukların önemli kısmı suça itilmekte veya yönlendirilmektedir. The Economist'in verdiği istatistikler incelediğinde sadece ülkemizde değil dünyanın bütün ülkelerinden benzer sorunların artarak devam ettiği görülmektedir (Habertürk, 2022). Dünya çapında yapılan çalışmada Çocuklar için en güvenilir ülke İngiltere iken, en güvensiz ülke ise Demokratik Kongo Cumhuriyeti olmuştur. Türkiye ise ortalarda yer alarak yarı güvenli ülke olarak kayıtlara geçmiştir. Listede 18. Sırada ve %56,7'lik bir güven düzeyi ile bizleri çok memnun eden bir sonuç olmadığı görülmektedir (Şekil 1). TÜİK'in 2019 verilerine göre suç mağduru olarak gelen 206 bin 498 çocuğun yüzde 15,2'si cinsel istismar kurbanıydı. Ancak resmi veriler

tam olarak paylaşılmadığı için son yıllarda nasıl bir değişim oldu bunu sağlıklı bir şekilde göremiyoruz. Ancak çok daha yüksek değerlere ulaşlığını söylemek yanlıltıcı olmayacağından emin oluyoruz. Adalet Bakanlığının verilerine göre, 2021 yılındaki 20 bin 459 dosya da ‘çocuğa karşı cinsel istismar’ suçu işlenmiştir. TÜİK rakamlarına göre de 2021 yılında 117’si 15 yaşından küçük 7 bin 190 çocuk doğum yapmıştır. Bunların çocuk istismarı sonucunda olduğu tahmin edilmektedir. Adalet Bakanlığı ve Aile ve Sosyal Hizmetler Bakanlığı, 2017 yılından bu yana istismar verilerini kamuoyu ile paylaşmıyor. İnsan Hakları Derneği 2018 raporuna göre, çocuğa yönelik cinsel suç vakalarının sadece yüzde 5’i açığa çıkıyor.



Şekil 1. Dünyada çocuk güvenliği sıralaması (%100 çok iyi, %0 çok kötü).

2. LITERATÜR TARAMASI

Hemşireler çocuk ihmal ve istismarı ile en sık karşılaşan sağlık profesyonellerinden biridir. Bu nedenle hemşirelerin çocuk ihmal ve istismarı belirti ve risklerini tanımlayabilmek için yeterli bilgi seviyesine sahip olması gerekmektedir. Ancak yapılan çalışmalarda hemşirelerin çocuk istismar belirti ve risklerini tanılama düzeylerinin yetersiz olduğu, istismar vakası ile karşılaşlıklarında uygulanması gereken prosedürleri bilmediklerini belirtmişlerdir (Burç & Güdücü Tüfekçi, 2015; Güner ve ark., 2016; Uncu, 2013). Ayrıca hastaneye başvuruların çoğu istismar nedeniyle olmamakta, öykü alma sırasında istismardan şüphelenilmesiyle istismar vakası olduğu tespit edilmektedir. İspanya da yapılan çalışmada acil serviste 404 çocuk istismarı vakasıyla karşılaşılmış ve vakaların yarısından fazlası istismar nedeniyle hastaneye başvurmamış, öykü alma sırasında istismardan şüphelenilmesiyle istismar vakası olduğu tespit edilmiştir (Solís-García et al., 2019).

Hemşirelerin çocuk istismarı olguları ile karşılaşlıklarında bildirim yapmama nedenlerinin yasal süreçte karşılaşacak sıkıntılar, çocuğu şuan ki durumundan daha kötü bir duruma sokmaktan çekinme, sosyal hizmetlerin durumla ilgileneceğini düşünmem, konuya dair kayıtların yeterli olmaması, sorunu nasıl bildireceğini bilmemesi, kişisel yollarla çözebileceğine inanması, şüphelerin doğru çıkmasıyla çocuğun ebeveynlerinden alınacağı düşüncesi ve her ailede benzer durumların yaşanabileceği olarak saptanmıştır (Burç & Güdücü Tüfekçi, 2015).

12/10/2004 tarihli resmî gazetede yayınlanan Türk Ceza Kanunu'nun 5237 Kanun Numaralı Madde- 280' e göre "Görevini yaptığı sırada suç işlendiği yönünde bir belirti ile karşılaşmasına rağmen durumu yetkili makamlara bildirmeyen veya bu hususta gecikme gösteren sağlık mesleği mensubu, bir yıla kadar hapis cezası ile cezalandırılır". Kanunda belirtildiği gibi bildirilmesi gereken durumlar arasında çocuk istismarı ve ihmali de vardır. (Türk Ceza Kanunu [TCK], 2004; UNICEF, 2011).

3. İSTİSMARIN TÜRLERİ

3.1. Fiziksel İstismar

Çocuğun ebeveynleri, koruyucu aile fertleri ya da yabancı kişiler tarafından çocuğun vücutuna zarar verilmesidir. Çocuğa vurma, itme, tokat atma, ısırma gibi davranışlar ile gerçekleşir. Sigara izleri, yaralar, yanıklar, morluk, ısırik ve parmak izleri, kemer izleri fiziksel istismarın belirtileridir (Kaytez ve ark, 2018).

Kafa, diz, dirsek, uyluk gibi normal yaralanma bölgeleri sayılabilen yerler dışında, kalça, genital bölge, boyun, sırt, bel, bacağı üst iç kısmı, koltuk altı gibi yaralanmanın az olacağı bölgelerde bir yaralanma mevcut ise fiziksel istismardan şüphelenilmelidir.

3.2. Duygusal İstismar

Çocuğun ruhsal ve zihinsel durumunu olumsuz yönde etkileyen aşağılayıcı, küçümseyici, hakaret edici, yok sayılı, gibi birçok davranışta bulunulmasıdır (Dalkılıç, 2018). Çocuğun yalnız bırakılması, hor görülmesi, korkutulması, argo kelimeleme maruz kalması, önemsenmemesi, çocukların arası ayrılm yapılması, aşırı baskıcı ebeveyn tutumu, çocuğa degersiz hissettirilmesini içermektedir (Kütük ve Bilaç, 2017).

3.3. Cinsel İstismar

Çocuğun anlamlandıramadığı, istemediği, gelişimine uygun olmayan cinsel durumlara maruz kalması ya da zorlanmasıdır. Cinsel istismar uygulamanın yanında temasla geçmeden de yapılmaktadır. Çocuğa cinsel içerikli videoların izletilmesi, çocuğun uygunsuz fotoğraflarının çekilmesi, çocuğun genital bölgesine bakılması, çocuğa cinsellikle alakalı söylemlerde bulunulması, yetişkin bireyin çocuğa cinsel organını göstermesi, çocuğa çıplaklık içeren fotoğrafların gösterilmesi gibi durumlarda cinsel istismarı içermektedir (Kaytez ve ark, 2018; Dalkılıç, 2018).

3.4. İhmal

Çocuğa bakım veren aile fertlerinin ya da sosyal hizmet kurumlarının çocuğun temel yaşam ihtiyaçlarını karşılamaması durumudur. Çocuğun pis kıyafetlerle dolaşması ve kişisel hijyenine önem verilmemesi, mevsim koşullarına uygun giyinmemesi, gelişim düzeyine uygun beslenmemesi veya aç bırakılması, öğrenim hayatından mahrum bırakılması, çocuğun çalışması, çocuğun yalnız bırakılması ihmaliin göstergelerindendir (Dalkılıç, 2018; Yüksel ve Yüksel, 2014).

4. İSTİSMARIN BELİRTİLERİ

Çocuğun kaçınan davranışlarında bulunması, korkması, yaşına uygun olmayan çocukluk dönemlerine geri dönmesi (5 yaşındaki çocuğun emzik takmak istemesi vb.), öfke patlamaları yaşaması, okulda ve arkadaşlık ilişkilerinde başarısızlık, ebeveynlerinden uzaklaşma, içe kapanma, sürekli ağlama, güvenli hissettiği yerden ayrılmama isteği ya da evden uzaklaşma, intihar etme düşüncesi, uyku problemleri, kabus görme, mutsuzluk, depresyon, konuşma bozuklukları, yeme içmede artma ya da azalma, cinsel davranışlara yönelik, alkol ve sigara bağımlılığı gözlenebilir (Sarı ve ark., 2016).

Hemşireler çocuğa terapotik yaklaşarak bildirilmesi gereken istismar ve ihmali vakalarındaki beden imajı değişikliklerini, çekingenlik ve korku durumunu, vücutta görülen deformiteleri, ebeveyn ve çocuk arasındaki olağanlışı uyumu, hijyen eksikliğini, tıbbi yardım ihtiyacını, öykü alma sırasında tutarsız veriler gibi ince ayrıntıları fark edebilecek bilgi seviyesine sahip olmalıdır ve uygulanması gereken prosedürü bilmelidir (Burç & Güdücü Tüfekçi, 2015, Solís-García et al., 2019). Çünkü yeterli bilgiye sahip olmayan acil hemşiresi fark etmeden istismar veya ihmale uğramış çocuğu evine gönderebilmekte ve çocuğun uzun zaman boyunca, sürekli yinelenen istismara uğramasına sebep olmaktadır (Burç & Güdücü Tüfekçi, 2015; Sofuoğlu et al., 2018).

5. ÖN ÇALIŞMA

Literatürdeki verilerin ve konunun önemini farkındalığına varabilmek için kör deneme çalışması gerçekleştirilmiştir. Kör deneme çalışmasında “Katılımcı Anket Formu” ve “Çocuk İstismarı ve İhmaliin Belirti ve Risklerini Tanılama Ölçeği” kullanılarak 10 hemşireden veri toplanılmıştır.

Kör deneme sonucunda literatürle benzer sonuçlarına varılmıştır. %60’ı daha önce çocuk ihmali ve istismarı ile ilgili eğitim almadıklarını belirtmişlerdir. %50’ si çalışmaları kurum içinde hizmet içi eğitim olarak, %25’i lisans eğitiminde çocuk ihmali ve istismarına yönelik eğitim aldılarını bildirmiştir. Ayrıca %66,7’si alındıkları eğitimin yetersiz olduğunu düşünmekte, %22,2’si kısmen yeterli, %11,1’i yeterli eğitimi aldığı düşünmektedir. % 60’ı istismar olgusunda uygulanacak hastane prosedürünü bilmediklerini bildirmiştir. Ayrıca katılımcıların tamamı çocuk ihmali ve istismarına yönelik eğitim almak istediklerini ifade etmişlerdir.

Katılımcılar, çocuk ihmali ve istismarı konusunda şüphe duyduklarında çocuğun zarar görmesinden endişelenme, yanlış bildirim yapma korkusu, nereye bildirim yapacağını bilmeme, çocuğun ailesinden ayrılmasından endişelenme ve diğer nedenlerden dolayı bildirim yapmadıklarını ifade etmişlerdir.

Yaptığımız kör deneme çalışması sonucunda hemşirelerin çocuk ihmali ve istismarı konusunda bilgi düzeylerinin yetersiz ve uygulanması gereken prosedürü bilmedikleri ortaya konmuştur. Bu yönüyle kör deneme yerine probleme ilgili daha büyük çalışmaların yapılması gereği önerilmektedir.

6. SONUÇ

Çocukta istismar tıbbi ve mental sağlık morbiditesi dahil uzun dönem sekeller bırakabileceği için acil hemşiresinin bulunduğu kültüre duyarlı bir tarzda, kapsamlı bir öykü ve fiziksel değerlendirme yürütmelidir. Hemşirelerinin daha önce istismar vakasıyla karşılaşması, önceden eğitim almış olması, uygulanacak prosedürü bilmesi, çocuk istismarı belirti ve risklerini tanıyalım düzeylerini etkilemektedir. Bu nedenle hastane içi eğitim ve uygulanacak prosedürler hakkında bilgi verilmelidir (Güner ve ark., 2016; Lee &

Kim, 2018; Carson, 2018). Ayrıca lisans ve lisansüstü eğitimde çocuk istismarı konusu üzerinde daha çok durulmalı, geleceğe çocuk istismarı belirti ve risklerini bilen, tanıyan, donanımlı hemşireler yetiştirmelidir. Konuya ilgili daha fazla ve daha büyük örneklemeye sahip çalışmaların yapılması önerilmektedir.

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DÜNYA ÜZERİNDE KRONİK HASTALIKLARIN DURUMU

THE STATUS OF CHRONIC DISEASES IN THE WORLD

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Özet

Dünya insanlık tarihi incelediğinde salgın hastalıkların zaman zaman görüldüğü milyonlarla ifade edilen can kayıplarının yaşandığı görülür. Salgın hastalıklar belli bir zaman diliminde etkili olduktan sonra alınan tedbirler ile engellenmekte ve belli bir süre sonra ise tarihe karışmaktadır. Ancak yine insanlık tarihi kadar eski olan kronik hastalıklar denen bulaşıcı olmayan hastalıklar; dünya çapında önemli bir sağlık sorunu olarak karşımıza durmaktadır. Bireylere, ailelere, sağlık sistemlerine ve ulusal ekonomilere önemli bir yük getirmektedir. Kronik hastalıklar insanları doğrudan anda kalıcı şekilde bir ya da daha fazla sistemde geri dönüşsüz yapı ve fonksiyon bozukluğuna yol sistem bozuklukları olarak tanımlanabilmektedir. Bu hastalıklar uzun dönem sağlık sorunlarına sebep olduğundan çok iyi izlenmesi ve değerlendirmelerin gerçekçi şekilde yapılması gerekmektedir. Yavaş gelişen ve sıkılıkla yaşam boyu devam eden bu hastalıklar arasında diyabet, kalp damar hastalıkları, kanser, hipertansiyon, koroner/ iskemik kalp damar hastalıkları, demans, alzheimer hastalığı ve kronik solunum yolu hastalığı gibi hastalıklar bulunmaktadır. Bu çalışmada belirtilen hastalıkların epidemiyolojik durumu ve günümüzde ülkelere yapmış olduğu sosyal ve ekonomik yükler incelenmeye çalışılmıştır. Kronik hastalıkların yıllık ölüm oranları içinde gelişmiş ülkelerde %70'lik, gelişmekte olan ülkelerde ise %85'lik bir orana sahip olduğu görülmüştür. Ölen he üç kişiden birisinin kardiyovasküler sistem (iskemik kalp hastalığı, ani kardiyak ölüm, miyokardiyal enfarktüs, kapak hastalığı, inme, konjestif kalp yetmezliği, kardiyomiyopati) ile ilişkili olduğu belirlenmiştir. Ölümlerin %16,3'üne kanserlerin, %14,2'sine bulaşıcı / paraziter hastalıkların (pnömoni, ishal, HIV, tüberküloz, sıtmalı) neden olduğunu belirlemiştir. Hijyenin kötü olması, toplumda yetersiz beslenme, eğitim düşük seviye olması, yoğun tütün ve alkol kullanımı, etkili sağlık hizmetlerine ulaşımda güçlükler, yoksulluk gibi faktörlerin kronik hastalıkları desteklediği belirlenmiştir.

Anahtar Kelimler: Kronik hastalıklar, hijyen, ölüm oranları, insanlık tarihi

Abstract

When the world history of humanity is examined, it is seen that epidemic diseases are seen from time to time, and there are millions of deaths. Epidemics are prevented by measures taken after they become effective for a certain period of time and become history after a certain period of time. However, non-communicable diseases called chronic diseases, which are as old as human history; remains an important health problem worldwide. It places a significant burden on individuals, families, health systems and national economies. Chronic diseases can be defined as system disorders that cause irreversible structure and dysfunction in one or more systems in a permanent way. Since these diseases cause long-term health problems, they should be monitored very well and evaluations should be made realistically. These slowly developing and often lifelong diseases include diabetes, cardiovascular diseases, cancer, hypertension, coronary/ischemic cardiovascular diseases, dementia, Alzheimer's disease and chronic respiratory disease. In this study, the epidemiological status of the diseases mentioned and the social and economic burdens they have made on the countries today have been tried to be examined. It has been observed that among the annual mortality rates of chronic diseases, 70% in developed countries and 85% in developing countries. It was determined that one out of every three people who died was associated with the cardiovascular system (ischemic heart disease, sudden cardiac death, myocardial infarction, valve disease, stroke, congestive heart failure, cardiomyopathy). He determined that 16.3% of deaths were caused by cancers and 14.2% by infectious / parasitic diseases (pneumonia, diarrhea, HIV, tuberculosis, malaria). It has been determined that factors such as poor hygiene, malnutrition in the society, low level of education, heavy use of tobacco and alcohol, difficulties in accessing effective health services, and poverty support chronic diseases.

Keywords: Chronic diseases, hygiene, mortality rates, human history

1. GİRİŞ

Bağışıklama, bireyin herhangi hastalığa karşı aşılama aracıyla korunduğu bir süreç olarak kabul edilmektedir (Özüm ve ark, 2021). Hayatı tehdit eden bulaşıcı hastalıklardan korunması için kanıtlanmış bir araç olan bağışıklama faaliyetlerinin nedeniyle her yıl 2 ile 3 milyonlarca ölümün önlendiği tahmin edilmektedir (World Health Organization [WHO], 2017). Tibbin en büyük başarılarından biri olan ve en maliyet etkili sağlık uygulamalarından biri olan aşılama; hastalığı, morbidite ve mortalitenin önlenmesinde en önemli halk sağlığı uygulamalarında biridir (Özüm ve ark, 2021; Akın, 2006). Amerika Birleşik Devletleri Hastalıklardan Korunma Merkezi'nin (CDC) yirminci yüzyılın en önemli başarısı olarak tanımladığı aşılama faaliyetleri sayesinde her yıl üç milyonlarca çocuğun hayatı kurtulduğu bildirilmiştir (Pehlivan ve ark, 2007). Türkiye'de yirminci yüzyılda devlet politikası olarak çocuk aşılama programlarıyla aşıların kullanımı yükseltince aşı ile önlenebilen birçok enfeksiyondan mortalite ve morbidite oranlarını azalma meydana gelmiştir (Altun, 2008; Danova, Salek, Kocourkova & Celko, 2015). Günümüzde yaşamı tehdit eden 26 bulaşıcı hastalığı önlemeye yönelik üretilmiş aşı mevcuttur, her yaştan insanın daha uzun ve daha sağlıklı yaşamاسına yardımcı olmaktadır (WHO, 2021a).

Ancak, kaydedilen başarılara rağmen, küresel olarak aşılama durumu optimal olmaktan uzaktır ve birçok zorluk devam etmektedir. Her ne kadar aşı kabulü genellikle yüksek olsa da yüksek olan ülkelerde bile genel nüfus aşılama kapsamı önemli sayıda çocuk ve yetişkinlerin çeşitli endişeler ve yanlış algılamalar nedeniyle yeterince aşılanamadığı bildirilmiştir (Heidemarie & Ursula, 2019). Bu çalışmada küresel olarak bağışıklama durumu, bağışıklama hizmetlerinde engeller ve zorlukları ele alınacaktır.

2. GENEL BAĞIŞIKLAMA İLKELERİ

Bağışıklık Sistemi; canlıda hastalıkların önlenmesinde koruma sağlayan, diğer tümör hücreleri ve patojenleri tanıyarak onları yok eden bir set işleyişleri olarak tanımlanmaktadır. Bağışıklık ise vücutun hastalık üretici mikroorganizmaların önlenmesinde gösterdiği direnç olarak tanımlanmaktadır. Bağışıklık; aktif ve pasif olmak üzere iki grupta sınıflandırılmaktadır. Aktif bağışıklık; bir kişinin kendi bağışıklık sistemi tarafından üretilen korumadır. Aktif bağışıklık uzun yıllar ve ömrü boyu sürdürmektedir. Pasif bağışıklık ise; vücutun antijenlere karşı antikor yapılmasını gerektirmez. Bazı durumlarda gerektiren antikorları dışarıdan vücuda getirilerek bağışıklık sağlamaktadır. Pasif bağışıklık uzun yıllar sürdürmemektedir (CDC, 2020; Public Health England, 2020).

Bağışıklama; aşı aracıyla kişiyi hastalıktan ya da enfeksiyondan koruma olarak tanımlanabilmektedir. En son yıllarda toplumun sağlığı kazanımlarından biridir. Bağışıklama sayesinde morbidite ve mortalite oranları azalmış olduğu ve toplum bağışıklığının sağlanması bildirilmiştir. Toplum Bağışıklığı; toplumda herhangi bir hastalığa karşı risk altındaki kişileri aşılama, aşı yapılan korumak ve hastalığın kontrolünün sağlanması amaçlanmaktadır. Toplumda bir enfeksiyonun ne kadar bulaşıcı olduğu, toplum bağışıklığının sağlanması için bağışıklama faaliyetleri gerekmektedir (Arvas, 2012; Dowdy & D'souza, 2020; CDC, 2020; Fine, Eames & Heymann, 2011; Public Health England, 2020).

3. FARKLI BÖLGELERDEKİ AŞILAMA ORANLARINA GENEL BAKIŞ AÇISI

Amerika bölgesinde 2019 yılında 23.279 kızamık vakası görüldürken 2022 yılında bu sayının 167 vakaya gerilediği bildirilmiştir. Bununla birlikte, kızamık ilk doz kapsama alanı azalma meydana gelmiştir ve 2021 yılında bölgedeki aşılanmamış çocuk sayısının 1,7 milyon olduğu bildirilmiştir. Bölgedeki 35 ülkenin tamamı kızamıkçık eliminasyon statüsünü, 32'si ise kızamık eliminasyon statüsünü koruduğu bildirilmiştir (WHO, 2023).

Afrika bölgesinde 2015'ten bu yana kızamık ilk dozu kapsamı durağanlaşmıştır. 2021 yılında kızamık ilk dozu kapsamı nerdeyse yarısında %80'in altındaydı bölgedeki 47 ülke arasındadır. Kızamık ikinci dozu kapsamı ise artmıştır ancak sadece %40 civarındadır (WHO, 2023). Doğu Akdeniz Bölgesinde bölgesel kızamık ilk dozu kapsamı sadece hafif bir düşüş göstermiştir ayrıca, Covid-19 Pandemi sırasında, bölgedeki 22 ülke ve bölge arasında ve içinde önemli farklılıklar görülmüştür. 2021'de tahminen 4 milyon çocuk kızamığa karşı koruyamadığı tahmin edilmiştir (WHO, 2023). Avrupa'da bölgesel kızamık ilk dozu kapsamı 2021 yılında sabit kalırken, iyileşme bölgedeki 53 ülke arasında ve içinde dengesiz olmuş ve farklı gelir düzeylerine sahip olan ülkelerde önemli sayıda aşılanmamış veya eksik aşılanmış çocukla sonuçlanmıştır (WHO, 2023).

Güneydoğu Asya Bölgedeki 11 ülkenin 5'inde kızamık eliminasyonu doğrulanmış olsa da, bölge genelinde eliminasyon hedefine planlandığı gibi 2023 yılına kadar ulaşılması pek olası değildir. Kızamık ilk dozu kapsamı 2020 yılında azalmadan önce 2019 yılında zirve yapmıştır ve iyileşme düzensiz olmuştur. (WHO, 2023). 2022 yılında Batı Pasifik 37 bölgesinin 8 içinde, kızamığın ortadan kaldırıldığı doğrulanmıştır ve kızamıkçık eliminasyonu 7 ülkede doğrulanmıştır. 2020 ile 2021 arasında kızamık kapsamı birçok ülkede azalmıştır ve bölge ülkelerinde kızamık vakasını kaydedildiğini sonuçlanmıştır (WHO, 2023).

Türkiye'de kızamık ilk doz içeren kapsamı 2019 yılına kadar artış görüldürken, ülke genelinde ikinci doz içeren kapsamı düşük olduğu kaydedilmiştir. Aşağıdaki tablolar Türkiye'deki 2009 ile 2019 arasında kızamık içeren karşılaştırılmış kapsamı göstermektedir (Muzaffer ve Bahar, 2021).

Tablo 1. Türkiye'de Kızamık ilk doz İçeren kapsamı

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
DSÖ-UNICEF tahmini	97	97	98	96	98	94	97	98	96	96	97
Resmi bildirim DSÖ-UNICEF	97	97	98	96	98	94	97	98	96	96	97
Aşı Uygulayıcı Anketi	97	97	98	96	98	94	97	98	96	96	97

(Muzaffer ve Bahar, 2021).

Tablo 2. Türkiye'de Kızamık 2. doz İçeren kapsamı

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
DSÖ-UNICEF tahmini	88	91	86	85	98	88	86	85	86	87	88
Resmi bildirim DSÖ-UNICEF	88	Uygun değil	86	Uygun değil	98	88	86	85	86	87	88
Aşı Uygulayıcı Anketi	88	91	86	85	90	88	86	85	86	87	88

(Muzaffer ve Bahar, 2021).

4. BAĞIŞIKLAMA HALK SAĞLIĞI ÜZERİNDEKİ ETKİSİ

Aşılama bilimsel çalışmaları ilk olarak William Jenner tarafından başlanmıştır ve 1796 yılında çiçek aşısı geliştirilmiştir. Benzer bir şekilde 1885- 1897 yılları arasında kuduz, veba, kolera ve tifo aşısı geliştirilmiştir (Altun, 2008; Danova, Salek, Kocourkova & Celko, 2015). Küresel olarak uygulanan aşılama faaliyetleri sayesinde çoğu bulaşıcı hastalıkların görülme sıklığı azalma meydana gelmiştir. Örneğin çiçek hastalıkların ortadan kaldırılması, vahşi poliomiyelit salgınlarının görülmemesi, kızamık enfeksiyonlarının eliminasyonu tıp tarihine geçen en önemli başarılar olarak sayılabilir (Clark, 2003).

Bağışıklama bir şekilde büyük küresel halk sağlığı başarı öykülerinden biri olarak kabul edilmektedir ve çocukların gereksiz ölüm, bulaşıcı hastalıklar ve sakatlıklardan korumak için temel sağlık hizmetleri. Genişletilmiş Bağışıklama Programı (GBP), difteri, tetanos ve boğmaca, çocuk felci, kızamık ve tüberküloza karşı rutin bağışıklama yoluyla çocuk sağlığını korumak için 1974 yılında küresel olarak kurulmuştur. Ancak on yıl önce yüz binlerce insan, Avrupa Bölgesindeki çocuklarda her yıl bu hastalıkların morbidite oranı yüksektir (WHO, 2005). Yirminci yüzyılda yaşam beklentisinin artması, büyük ölçüde aşılamaya bağlı olarak bulaşıcı hastalıklardan kaynaklı ölüm oranlarının azalması, dolayısıyla çocukların hayatı kalması ile ilgili gelişmelerden kaynaklanmaktadır (Health People, 2020).

5. BAĞIŞIKLAMA HİZMETLERİNDE ENGELLER VE ZORLUKLARI

Aşılama aracıyla hastalıklardan kaynaklı morbidite ve mortalitenin önlenmesi, yirminci yüzyılın en önemli halk sağlığı kazanımlarında biridir (Black ve Rappuoli, 2010). Küresel bağışıklama programları; tetanoz, boğmaca vb. hastalıklardan her yıl 2-3 milyon ölümü önlenmektedir. Ayrıca bu ilerlemeye rağmen dünya genelinde, her yıl yaklaşık 20 milyon bebek dahil olmak üzere, çok fazla sayıda aşılanmamış bireyler

bulunmaktadır. Hatta bazı ülkelerde gerileme göstermeye başlamıştır (WHO, 2021b). Türkiye'de 1981 yılında başlatılan GBP kapsamında başarılı aşılama faaliyetleri nedeniyle Çocuk felci eradik edilmiştir ve yenidogan tetanozu elimine edilmiştir (Sağlığı Bakanlığı, 2020). Ancak hiç aşılanmamış çocuk yüzdesinde yıllara göre artış olduğu bildirilmiştir (Türkiye Nüfus ve Sağlık Araştırması, 2009). Aşılama oranlarının azalması, aşı ile önlenebilir hastalıkların artmasının sebepleri arasında aşı tereddüdü yer almaktadır. Aşıların her yıl milyonlarca insanın hayatını kurtardığına dair önemli ve ikna edici kanıtlar olmasına rağmen aşı tereddüdü artış meydana gelmiştir (Black ve Rappuoli, 2010). Dünya Sağlık Örgütü'ne göre, küresel sağlığa yönelik tehditler arasında aşı tereddüdünü sıralamıştır (WHO, 2021). Aşı tereddüdünün nedenleri arasında; dini nedenler, kişisel inançlar/felsefi nedenler, güvenlik endişeleri, Yan Etkiler, Aşıların zararlı olması, Aşı İçeriğine Güvenmeme, Aşıların yurtdışı kaynaklı olması gibi yer almaktadır (McKee ve Bohannon, 2016; Muzaffer ve Bahar, 2021). Bunlara yönelik aşıların güvenilirliği, aşı yan etkiler, aşıların yararları hakkında iletişim ve eğitim önemli rol taşımaktadır (Black ve Rappuoli, 2010).

6. COVID-19 PANDEMISİNIN BAĞIŞIKLAMA HİZMETLERİNE ETKİSİ

Covid-19 salgını ortaya çıktığında dünyada dikkat çekmiştir. Hemen birinci basamak sağlık hizmetlerinde aksamalar meydana getirmiştir. Bu sırada kızamık salgıları ortaya çıkması dolayısıyla ekonomik hasarı, morbidite ve mortalite oranları şiddetlendirmektedir. Dünya genelinde çocuk aşılama faaliyetlerinde önemli aksama meydana gelmektedir (WHO, 2020; Türk Toraks Derneği, 2020). Hindistan'da Mart 2019 ile Mart 2020 arasında çocuklara kızamık, kabakulak ve kızamıkçık aşılamasında %69 azalma olduğu belirtilmiştir (Cash vd., 2020). DSÖ ve UNICEF'nin verilerine göre Covid-19 pandemisi nedeniyle kaynaklı rutin aşılama programlarının aksama meydana geldiği için küresel olarak 80 milyonun üzerindeki çocuğun kızamık, difteri ve çocuk felci gibi hastalıklara karşı risk altında olduğu bildirilmiştir ve çocuk felci, kızamık aşısı kampanyaları olumsuz etkilenmiştir (UNICEF, 2020).

7. BAĞIŞIKLAMADA HEMŞIRELERİN ROLÜ

Bireyler, aileler ve toplumun sağlığının korunması ve geliştirilmesinde sorumlulukları dışında hemşirelerin bağışıklama faaliyetlerinde önemli rolleri vardır. Öncelikle bağışıklama ile ilgili güncel aşı uygulamaları bilgilerine sahip olmalıdır (Sağlık Bakanlığı, 2018; Türk Hemşireler Derneği, 2013; Özüm ve ark, 2021). Hemşireler; yaş dönemlerine göre özgü aşılar, özellikle gruplara yapılan aşıları, aşıların özellikleri, her aşının uygulama yöntemleri, yan etkilerini aşı uygulamanın kontrendikasyonunun varlığı sorgulanmaktadır. Aşılama faaliyetleri, herhangi bir sağlık bakımı almak için sağlık kurumlarına/ gezici sağlık hizmetlerine başvuranların aşılanma durumu kontrol edilmelidir, aşı takvimine göre aşılanması gereken aşılarının tamamlanmasını sağlamaktadır (WHO, 2017b).

8. SONUÇ

Bağışıklama, hastalıkların önlenmesinde ve küresel halkın sağlığının korunmasında hayatı bir rol oynamaktadır. Ancak, elde edilen başarılarla rağmen, dünya çapında bağışıklama durumu birçok zorlukla karşı karşıyadır. Aşılarla erişimdeki eşitsizlikler, aşı tereddüdü ve sosyo-ekonomik ve coğrafi eşitsizlikler, aşılama kapsamı ve önlenebilir hastalıkların önlenmesi üzerinde etkilidir. Bağışıklama durumunu iyileştirmenin toplu bir hedef olduğunu kabul etmek çok önemlidir.

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HASTALARDA GÖRÜLEN BEKLENMEDİK SEMPTOMLARDA (AĞRI, ANKSİYETE VE UYKU BOZUKLUĞU) AROMA TERAPİNİN ETKİSİ

***UNEXPECTED SYMPTOMS IN PATIENTS (PAIN, ANXIETY AND SLEEP
DISORDER)***

EFFECT OF AROMA THERAPY

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Özet

İnsanlar hastalandıklarında ilk başvurdukları ya da akıllarına ilk gelen şey ilaç alarak iyileşmektir. Ancak hastalıkların bazıları ilaçlarla ancak tedavi edilebilirken, bazıları ise ilaç kullanmadan tedavi edilebilir niteliktedir. Hastaneye başvuran hastalar gözlemlendiğinde genel olarak en büyük sıkıntılarının ağrı, anksiyete ve bunların en büyük alt dalı olan uykusuzluk olduğu görülmektedir. Son yıllarda istenmeyen bu ve benzeri komplikasyonların sadece ilaç yerine aroma terapi yöntemleri ile de başarılı şekilde tedavi edilebileceği görülmeye başlanmıştır. İlk aromatik tedavi olan lavanta yağı günümüzde yan etkisi en az, maliyeti ucuz, kullanım kolay ve çok yönlü olması nedeniyle çok tercih edilmektedir. Maliyetin azlığı, multimodal kullanımı, yan etki azlığı gibi nedenlerle aromaterapi çok popüler bir alan olmaktadır. Aromaterapi kendi alanı dışında diğer (sanal gerçeklik, müzik terapi vs.) alanlarda kombine olması ve uyumu çok büyük avantajlar sağlamaktadır. Yapmış olduğumuz bu çalışmada PUBMED, DERGİ PARK, Science Direct vs. veri tabanlarından 2015 ten bu yana olan çalışmalar ele alınmış daha eski yıllara atıflarda bulunulmuştur. Hemşirelik bakımında çok değerli ilerlemeler ve hastalara konforlu bir bakım sağlayan bu esansiyel yağların öneminden ve kullanım şekillerinin nasıl olması gereği örneklerle açıklanmaya çalışılmıştır.

Anahtar Kelimeler: Aroma terapi, hastalık, tedavi, veri tabanı

Abstract

When people get sick, the first thing they resort to or the first thing that comes to their mind is to get better by taking medicine. However, some diseases can only be treated with drugs, while others can be treated without medication. When the patients admitted to the hospital are observed, it is seen that their biggest problems are pain, anxiety and their biggest sub-branch, insomnia. In recent years, it has been seen that these and similar complications can be successfully treated with aromatherapy methods instead of just drugs. Lavender oil, which is the first aromatic treatment, is preferred because it has the least side effects, cheap, easy to use and versatile. Aromatherapy is a very popular field for reasons such as low cost, multimodal use, and less side effects. The combination and harmony of aromatherapy in other fields (virtual reality, music therapy, etc.) outside its own field provide great advantages. In this study we have done, PUBMED, DERGİ PARK, Science Direct etc. Studies from the databases since 2015 were discussed and references were made to earlier years. The importance of these essential oils, which provide very valuable advances in nursing care and comfortable care for patients, and how they should be used are tried to be explained with examples.

Keywords: Aroma therapy, disease, treatment, database

GİRİŞ

Tamamlayıcı sağlık uygulamaları; hastaların yaşam konforunu artırmak, tam iyilik haline eriştirmek amacıyla çeşitli hastalıkların tedavisinde veya komplikasyonunda yaygın olarak kullanılır. Bu uygulamaların en önemlilerinden birisi de aromaterapi oluşturmaktadır (Baltacı ve Deniz, 2019). Uçucu yaqlarda bulunan kimyasallar vücuta uygulandığında emilerek veya inhalasyon yolu ile dolaşım ve sinir sistemine etki ederek fiziksel ve psikolojik etkiler göstermektedir. Bu uygulanan metot da lavanta, melekotu, papatya, sardunya, çay ağacı, limon vb. yaqlar kullanılmıştır (Berman ve ark., 2016; NCCIH, 2020). Aromatik tedavide yaqlar bazen tek başına kullanılırken bazen de karışım şeklinde uygulama yapılmıştır. Yapılan araştırmalarda ise en çok kullanılan aromatik yağı (%78,9) lavanta olduğu gözlenmiştir (Kasar, 2018, Ovayolu ve ark. 2014). Lavanta yağı tek başına uygulanırken bazı çalışmalarda karışım halinde uygulanmıştır (Ovayolu ve ark. 2014; Nikjou ve ark., 2018, Lavender, 2022).

Ovaoğlu ve ark. (2014) meme kanseri kadınlarında, yaptıkları randomize kontrollü çalışmada %90 oranında tatlı badem yağına, %2 lavanta, %2 nane, %2 papatya, %1 yasemin, menekşe, yasemin, biberiye yağı ekleyerek hazırladığı karışımı masaj ve inhalasyon yoluyla uyguladıkları aromaterapinin fiziksel semptomları ve ağrıyi azaltmada etkili olduğu gösterilmiştir (Ovayolu ve ark. 2014).

Nikjour ve ark. (2017) İranda 2013-14 yıllarında 100 menopozlu kadında çift kör-çapraz klinik çalışmada. Rastgele ikiye ayrılan 45-155 yaş aralığındaki kadınların deney grubuna lavanta ve kontrol grubuna seyreltilmiş süt 12 hafta boyunca her gün 20 dk koklatılmıştır. Müdahale sonrası kiyas yapıldığında lavanta yağı kullanılan deney grubunun kontrol grubuna göre menopoz semptomları anlamlı derecede azalmıştır (Nikjou ve ark., 2018).

Aroma terapi sağlık alanında çok farklı şekillerde ve sahalarda uygulanabilmektedir. Bunları şu şekilde sıralamak mümkündür (Baltacı, 2022);

- Enfeksiyon tedavisinde
- Uykusuzluk tedavisinde

- Bulantı ve kusma hastalığının giderilmesinde
- Ağrı ve inflamasyonun azaltılması ya da giderilmesinde
- Yaşlı bakımı sorunlarının giderilmesi ya da azaltılmasında
- Endokrinolojik sorunların giderilmesinde
- Yaşam sonu bakım sorunlarının giderilmesinde
- İmmünolojik sorunların giderilmesinde
- Pediatrik sorunların çözümünde
- Psikiyatrik sorunların çözümüne yardımcı olabilmesinde
- Solunum sistemi sorunlarının giderilmesinde
- Yoğun bakım sorunlarının azaltılmasında

LAVANTA YAĞI İLE AROMATERAPİNİN AĞRI VE ANSIYETEYE ETKİSİ

Lavanta (*lavandula sp.*), Lamiaceae familyasından çok değerli bir uçucu yağ bitkisidir. Lavanta (*lavendula angustifolia*) çiçekleri, yaprakları ve yağı linaoil asetat, linalool, perilil alkol, sineol gibi 100'den fazla bileşik içerir. Çoğu Akdeniz kökenli 39 lavanta türü vardır. Dünyada sıklıkla üç tür kullanılır. Bunlar; Lavandin (*Lavandula Intermedia Emeric ex Loisel*, *Lavandula hybrida*), Lavander (*Lavandula angustifolia*, *Lavandula Officinalis*) ve Spike lavander (*Lavandula spica*). Lavanta preparatları anksiyete, uykusuzluk, ağrı ve çeşitli diğer durumlar için, genellikle aromaterapi için kullanılmıştır (Lavender, 2022). Yapılan çalışmalarla aromaterapide en çok kullanılan aromatik yağı lavanta olduğu ve lavanta ile yapılan uygulamaların %60 inhalasyon şeklinde uygulandığı izlenmiştir. Bu yöntemlerle kişilerin ağrı, anksiyete ve semptomlarında anlamlı iyileşme görülmüştür (Ovayolu ve ark. 2014; Zorba, 2016, Taşan, 2018).

Imura ve ark (2006)' in çalışmasında, doğum sonrası annelere doğumun 2. gününden itibaren her gün 30 dk uygulanan aromaterapi masajının fiziksel ve ruhsal durumu olumlu etkilediği, annenin fiziksel değişikliklerini daha kolay kabullendiği ve anne-bebek arasındaki etkileşimi kolaylaştırdığı bulunmuştur.

Özdemir ve Akyol (2021), 20 Ağustos – 30 Eylül 2019 tarihleri arasında fistül girişimi için lavanta aromaterapisi etkisi ölçülüyor. Bu çalışma randomize kontrollü ve deneyel tipte bir çalışma olup 90 hasta üzerinde yürütülmüştür. Araştırma öncesi puan ortalaması deney grubu 57,58 iken, kontrol grubunun 48,53 olduğu kaydedilmiş. Lavanta yağı sonrası deney grubu ağrı puanı 22.66 hatta topikal uygulama ile 16.33 e kadar inerken. Kontrol grubunda ise yalnızca 45,33'e kadar azalma görülmüştür.

Soltani ve ark. (2013) yaptıkları çalışmada tonsillektomi ameliyatı olmuş 6-12 yaş aralığında pediatrik hasta üzerinde randomize kontrollü deneyde postoperatif asetaminofen ihtiyacı incelenmiştir. Çalışmaya toplam 48 pediatrik hasta dahil edildi. Hastalar rastgele kontrol ve deney grubu olarak ikiye ayrılmış. Deney grubuna asetaminofen yanında lavanta aromaterapisi uygulanırken, kontrol grubuna sadece asetaminofen uygulanmıştır. Yaşı ortalaması 7,66 olan hasta grubunda tonsillektomi sonrası lavanta yağı kullanan deney grubunda asetaminofen ihtiyacı azalırken, kontrol grubunda ihtiyaç değişmediği gözlemlenmiştir.

Çetinkaya ve Başbakkal (2012)' in çalışmasında, bebeklere koliğin başlamasından itibaren 20 ml bademyağına 1 damla lavanta yağı damlatılarak hazırlanan solüsyonun 1 mililitresi ile 5-15 dk el ile karın masajı uygulanmış, bebeklerde koliğin giderilmesinde aromaterapi masajının etkili olduğu görülmüştür.

Lavanta yataştıracı, duygusal anlamda sakinleştirici, analjezik, antiseptik özelliklere sahiptir ve aynı zamanda orta derece depresyon üzerinde etkinliği ispatlanmıştır. Lavanta, stres yönetiminde anksiyete ve insomniayı azaltma etkisi yanı sıra uyku kalitesine etkisine tercih sebebidir. Parasempatik sinir sistemini stimüle edebilir (Öz, 2020). Lavanta yağı inhalasyon yolu ile uygulandığında anksiyeteyi azalttığı gibi masaj yolu ile de çok etkili olduğu çalışmalarla kanıtlanmıştır (Öz, 2020; Beyiklioglu, 2018; Stanley, 2019).

Beylikoğlu ve Arslan (2018) meme cerrahisin uygulanacak hastalara lavanta yağıının ameliyat öncesi anksiyete üzerinde etkisini incelediği araştırmada; 40 hastaya ameliyat sabahı üç, beş damla lavanta yağı (*Lavandula angustifolia* miller *oleum*) damlatılmış gazlı bez 20 dk boyunca soluması sağlanmış. Bu kontrol grubu hastalara bu işlem dışında diğer uygulanmayan gruptan farklı herhangi bir işlem yapılmamıştır. Lavanta yağı koklatılan bu grupta ameliyat öncesi anksiyete düzeyleri anlamlı düzeyde azaldığı bildirilmiştir.

Stanley ve ark. (2019) yaptıkları çalışmada katarakt cerrahisi uygulanacak hastalara lavanta yağıının koklatılmasının ameliyat öncesi anksiyeteye etkisi araştırılmıştır. Araştırmada; yetişkin yaş ortalaması 58 olan 78 hasta rastgele iki gruba ayrılmış deney grubuna 20 dk boyunca lavanta yağı koklatılmış, diğer kontrol grubuna ise normal klinik prosedür uygulanmıştır. Deney grubu lavanta yağı koklayarak ameliyattan önce anksiyetede anlamlı azalma olduğu bildirilmiştir.

Çalışmalar lavanta yağıının ağrı ve anksiyete ye olumlu etkilerinin ispatlandığı gibi bu hastalarda uyku düzeni ve yaşam kalitesi de belirli oranda arttığı izlenmiştir. Ayik (2016) yaptığı çalışmada; ameliyat öncesi dönemde aromaterapi masajının anksiyete ve uyku kalitesine etkisi incelemiştir. Ameliyat öncesi 19.00-21.00 tedavisinde ve sabah 06.30-08.00 tedavisinde %5'lik lavanta yağı masajı yapılmıştır. Yetişkin 80 kolorektal cerrahi geçirecek hasta rastgele 2 gruba ayrılmıştır. Kontrol grubuna masaj ve rutin prosedürler uygulanırken, diğer gruba rutin prosedürle uygulanmıştır. Ameliyat öncesi lavanta yağı uygulanan deney grubunda masajın anksiyeteyi önemli miktarda azalttığı ve uyku kalitesinin yükseldiği ifade edilmiştir (15).

Kamalifard ve ark., (2018) menopoz dönemi ağrı sorunu ile gelen hastaların uyku kalitesi in yaptıkları randomize çalışmada lavanta ve acı portakal tozunun uyku kalitesine etkisi ölçülmüş. Çalışmada; her biri 52 kişiden oluşan üç gruba 8 hafta 500 mg lavanta çiçeği tozu, 500 mg acı portakal tozu ve bir miktar nişasta verilmiş. Nişasta verilen grupta hiçbir değişiklik olmazken acı portakal ve lavanta tozu verilen hastaların uyku düzeni anlamlı iyileştiği gözlemlenmiştir.

Esansiyel yağların kullanımı hemşirelik bakım felsefesi, etik kuralları ve ilkelerine uygun olması sebebiyle, hasta bakımını geliştirmek ve mesleği güçlendirmek amacıyla hemşireler tarafından kullanılmaktedir (Bilgiç, 2017). İlk olarak Flörence Nightingale Kırım savaşında yaralı ve korkan askerler iyileştirmek, sakinleştirmek ve anksiyeteyi azaltman için alınlarına lavanta yağı kullanmasıyla başlamıştır (Gnatt ve ark., 2016). Bu bağlamda modern tıp yöntemleriyle karşılaşamayan bakım gereksinimlerini tamamlayıcı yöntemler ile desteklemek hayli önem kazanmıştır. Hastalar klinik izlemde en çok şikayetleri ağrı, anksiyete ve bunlara bağlı semptomlar olduğu izlenmiş en çok da uykusuzluktan yakınmışlardır. Modern tıbbın yanı sıra hemşireler bakım olarak birçok aroma terapi tedavisi şeklinde başvurmuşlardır (Ali ve ark., 2015). Lavanta ise bu yöntemler içinde en az yan etkili olup ağrı ve rahatlamaya en etkili esansiyel yağdır (Johnson ve ark., 2016). Hemşireler yaptıkları bakım sonrası lavanta içindeki inhalar sedasyon etkisi yapan linaloolün analjezik ilaç kullanımını ve erken iyileşmeye yardımcı olduğunu ifade etmişlerdir (Farrar ve Farrar, 2020).

SONUÇ

Aromaterapide en çok kullanılan tür olan lavanta yağı tek başına ve kombine halde aynı zaman da hem masajla hem inhalasyon yolu ile kullanılan yan etkisi en az olan bileşendir. Uçucu olan bu yağ ulaşım, maliyet ve yan etkisi bakımından denenmesi gereken yöntem olmakta hızla ilerlemiştir. Yapılan çalışmalar ışığında anksiyete, ağrı, uyku kalitesine etkisi yüksek olması ve hoş kokusu bu yöntemi ön plana getirmektedir. Aromaterapi hemşirelik görevi olması nedeniyle hemşirelik bakımında kaliteyi önemli açıdan etkilemiştir. Hemşireler yan etki azlığı ve noninvaziv olması gibi nedenlerle aroma terapi kombinasyonunda çok çalışma yapmışlardır. Lavantanın birçok ispatlanmış etkileri yanı sıra ispatlanmayan etkileri de vardır ve alerjen etkisi azdır. Gerek sağlık alanında gerek sosyal hayatı çalışma devam etmektedir.

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HEMŞİRELİK EĞİTİMİNDE SİMÜLASYON UYGULAMALARININ ETKİNLİĞİNİN BELİRLENMESİ

*DETERMINING THE EFFICIENCY OF SIMULATION APPLICATIONS IN
NURSING EDUCATION*

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Özet

Teknolojik gelişmeler çok hızlı bir şekilde ilerlemeye devam etmektedir. Teknolojik gelişme çok yönlü olarak gelişirken aynı zamanda farklı alanlara kullanım kolaylığı sağlama nedeniyle tercih edilir olmaktadır. Teknolojinin etkin olarak kullanıldığı alanlardan birisi de sağlık sektörünün çok önemli yükünü taşıyan hemşirelik eğitimidir. Coğu hemşirelik öğrencisi yeterli uygulama alanını bulamadığından büyük oranda teorik bilgiye sahip olmakta ve etkin beceri kazanamadan mezun olmaktadır. İletişim ve motor becerilerini geliştirmeyi amaçlayan staj programları öğrenci yoğunluğundan ve hastaların zaman zaman gösterdikleri uyumsuz davranışlarından dolayı amacını ulaşamamaktadır. Bu durum hemşirelik öğrencilerinin eğitimi için bir problemdir. Bu problem sonucunda öğrenci hemşireler beceri geliştirmeden mezun olmaktadır. Bunun sonucunda ise yapabildikleri hemşirelik gayretleri de orantılı olarak sınırlanmaktadır. Bu çalışmada teknolojinin son yıllarda kullandığı simülasyon çalışmasının hemşirelik eğitiminde uygulanabilirliği üzerinde durulmuştur. Çalışmada simülasyon kullanımının sonuçlarını değerlendiren uygulamalar sistematik bir şekilde incelenmiş ve buna göre sonuçlar çıkarılmıştır. Çalışmaya hemşirelik öğrencilerinin bilgi-beceri, iletişim ve klinik karar vermesini değerlendiren çalışmalarla yer verilmiştir. Çalışmalar incelendiğinden genel olarak araştırmaların deneyel ve yarı deneyel tasarımları kullanıldığı saptanmıştır.

Anahtar Kelimeler: Simülasyon, teknoloji, hemşirelik, sağlık, eğitim

Abstract

Technological developments continue to progress very rapidly. While technological development develops in many ways, it is also preferred because it provides ease of use in different areas. One of the areas where technology is used effectively is nursing education, which carries a very important burden in the health sector. Since most nursing students cannot find enough practice, they have a large amount of theoretical knowledge and graduate without gaining effective skills. Internship programs aiming to improve communication and motor skills cannot reach their goals due to the density of students and the incompatible behaviors of patients from time to time. This is a problem for the education of nursing students. As a result of this problem, student nurses graduate without skill development. As a result, their nursing efforts are limited proportionally. In this study, the applicability of the simulation study, which has been used by technology in recent years, in nursing education has been emphasized. In the study, the applications evaluating the results of the use of simulation were systematically examined and it was tried to draw conclusions accordingly. The study included studies evaluating nursing students' knowledge-skills, communication and clinical decision making. When the studies were examined, it was determined that the experimental and quasi-experimental designs of the studies were used in general.

Keywords: *Simulation, technology, nursing, health, education*

GİRİŞ

Hemşire, bireysel ve toplumsal olarak insanların sağlık düzeyini yükseltmek, korumak ve hastalık halinde tam bir iyileşme sağlamak için çalışan ve bu konuda çeşitli roller üstlenen sağlık profesyonelidir. Hemşirelik biliminin rolleri ve görevleri zaman içinde değişime uğramıştır. Hemşirelik rolleri; önceden sadece tedavi ve bakım yapmaktan ibaret iken şu an hastaların tedavi ve bakımından ayrı savunuculuğunu yapmak, sağlığını korumak, sürdürmek ve yükseltmek, eğitim vermek, onları rehabilite etmek gibi roller üstlenmiştir (Şendir ve ark. 2018). Bu rolleri üstenden hemşire, eğitimini birbirini tamamlayan teorik ve uygulama bölümlerinden oluşturmaktadır. Klinik uygulamalar hemşirelik eğitiminin önemli bir bölümünü oluştursa da öğrenciler çoğunlukla teorik bilgisini uygulama becerisine dönüştüremeden hastanede kliniğe çıkmaktadır (İbrahimoğlu ve ark. 2019).

Hastanede kliniğe çıkmadan önce ise okulda uygulama dersleri kapsamında cansız maketlerde veya gönüllük esasıyla kendileri üzerinde bu uygulamaları denemektedir. Bu uygulama yöntemlerinde öğrenci etkin beceri geliştiremez ve gerçek hastaya uyguluyormuş gibi hissedemez böylece gerçeklik algısı zayıf olur. Gerçeklik algısı zayıf olan öğrenci gerçek hastaya birebir kaldığında ise stres yaşar. Böylece etkin beceri geliştirilmeden hastanede kliniğe çıkan hemşirelik öğrencilerinde öz güven eksikliği, uygulama yaparken isteksiz olmak ve yeterli deneyim kazanamama gibi sorunlarla karşılaşılır. Hastalar ise zaman zaman bu durumdan şikayetçi olup hemşirelik öğrencilerinin işlem yapmasına izin vermemektedir (Sezer ve Orgun, 2017). Klinik deneyim yaşamak öğrencilerin gözlem yapmasına olanak sağlar olası olaylara verilen tepkileri izleyerek kendilerine rol model oluşturabilir fakat sadece gözlem yapmak öğrencilerin yaşadıkları klinik deneyimi sınırlar ve uygulama becerileri geliştirilmez. Bu şekilde eğitim gören öğrenciler mesleğe başladıklarında uyum sağlayamaz ve hastalar üzerinde yapılabilecek olası hatalar artmış olur (Takoğlu ve ark. 2020). Yapılan hemşire kaynaklı hataları inceleyen bir araştırma sonucunda eğitim standartlarına teknolojinin dahil edilmesi ile hataların önleneneceğine degenmişlerdir (Sweeney et al., 2017). Buna karşılık yapılan başka bir araştırmada ise 2025 yılının hemşirelerinin eğitim alanının çok farklı olacağını ve teknolojinin etkisinin bu konuda büyük olacağı vurgulanmıştır. (Risling, 2017).

Teknolojinin gelişimi, simülasyon uygulamalarının hemşirelik eğitimine entegre edilebilmesine olanak sağlamıştır. Simülasyon ise genel tanımıyla gerçeğe yakınlık demektir. Hemşirelikte kullanılan simülasyon ise hasta güvenliği teriminin yaygınlaşmasıyla ortaya çıkmıştır. Amaç kendine güvenen teorik bilgisini uygulamayla birleştirmiş hatalarından ders çıkarmış tecrübeli öğrenciler yetiştirmektir (Aebersold,2016). Ayrıca bu uygulamalar klinik deneyimde stres yaşayan öğrencilerin psikososyal yönünü de güçlendirmiş ve simülasyona dayalı eğitimin öğrencilerin psikolojik güvenlilik oranını artttığı tespit edilmiştir (Daniels et al.,2021). Buna benzer yapılan bir çalışmada ise klinik simülasyon eğitimi verilen öğrencilerin stres faktörlerinin olumlu yönde iyileştiğini ve kendilerine eleştirel bakabildiklerini tespit edilmiştir (Ayhan ve ark. 2019). Çalışmalarda görüldüğü gibi öğrencinin stres faktörleri azaldığından öğrenci hastalar ile daha yakın iletişimde geçebilir. Bununla birlikte hemşirelik hastalara duyulan empati duygusuyla onları rehabilite etmek ve bu şekilde anksiyete varlığını azaltmak gibi rolleri de vardır (Daniels et al.,2021). Bu roller teknolojik gelişmelerden önce sınıf ortamında yapılan rol-play tekniğiyle kazandırılmaya çalışılmaktaydı. Fakat Rol-play uygulaması öğrencide tam olarak gerçeklik algısı yaratamaz. Yapılan bir araştırma sonucunda rol oynama senaryolarının öğrencilerin toplumsal cinsiyet algısı ile çatışma ve şiddete yönelik farkındalıkları üzerinde etkili olmadığı saptanmıştır (Kılınç ve ark. 2021). Bu çalışmaya karşılık yapılan başka bir çalışmada ise hemşirelik öğrencilerinde yaşlı yetişkinlere yönelik empatiyi geliştirmek için simülasyon tekniği kullanılarak o olay durumunun içindeymiş gibi hissettiklerinden empati duygusunu geliştirdiklerini ayrıca öğrencilerin tutum ve davranışlarında olumlu iyileşmeler olduğunu tespit etmişlerdir (Fernandez et al.,2022).

Hemşirelik öğrencilerinde beceri geliştirmek için öğrenci tarafından yapılan ilk deneyimin simülasyon üzerinde olması tekrarlı denemeleri kolaylaştırmış öğrencinin deneme yanlış yoluyla hatalarından ders çıkararak öğrendiği becerisinin kalıcılığı arttırlılmıştır. Sanal ameliyathane ortamında eğitim gören öğrenciler ile yapılan bir çalışmada öğrencinin klinik öncesi öz yeterliliğini artttığı tespit edilmiştir (Francis et al.,2020). Benzer bir çalışmada simülasyon uygulaması ile kardiyopulmoner resüsitasyonu dersi alan öğrencilerin etkin bir şekilde uygulama becerisi geliştirdiğine degniilmiştir. (Boudiche et al.,2020). Sanal gerçeklik simülatörü kullanılan başka bir çalışmada ise öğrenmesi zor olan tekrarlı deneyim gerektiren cerrahi prosedürleri öğretmek daha hızlı ve daha kalıcı bir şekilde beceri kazandırdığı görülmüştür (Barcq et al.,2019).

Simülasyon uygulamaları ile yapılan çalışmalarda görüldüğü gibi öğrenci klinik deneyim yaşamadan ve mezun olmadan önce simülasyon eğitim tekniğiyle etkin bir şekilde beceri kazanmış olmaktadır. Sağlık bilimi bu motor becerilerin yanında problem çözme becerisi ve olay anında hızlı düşünüp hareket edebilmesini gerektirir fakat sağlık biliminin teorik kısmı anlatılırken öğrencinin sık karşılaşamayacağı vaka türlerini anlatmak ve bu konuda yeterlilik kazanmasını sağlamak zordur. Gerçek hayatı bu vakalar ile karşılaşınca ise öğrencinin çözüm becerileri zayıf olduğundan gerekli tıbbi bakımı veremeyebilir. Simülasyonda ise bu vakalara çeşitli ek senaryolar eklenerek çeşitlendirilebilir ve bu şekilde öğrenci olabilecek vakalara karşı tüm becerilerini geliştirebilir. Bu konuya desteklemek için yenidoğanlar ile yapılan bir çalışmada hemşirelik öğrencilerine yenidoğanlarda olusabilecek seyrek görülen vakaları simülasyon eğitimi ile verildiğinde vaka karşısındaki öğrencinin çözüm becerilerinin geliştirildiği tespit edilmiştir (Smith et al.,2020). Benzer bir çalışmada ise yapay zekâ ile oluşturulmuş sanal ameliyathane ortamında ameliyathane personeline yangın senaryosuna uygun eğitim düzenlendiğinde öğrencilere gerçek bir yanında yapılması gerekenleri ve önlenebilir sorunları daha etkin bir şekilde anlatıldığını bununla birlikte olabilecek ve önlenebilecek bir olaya karşı öğrenciler hazırlanması sağlanmıştır (Qi et al.,2021).

Bugünün ve geleceğin birincil eğitim stratejisi olması beklenen simülasyon uygulamaları ile ilgi birçok çalışma mevcuttur ve bu çalışmaların sonuçları olumlu olup bütün araştırmacılar tarafından desteklenmektedir. Fakat simülasyon uygulamalarının maliyeti oldukça fazladır. Her öğrenci eşit gerçeklikte kaynaklara ulaşamaz. Tüm şartlar sağlansa bile simülasyon uygulama senaryoları, değerlendirmeleri ve puanlama sistemi geliştirilmelidir. Bu durum ise yeterli personel ihtiyacı karşılandığı takdirde gerçekleşmiş olur.

Birçok eğitim kurumu bu teknolojiye bu gibi nedenlerle erişemez fakat etkin beceri geliştirilmeden kliniğe çıkarılan öğrenciler uygulama yaparken kendini yetersiz hisseder ve bundan dolayı isteksiz olur bu şekilde eğitim gören öğrenci hemşire mezun olduktan sonra mesleğe başladığında zorlanır. Bu hemşirelik mesleği ve hasta güvenliği için bir problemdir. Bu problemin çözümü teknolojiyi kullanıp simülasyon uygulamalarının eğitime entegre edilmesiyle çözülebilir. Bu konuda yetkililere düşen görev ise üniversitelere gereken mali desteği vermeleridir (Marshal et al., 2020). Böylece her öğrenci eşit gerçeklikte eşit kalitede eğitim görüp hemşirelik mesleğinin kalite standartlarını yükseltirken verilen hasta bakım hizmeti ve hasta güvenliği üst düzeye çıkar. Böyle bir eğitim gören hemşire; kendine güvenir, olası olabilecek olaylara karşı dikkatli ve bilgili olur, hemşirelik becerisi ise tekrarlı denemelerin sonucunda deneyim kazandığından dolayı yüksek olur (Şendir ve ark. 2018; Marshal et al., 2020).

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MAKİNE ÖĞRENMESİ ALGORİTMALARINI KULLANARAK EKSİK VERİ TAMAMLAMA

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Özet

Veriyi bilgiye dönüştürme süreci, insanlık tarihi boyunca en önemli konularından birisi olmuştur. Oldukça zor olan bu süreçte, karşılaşılan en büyük sorunlardan birisi de veri setlerinde eksik değerlerin olmasıdır. Analiz edilmek üzere toplanan veri setlerinde, eksik olan değerlerin olması çok sık karşılaşılan bir sorundur. Veri setinin sağlıklı bir şekilde analiz edilebilmesi için eksik değerlerin yarattığı sorunlar ortadan kaldırılmalıdır. Literatürde bu sorunları çözebilmek adına, eksikliğin ve verinin türüne göre farklılık gösteren eksik veri tamamlama yöntemleri bulunmaktadır. Uygulamada, eksik olan değerler yerine, ilgili verinin ortalamasının atanması veya eksik olan verilerin yok sayılarak veri setinden çıkarılması, genel olarak kullanılan yöntemlerdir. Bu noktada, veri setinde yer alan eksik değerlerin oranı da oldukça önemlidir. Eğer bu eksiklik oranı, büyük sayılacak bir seviyede ise bu gibi yöntemler, veri setinin yapısını yani doğasını bozabilir. Bu sebeple, eksik veri tamamlama yöntemleri çok önemli bir konuma sahiptir. Bilgi teknolojilerinin gelişmesi ile birlikte makine öğrenmesi algoritmaları, birçok alanda olduğu gibi eksik veri tamamlamada da kullanılmaktadır. Bu çalışmada, literatürde geniş bir kullanım ağına sahip olan “Hitters” veri seti manipüle edilerek belli oranda eksiltilmiş ardından eksik değerler, ortalama atamanın yanı sıra en yakın k-komşu algoritması, random forest (rassal ormanlar) algoritması, amelia algoritması, stokastik regresyon gibi makine öğrenmesi algoritmalarıyla tamamlanmıştır. Eksik değerleri, bahsedilen yöntemlerle tamamlanarak ortaya çıkan tamamlanmış veri setlerinde, “Hitters” veri setindeki oyuncuların maçlarda gösterdikleri performans değerlerini ifade eden değişken, sınıf nitelik olarak atanarak veri madenciliği uygulamalarından biri olan sınıflandırma operasyonu yapılmıştır. Böylece eksik verilerin tamamlanma yöntemlerinin sınıflandırmaya olan etkileri gözlenmiş ve makine öğrenmesi algoritmalarının, ortalama atamaya göre anlamlı bir şekilde sınıflandırma işlemi performansının artırdığı görülmüştür.

Keywords: makine öğrenmesi, eksik veri tamamlama, veri madenciliği, sınıflandırma

Abstract

The process of transforming data into information has been one of the most important issues throughout human history. In this difficult process, one of the biggest problems encountered is the missing values in the datasets. It is a very common problem that there are missing values in the datasets collected for analysis. In order to analyze the dataset in a healthy way, the problems caused by missing values should be eliminated. In the literature in order to solve these problems there are lots of missing data imputation methods that differ according to the type of missingness and data. In practice, instead of missing values, imputing the average of the relevant data or removing the missing data from the data set by ignoring it are the methods used in general. At this point, the rate of missing values in the dataset is also very important. If this missingness rate is at a high level, such methods may disrupt the structure of the dataset. For this reason, missing data imputation methods have a very important position. With the development of information technologies, machine learning algorithms are also used in imputing missing data as in many areas. In this study, the "Hitters" dataset, which has a wide usage network in the literature, was manipulated to a certain extent and then missing values are imputed by mean imputation, as well as machine learning tools such as k-nearest neighbours algorithm, random forest algorithm, amelia algorithm, stochastic regression. Classification is one of the data mining applications, was carried out by assigning the variable, which expresses the performance values of players in the "Hitters" dataset, as a class attribute, in the imputed datasets, whose missing values were imputed by mentioned methods. Thus, the effects of the methods of missing data imputation on the classification were observed and it was seen that the machine learning algorithms significantly increased the performance of the classification process according to the average assignment.

Keywords: machine learning, missing data imputation, data mining, classification

1. GİRİŞ

İnsanlık tarihine bakıldığından, ilk başta hayatı kalmak, yemek bulabilmek gibi temel ihtiyaçların karşılanması adına insanların, yaşanılan çevreyi detaylı bir şekilde incelenerek o çevreye uyum sağlamaya çalışma amacı fark edilebilir. Bunun yapılabilmesi için insanlar etrafı inceleyerek veri sağladılar ve bu verileri görerek, izleyerek ve deneyerek tecrübe edenler. Bu şekilde, eldeki veriden hareketle ilgili konuda bilgi sağlayıp hayatlarına o bilgiyi entegre ederek yaşadıkları görülmektedir. Günümüz dünyasına geldiğimiz zaman, veriden bilgiye giden sürecin felsefesi aynı iken ilgili verileri elde etme, analiz etme ve bilgiye dönüştürme şekillerinde farklılıkların söz konusu olduğu görülmektedir. Bu durum, başta bilgi elde etmenin ve bunun hemen öncesinde veriyi işleyebilmenin ne kadar büyük bir öneme sahip olduğunu göstermektedir.

Veriyi analize hazır hale getirme sürecinde, veride yer alan birtakım problemler, sağlıklı bir analizin yapılamamasına neden olabilmektedir. Bunlardan birisi ve en geneli verilerde eksik değerlerin bulunmasıdır. İlgili veri setinin analiz edilebilmesi için bahsi geçen eksikliklerin üzerine eğilmek ve mümkün sınırlar çerçevesinde bu problemin ortadan kaldırılması gerekmektedir. Pratikte, en genel ve ilk akla gelen yaklaşımın eksik değerlerin olduğu verileri silmek diğer bir ifade ile yok saymak olduğu görülmüştür. Bu durum, veri setinin yapısının dolayısıyla karakteristik özelliklerinin farklılaşması, bozulmasını anlamına gelebilir. Bu nedenle, veri setindeki eksik değer oranı bu konuda bir ön fikir vermektedir. Yüksek sayılabilecek bir oranda eksik değer söz konusu iken eksik değerlerin olduğu verilerin silinmesi gibi bir yol izlenirse, tamamlanmış veri seti ile orijinal veri seti istatistiksel olarak karşılaştırıldığında neredeyse iki farklı veri seti ile karşılaşılabilir.

Bu noktada veri setinin genel özelliklerini taşıyan, veri setinin yapısını bozmayan bu anlamda uygun değerler ile eksik olan kısımlar tamamlanmalıdır. Belirtilen bu durumda, eksik verileri tamamlamak için birçok yöntem bulunmaktadır. Bu yöntemler, verinin özelliklerine göre farklılık göstermektedir. Örneğin; en çok tercih edilen temel yöntemlerden ortalama atama, medyan atama veya eksik değerlerin bulunduğu veri kayıtlarını silmenin yanı sıra makine öğrenmesi algoritmaları da eksik değerlerin tamamlanmasında kullanılmaktadır. Bu yöntemleri kullanarak verinin yapısına uygun bir şekilde eksik verilerin tamamlanması yapılmaktadır.

2. EKSİK VERİ VE TÜRLERİ

Yapılan araştırmalara bakıldığından eksik verilerin bulunması oldukça sık karşılaşılan bir durumdur. Var olan bu eksiklikler elbette birçok sebepten kaynaklı olabilmektedir. Bu noktada, eksik verilerin eksik olma sebeplerine dair bilgi edinip açıklama yapmak için istatistiksel ve matematiksel bir bakış açısıyla eksik veri türleri ortaya koyulmuştur. Bu türler, MCAR (Missing Completely at Random) tamamen rassal eksik veri, MAR (Missing at Random) rassal eksik veri ve MNAR (Missing Not at Random) ise rassal olmayan eksik veriler şeklinde üç başlık altında toplanabilmektedir.

MCAR: Verideki eksiklik, tamamen rassal olduğunda eksiklik mekanizması ile ilgili ihmali edilebilen bir durum söz konusu olmaktadır. Bunun nedeni, veri setindeki bir değerin eksik olma nedeninin gözlenen bir değerden veya diğer bir değişkene ait değerlerden bağımsız olmasıdır (Allison, 2009). Böyle bir durum var ise eksik verinin MCAR'dır. Anket çalışmalarında soruların eksik olması durumu örnek verilebilir. Bağımsızlık varsayımları çok önemlidir. Buradan hareketle, veri MCAR ise, eksik veriye sahip olmayan değişkenlerin, hedef kitlenin rassal bir örneği olduğunu belirtirilir. (Donders ve ark., 2006).

MAR: Veri eksikliği, verinin kendi aldığı değerlerden bağımsız iken var olan diğer değişkenlerin kontrol altında olduğu durumda, diğer değişkenlere bağlı olabilme durumunu ifade etmektedir (Schafer, 1997). MCAR'a göre nispeten daha zayıf sayılabilen bir varsayımdır. Soruları okumaktan sıkılan bir anket katılımcısının bazı soruları cevapsız bırakması örnek gösterilebilir.

3. MAKİNE ÖĞRENMESİ

Değişen ve gelişen teknolojinin etkisi, bilgi teknolojilerine de yansımıştır. Bu anlamda verinin elde edilmesi, saklanması, taşınması, analize hazır hale getirilip sonucunda bilgiye dönüştürülmesi sürecinde kullanılacak tüm yöntem ve gereçler yeni ihtiyaçlara da cevap verebilir nitelikte olmalıdır. Bu noktada, tanıtılan kavramlardan birisi de makine öğrenmesi kavramıdır. Makine öğrenmesi kavramı, bilgisayarların belirli bir görevi, insan müdahalesinden bağımsız ve doğrudan kodlanmadan yapabilmesine olanak tanıyan bir yapay zekâ dalı olarak tanımlanmaktadır (Bi ve ark., 2018). Bunun dışında, veri üzerinde istatistiksel ve matematiksel aksiyonları gerçekleştirip veriye ait örtüyü ortaya çıkarma ve bu örtüden hareketle geleceğe yönelik modelleme yapmaya dayanan yapay zeka aracıdır şeklinde tanımlanabilir (Brynjolfsson ve Mitchell, 2017). Makine öğrenmesini, öğrenme şekillerine göre çeşitli kategorilere ayırmaktadır.

· Gözetimli öğrenme (Supervised Learning): Bu yöntemde, bilgisayara öğretmek istediğimiz görev ve doğru sonuçları içeren etiketli veriler sunulur. Bu verileri kullanarak, bilgisayar, yeni verileri tahmin etmek için model oluşturur.

· Gözetimsiz öğrenme (Unsupervised Learning): Bu yöntemde, etiketlenmemiş veriler kullanılır ve bilgisayar bu verileri analiz ederek, kalıpları ve yapıları kendisi tespit eder. Bu yöntem daha karmaşık ve öngörelmemeyen sonuçlar verebilir.

· Yarı gözetimli öğrenme (Semi-supervised Learning): Bu yöntemde, bir kısmı etiketlenmiş ve bir kısmı etiketlenmemiş veriler kullanılır. Bu yöntem, gözetimli öğrenmenin getirdiği maliyet ve zaman sorunlarına bir çözüm olarak ortaya çıkmıştır.

· Takviyeli öğrenme (Reinforcement Learning): Bu yöntem, bir ajanın belirli bir ortamda öğrenmesine

dayanır. Ajan, belirli bir eylemi gerçekleştirek ortamın mevcut durumunu değiştirir ve bu durumda alacağı ödülü göre hareket eder. Ajanın amacı, ödülü maksimize eden bir strateji geliştirmektir.

Geniş bir çerçeveye sahip olan bu kavram, veri işleme, görüntü işleme, robotik, tıp, dil işleme, finans ve daha birçok alanda kullanılmaktadır. Bu anlamda, çalışma kapsamında kullanılan makine öğrenmesi yöntemlerine sonraki bölümlerde yer verilmiştir.

H. En Yakın k-Komşu Algoritması

En yakın k-komşu algoritması (K-nn), regresyon, sınıflandırma ve eksik veri tamamlama problemlerinin çözümünde kullanılan algoritmalardan biridir. Algoritma, bu çözümlemeleri yapmak için en yakınında bulunan k adet örneğin değerlerini, sınıflarını dikkate alarak operasyonu yapan benzerlik ve mesafe tabanlı bir algoritmadır (Zhang, 2016). Bunun için önce tüm veriler tanımlanır ve bir uzayda gösterilir. Ardından, mesafe olarak en yakın k adet örnek belirlenir. En yakın örnekler belirlenirken kullanılan mesafe ölçümünde Öklid, Manhattan ve Minkowski gibi uzaklık fonksiyonları kullanılmaktadır. Belirlenen örneğin özellikleri tahmin, sınıflandırma, regresyon ve eksik veri tahmini için kullanılır (Mahesh, 2020).

Öklid uzaklığı, Pisagor teoreminin 2 boyutlu uzayda uygulanması ile elde edilmektedir. Aşağıda Öklid uzaklığını belirten $d(i, j)$ fonksiyonu ifade edilmiştir.

$$d(i, j) = \sqrt{\sum_{k=1}^p (x_{ik} - x_{jk})^2} \quad (1)$$

Örnekler arası uzaklıkların mutlak değeri şeklinde ifade edilen uzaklık Manhattan uzaklığı olarak tanımlanmaktadır. Aşağıda bu uzaklık fonksiyonu belirtilmiştir.

$$d(i, j) = \sum_{k=1}^p |x_{ik} - x_{jk}| \quad i, j = 1, 2, \dots, n; k = 1, 2, \dots, p \quad (2)$$

P-adet değişken için örnekler arası uzaklık hesabında kullanılan bağıntı Minkowski uzaklığıdır ve aşağıdaki gibi tanımlanmaktadır. Aşağıdaki eşitlikte $m=1$ için Manhattan uzaklığı ve $m=2$ için Öklid uzaklığı elde edilmektedir.

$$d(i, j) = \left[\sum_{k=1}^p (|x_{ik} - x_{jk}|^m) \right]^{\frac{1}{m}} \quad i, j = 1, 2, \dots, n; k = 1, 2, \dots, p \quad (3)$$

I. Random Forest Algoritması

Makine öğrenmesinde yaygın olarak kullanılan Random Forest (RF) algoritması, en basit ifade ile birbirinden bağımsız veya düşük korelasyonlu birçok karar ağaçının bir araya getirilmesiyle oluşturulmuş bir karar ormanı topluluğu algoritmasıdır. İlgili karar ağaçları, yine ilgili veri setinden bootstrap yöntemi ile elde edilen örneklerden oluşturulur. Sınıflandırma, regresyon ve eksik veri tamamlama da sık kullanılan algoritmada, her bir karar ağaçının ilgili veri kaydının sınıfı belirlenir ve operasyon yapılır.

RF, öncelikle veriyi öğrenmek için birden fazla karar ağaçları oluşturur. Bu ağaçlar, verinin farklı alt kümeleri üzerinde eğitilir. Bu eğitim sırasında, her ağaç rastgele bir özellik alt kümelerini kullanarak en iyi karar ağaçını oluşturmaya çalışır. Bu nedenle, her ağaçın farklı bir baktır açısı ve özellikleri dikkate alması sağlanır. Karar ağaçları eğitildikten sonra, yeni bir veri örneği geldiğinde, her ağaç bu örneğin sınıflandırmasını yapar ve sonuçlar bir oyelama yöntemiyle birleştirilir. Bu sayede, her ağaçın veri kümelerindeki kusurlarının etkisi azaltılır, düşük sapmalar ve yüksek doğruluk oranları sağlanır (Tang ve Ishwaran, 2017). Ayrıca, veri kümelerindeki gürültüye ve eksik verilere karşı da oldukça dirençlidir.

RF'de m , en iyi bölünmeyi tespit adına düğüm başına kullanılan değişken sayısını, N , geliştirilecek ağaç sayısını göstermek üzere; eğitim veri setinin $2/3$ ü ön yükleme örnekleri elde edilir. Eğitim verisinin kalan kısmıyla da hatalar test edilir. Bu $1/3$ 'luk kısma aynı zamanda out of bag verisi de denilmektedir. Her düğümde değişkenler arasından m değişkenleri rassal olarak seçilerek değişkenler arasından en iyi dal tespit edilir. Sınıflandırma uygulamalarında, her yaprak sadece bir sınıfı giren sınıf elemanlarını içerecek şekilde oluşturulur. Regresyon uygulamalarında ise ilgili yaprakta çok az sayıda birim kalana kadar ilgili ağaçlar bölünmeye devam etmektedir.

J. Amelia

Amelia, eksik veri tamamlamada kullanılan sahip istatistiksel bir modelleme yapısıdır. Bu yapı, eksik veriyi tamamlarken otomatik olarak çoklu tamamlama yöntemleri kullanmaktadır. Eksik olan verinin doğal dağılımının analizi ile verinin eksik olma olasılığını ortaya çıkarmaktadır. Böylece ilgili bilgilerle istatistiksel olarak uygun yöntem ile eksik veri tamamlanmaktadır. Amelia algoritması, çok boyutlu veri yapılarında kullanılabilen farklı tamamlama yöntemlerini birleştiren bir yapıya sahiptir. İyi sonuçlar üretmesinin yanında araştırmacının, istatistiksel modelleme konusunda uzman olmasını gerektirmediği için ekstra bir kullanım sıklığına da sahiptir.

Amelia algoritması, bootstrap ve bekleni maksimizasyonu (EM) algoritmalarını kullanarak çoklu tamamlama yapmaktadır. Algoritma, eksik olan verinin tamamlanması için birden fazla tamamlama modeli uygular ve her bir modelde bootstrap ve EM algoritmasıyla tamamlanan eksik verinin ortalamasını alarak elde edilen sonuçları birleştirmektedir (Honaker ve ark., 2011).

Bootstrap kısaca, ilgili veriden örneklem çekme yoluyla yeniden örneklem yaparak örneklem dağılımı hakkında çıkarımların yapılmasını imkân veren bir yöntemdir (Doğan,2017). Amelia algoritması da, farklı örneklemelerden elde edilen birden çok eksik veri setlerini oluşturabilmek için kullanmaktadır. EM algoritması ise kısaca, iteratif olarak eksik veri yerine tamamlanacak değerlerin güncellenerek en yüksek olabilirlik tahminlerini bulmak adına kullanılmaktadır (Doğru ve ark.,2016). Böylece Amelia, EM yoluyla her bir eksik veri seti için eksik değerleri tamamlamakta ve tamamlanan değerleri kullanarak veri setinin tamamında eksik değerlerin ortalamasını almaktadır. Amelia algoritması, bu şekilde bootstrap ve EM algoritmasının kombinasyonları ile iyi ve güvenilir sonuçlar sunmaktadır.

K. Stokastik Regresyon

Stokastik regresyon (SR), istatistiksel bir regresyon modeli türüdür. Bu model, özellikle zaman serisi verileri gibi sürekli bir değişkenin geçmiş değerleri ile gelecekteki değerleri arasındaki ilişkiyi analiz etmek için kullanılır. Birçok değişkenden etkilenen bir sürekli değişkenin tahmininde kullanılan bir modeldir. Bu modelde, sürekli değişkenin tüm değişkenlere bağlı olduğu kabul edilir ve bu bağımlılık stokastik bir şekilde modellenir. Stokastik regresyon modelleri, genellikle Gauss markov varsayımlarının geçerli olduğu ve gürültülü verilerin olduğu durumlarda kullanılır. Bu modelde, sürekli değişkenin gelecekteki değerleri, rastgele bir hata terimi ve bir dizi bağımsız değişkenin doğrusal kombinasyonu ile açıklanır. Bu modelin en önemli özelliklerinden biri, hata teriminin normal dağılıma sahip olduğu ve tüm hata terimlerinin birbirinden bağımsız olduğu varsayımdır. Bu varsayımlar altında, stokastik regresyon modeli, maksimum olabilirlik yöntemi ile tahmin edilir ve gelecekteki değerler için tahmin aralıkları belirlenebilir.

SR, eksik veri tamamlamada tercih edilen yöntemlerden biridir. SR ile eksik veri tamamlama, lineer regresyon doğrusundaki değerlerin eksik veri yerine kullanılmamasından kaynaklı veri dağılımının etkilenmesi ve kovaryans değerlerinin daha düşük kestirilmesi gibi benzer problemleri çözümlemek adına geliştirilmiştir. Bu şekilde elde edilmiş değerlerle kurulmuş olan regresyona sıfır ortalamalı normal dağılıma sahip hatalar eklenmektedir. Enders (2010), bu yöntemin, rassal ve tamamen rassal şekilde eksiklik taşıyan veri düzenlerinde yansız parametre tahminleri verdiği ve lineer regresyon ile eksik veri tamamlama yöntemine göre çok daha iyi sonuçlar ürettiğini ifade etmiştir (Baraldi ve Enders,2010).

L. Ortalama Atama

Ortalama atama yöntemi, eksik verileri, veri setindeki ilgili değişkenin var olan değerlerine ait ortalamayı eksik olan değer yerine koyarak tamamlamaktadır. Literatürde, eksik veri tamamlama uygulamalarında oldukça sık bir kullanıma sahiptir.

M. Naïve Bayes Algoritması

İstatistiksel sınıflandırma araçlarından biri olan ve veri madenciliği uygulamalarında yaygın bir şekilde

kullanılan Naive Bayes sınıflandırma algoritması, sınıf nitelik değeri araştırılan bir veri kümelerinin, her bir sınıf nitelikine sahip olma olasılıklarının hesaplanıp, hesaplanan olasılıklardan en büyük değere sahip olan nitelik değerini, sınıf niteliği değeri olarak atayan sınıflandırma aracıdır. Naive Bayes, önceden sınıflanmış vaziyette olan verileri kullanarak, yeni veri kayıtlarının, tanımlanmış her sınıf değerini alma olasılıklarını hesaplamaktadır (Dondurmacı, 2011). Veri kümelerinin içeriği nitelik değerlerinin koşullu olarak birbirinden bağımsız olduğu varsayımlı, yapılacak sınıflandırma tahminlerinin analiz sürecini kolaylaştırmaktadır (Vembandasamy ve ark., 2015).

$$P(C_i|X) = \frac{P(X|C_i)P(C_i)}{P(X)} \quad (4)$$

Böylece, her bir sınıf değerine ait olasılıkların hesaplanması payda kısmi eşit olacağı için pay değerleri arasından en büyük değere olasılığa sahip nitelik değeri, veri kümelerinin sınıf niteliği olarak atanır.

$$\arg \max_{C_i} = \{P(X|C_i)P(C_i)\} \quad (5)$$

4. PERFORMANS DEĞERLENDİRME KRITERLERİ

Kullanılan algoritmaların performanslarını değerlendirmek kıyaslamak amacıyla bazı kriterler kullanılmaktadır. Bu kriterler, sınıflandırma süresi, doğruluk, kesinlik, duyarlılık, F-ölçütü ve ROC (Receiver Operating Characteristic) alanı değerleridir. Sınıflamada kullanılan algoritmaların başarısı, doğru ve yanlış sınıf değeri atanmış örneklerle bağlantılıdır. "Confusion Matrix" adı verilen matris yapısı bu değerlere ait çıktıyı sunmaktadır. Tablo-1'de verilen bu matris değerleri ile performans kriterleri hesaplanmaktadır. Bu matriste, X: TP= True Pozitif, Y: FN= False negatif, Z: FP= False Pozitif ve K; TN=True Negatif değerlerini ifade etmektedir (Oprea ve Ti, 2014).

Table 1. Confusion matrix yapısı

		TAHMİNLENEN SINIF	
		Sınıf 1	Sınıf 0
GERÇEK SINIF	Sınıf 1	X	Y
	Sınıf 0	Z	Z

Doğruluk oranı; doğru sınıfa atanmış örnek adedinin toplam örnek adedine bölümü ile bulunur. Bu değerden, sınıflandırma sonucunun gerçeğe ne kadar yakın olduğunu göstermektedir. Bu ölçüt, sınıflandırma sonucunun gerçek değerlere ne kadar yakın olduğunu gösteren bir orandır.

$$\text{Doğruluk} = \frac{TP+TN}{TP+TN+FP+FN} \quad (6)$$

Kesinlik: Sınıf 1 olarak sınıflandırılmış TP örnek adedinin, sınıf 1 olarak sınıflandırılmış tüm TP ve FP örnek sayısına bölünmesiyle bulunur. Kesinlik oranının araştırılmasının sebebi, aynı yöntemle elde edilmiş analiz sonuçlarının birbirine yakınlığını tespit edilmeye çalışılmasıdır.

$$\text{Kesinlik} = \frac{TP}{TP+FP} \quad (7)$$

Duyarlılık: TP olarak sınıflandırılmış örnek sayısının toplam pozitif TP ve FN toplamlarına oranıdır. Sınıflandırma işlemi sonuçlarının birbirine olan yakınlığının bir göstergesidir.

$$\text{Duyarlılık} = \frac{TP}{TP+FN} \quad (8)$$

Duyarlılık ve kesinlik değerlerinin harmonik ortalaması F-ölçütü kriterini tanımlanmaktadır. Duyarlılık ve kesinlik geçerli ve değerlendirme anlamında önemli kriterler olsa da tek başlarına yeterli kıyaslama kalitesinde olmayabilirler. F-ölçütü, dengeli bir duyarlılık ve kesinlik durumunda yüksek değerler almaktadır.

$$F\text{-ölçütü} = \frac{2 \times \text{Duyarlılık} \times \text{Kesinlik}}{\text{Duyarlılık} + \text{Kesinlik}} \quad (9)$$

ROC alanı: TP oranının Y ekseninde ve FP oranının X ekseninde karşılaştırıldığı 2-boyutlu bir grafiğin oluşturduğu alandır. Daha büyük alan değeri daha iyi performans anlamına gelmektedir. Bu alan, veri madenciliği algoritmalarının karşılaştırmasında genel bir kullanımına sahip bir kriterdir.

5. UYGULAMA

Çalışma kapsamında makine öğrenmesi ve veri analizi çalışmalarında sık kullanıma sahip olan “Hitters” veri seti kullanılmıştır. Bu veri seti, 1986 ve 1987 yıllarında Major Ligi’ndeki beyzbol sporcularına ait oyun istatistikleri ve yıllık aldıkları ücret (bin dolar) verilerinden oluşmaktadır. Ayrıca veri setinde oyuncuların aldıkları yıllık ücretler dikkate alınarak en çok olan ücretten en düşük ücrette doğru A, B, C, D ve E şeklinde kodlanıp kategorize edilerek sınıflandırılmış veri haline getirilmiştir ve “Player” değişkeni düzenlenmiştir. Böylece, ilgili veri seti, 18 adet değişken ve değişkenlere ait 322 adet kayıttan oluşmaktadır.

Veri setindeki veriler manipüle edilerek verilerin %5’i eksiltilmiştir. Manipülasyon işlemi R programlama dili kullanarak yapılmıştır. Eksiltilmiş olan veriler, ilgili değişken değerlerinin ortalamasıyla, stokastik regresyon yöntemiyle yanı sıra daha önce bahsedilmiş olan K-nn, Random Forest ve Amelia makine öğrenmesi algoritmalarıyla tamamlanmıştır. Ardından, bu algoritmalarla tamamlanarak elde edilen her bir veri setine ve veri setinin manipüle edilmemiş orijinal haline Naive Bayes algoritmasıyla “Player” değişkeni sınıf niteliğ olmak üzere sınıflandırma operasyonu yapılmıştır. Sınıflandırma işlemi için WEKA programı kullanılmıştır. Böylece, temel yöntemlerin en başında gelen ortalama atama ile makine öğrenmesi algoritmalarının, eksik veri tamamlama performansları karşılaştırılmıştır. Bunu dışında, algoritmaların eksik veri tamamlama performanslarının veri madenciliği ve makine öğrenmesinde sık başvurulan sınıflandırma analizine etkileri de ortaya koyulmuştur.

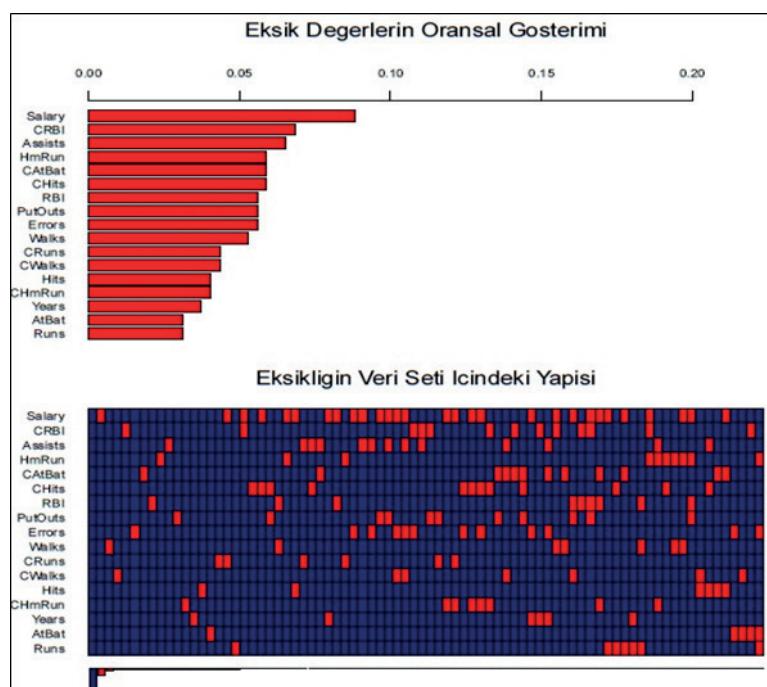


Fig 1. Veri Setindeki Her Değişkene Ait Eksik Değerler

İlk olarak veri setin manipüle edilmeden önce orijinal hali Naive Bayes algoritmasıyla “Player” değişkeni sınıf niteliği olmak üzere sınıflandırılmıştır. Sonuçlar Şekil 2’de gösterilmiştir.

Time taken to build model: 0.03 seconds
==== Stratified cross-validation ====
==== Summary ====
Correctly Classified Instances 282 87.5776 %
Kappa statistic 0.8081
Mean absolute error 0.0978
Root mean squared error 0.2735
Relative absolute error 22.5981 %
Root relative squared error 58.8138 %
Total Number of Instances 322
==== Detailed Accuracy By Class ====
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area
Weighted Avg. 0.876 0.072 0.877 0.876 0.876 0.807 0.961 0.943

Fig 2. Orijinal Veri Setinin Sınıflandırma Sonuçları**Table 2.** Orijinal Veri Seti Sınıflandırması Performans Kriteri Değerleri Özeti

Sınıflandırma Sonuçları					
Sınıflandırması Süresi(Saniye)	Doğruluk(%)	Kesinlik	Duyarlılık	F-Ölçütü	ROC Alanı
0.03	87.5776	0.877	0.876	0.876	0.961

Ardından manipüle edilen veri seti, daha önce bahsedilen yöntemlerle tamamlanmış ve yine Naive Bayes algoritmasıyla sınıflandırılmıştır. Tüm sınıflandırma sonuçları özet olarak Tablo 3'te verilmiştir. Sınıflandırma sonuçlarına ait çıktılar Ekler bölümünde sunulmuştur.

Table 3. Eksik Veri Tamamlama Yöntemleri ve Sınıflandırma Sonuçları

Algoritmalar	Sınıflandırması Süresi(Saniye)	Doğruluk(%)	Kesinlik	Duyarlılık	F-Ölçütü	ROC Alanı
Ortalama Atama	0.04	80.4348	0.819	0.804	0.806	0.963
K-nn	0.02	88.5093	0.886	0.885	0.885	0.976
Random Forest	0.02	86.3354	0.869	0.863	0.864	0.981
Stokastik Regresyon	0.01	84.1615	0.849	0.842	0.841	0.957
Amelia	0.03	82.9193	0.829	0.829	0.828	0.958

6. SONUÇ

Bu çalışmada, tüm sınıflandırma operasyonları Naive Bayes Algoritması ile yapıldığı için sınıflandırma sonuçları üzerinde farkı oluşturan unsur, sadece eksik verileri tamamlama algoritmalarıdır. Yapılan sınıflandırma sonuçlarına bakıldığından, makine öğrenmesi algoritmalarına ait performans değerlerinin, veri setinin manipüle edilmemiş haline ait sınıflandırma performans değerlerine anlamlı derecede yakın olduğu görülmektedir. Bu yakınlığın, tüm performans değerlendirme kriterleri için geçerli olduğu ortadadır. Bu durumdan, makine öğrenmesi yöntemlerinin, eksik değerleri, orijinal değerleri oldukça iyi yansıtacak şekilde tamamladığı çıkarımı yapılmaktadır.

Ortalama atama yöntemine ait performans değerleri incelediğinde, veri setinin manipüle edilmemiş haline uygulanmış sınıflandırma işlemine ait performans değerlerinin gerisinde kaldığı gözlenmektedir. Bunun aksine makine öğrenmesi algoritmalarına ilişkin performans sonuçları, orijinal veri setinin performans

değerlerine oldukça yakın olmasıyla birlikte ortalama atama yöntemine ait performans değerlerinden anlamlı derecede daha üstündür. Sınıflandırma süresi kriterine göre makine öğrenmesi yöntemlerinin, veri setinin manipüle edilmemiş haline dayalı durumdan daha kısa sürede sınıflandırma operasyonu yaptığı gözlenmiştir. Çok büyük hacimli veri setleri ile çalışıldığında kısa sürede aynı operasyonu yapabilmek oldukça öne çıkan ve aranan bir özelliktir. Böylece, kısa sürede sınıflandırma yapabilme özelliği bakımından makine öğrenmesi yöntemlerinin ön planda yer aldığı görülmüştür. Doğruluk, kesinlik, duyarlılık, F-ölçütü ve ROC alanı kriterlerinde de, makine öğrenmesi algoritmalarının performanslarına ait değerlerin, orijinal durumunun performans değerlerine oldukça yakın seviyede seyrettiği yanı sıra özellikle K-nn ve Random Forest algoritmalarının çok daha iyi bir performans seviyesinde olduğu tüm kriterlerce gözlenebilmektedir. Hatta K-nn algoritmasının, veri setinin manipüle edilmiş haline ait performans değerlerinden daha iyi performans değerlerine ulaştığı ortadadır. Bu durum, K-nn algoritmasının tamamladığı eksik değerlerin, veri setinin yapısına ve karakteristiğine çok iyi uyum sağlayan değerler olduğu ve böylece, sınıflandırma operasyonunda da başarıyı yükselten bir etki yaptığı görülmektedir.

Çıktılara bakıldığında, makine öğrenmesi ile yapılan eksik veri tamamlama yöntemlerine ait performans değerleri birbirlerine yakın olsalar da, kendi aralarında ufak farklılıklar içermektedir. Sonuçlara göre, makine öğrenmesi algoritmaları arasında en iyi performansı gösteren algoritmanın K-nn olduğu ve Amelia algoritmasının, diğer makine öğrenmesi algoritmalarına nispeten daha düşük performans gösterdiği tüm kriterlerce gözlenmiştir. Böylece, makine öğrenmesi algoritmalarının eksik veri tamamlamada oldukça başarılı olduğu görülmüştür. Ayrıca, K-nn algoritmasının çalışma kapsamında elde ettiği sonuçlar gibi makine öğrenmesi algoritmalarının, sınıflandırma performanslarına katkı yaparak olumlu bir etki yapabileceği de gözlenmiştir.

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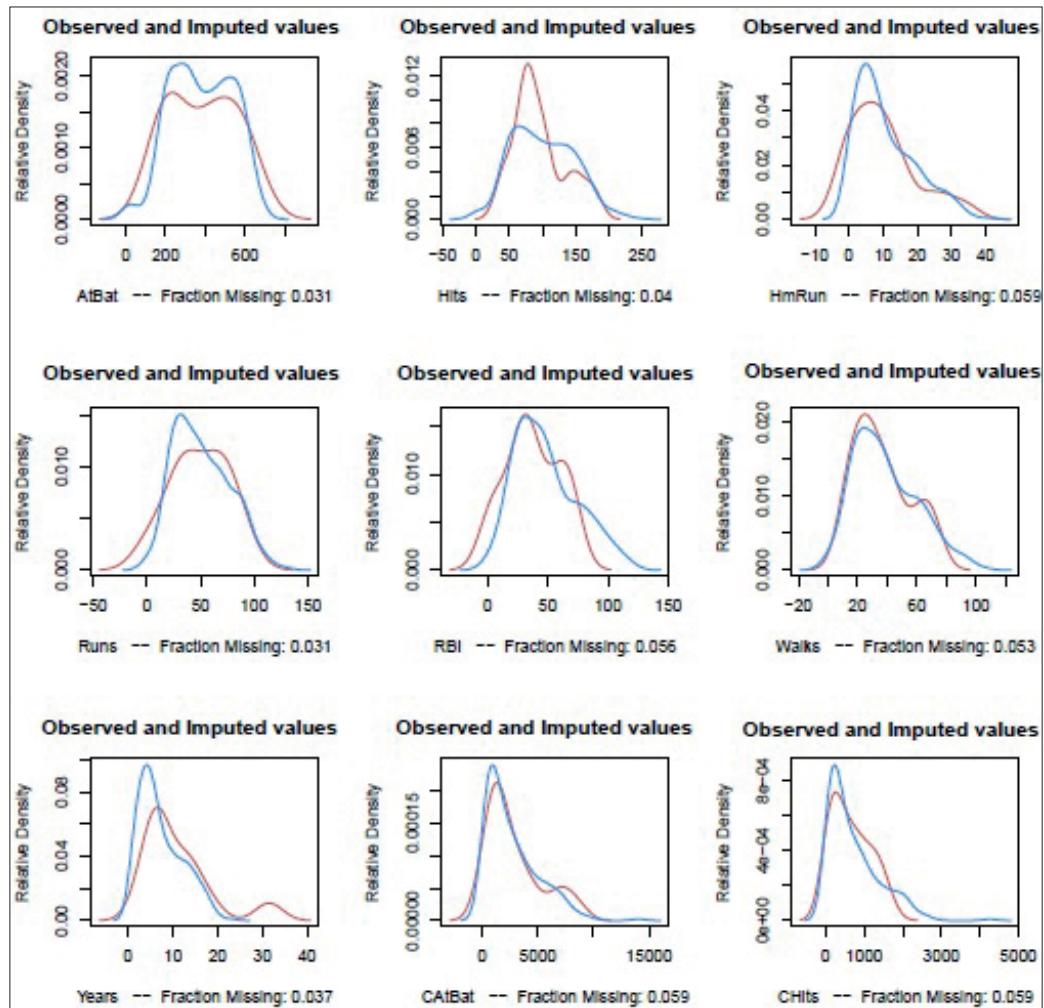
EKLER

Sırasıyla ortalama atama yöntemi (1), Stokastik Regresyon Atama (2), K-nn algoritması (3), Random Forest algoritması (4), Amelia algoritması WEKA çıktıları (5) ve Amelia algoritmasının değişkenlere ait gözlemler ile tamamlan değerleri ilişkin iteratif çıktıları (6) verilmiştir.

Time taken to build model: 0.04 seconds
*** Stratified cross-validation ***
*** Summary ***
Correctly Classified Instances 259 80.4348 %
Kappa statistic 0.7468
Mean absolute error 0.0835
Root mean squared error 0.2644
Relative absolute error 27.4489 %
Root relative squared error 67.815 %
Total Number of Instances 322
*** Detailed Accuracy By Class ***
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.865 0.081 0.672 0.865 0.756 0.711 0.962 0.874 A
0.756 0.046 0.705 0.756 0.729 0.689 0.950 0.775 B
0.792 0.040 0.922 0.792 0.852 0.780 0.969 0.951 C
0.730 0.035 0.836 0.730 0.780 0.733 0.944 0.863 D
0.913 0.040 0.792 0.913 0.848 0.824 0.986 0.946 E
Weighted Avg. 0.804 0.046 0.819 0.804 0.806 0.754 0.963 0.898
*** Confusion Matrix ***
a b c d e <-- classified as
45 7 0 0 0 a = A
6 31 4 0 0 b = B
13 6 95 6 0 c = C
2 0 4 46 11 d = D
1 0 0 3 42 e = E
Time taken to build model: 0.01 seconds
*** Stratified cross-validation ***
*** Summary ***
Correctly Classified Instances 271 84.1615 %
Kappa statistic 0.8013
Mean absolute error 0.0727
Root mean squared error 0.2259
Relative absolute error 22.8044 %
Root relative squared error 56.5834 %
Total Number of Instances 322
*** Detailed Accuracy By Class ***
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.955 0.055 0.821 0.955 0.883 0.853 0.983 0.974 A
0.887 0.015 0.922 0.887 0.904 0.886 0.946 0.929 B
0.719 0.016 0.920 0.719 0.807 0.775 0.920 0.882 C
0.795 0.049 0.838 0.795 0.816 0.759 0.967 0.914 D
0.867 0.065 0.754 0.867 0.806 0.761 0.966 0.915 E
Weighted Avg. 0.842 0.041 0.849 0.842 0.841 0.803 0.957 0.923
*** Confusion Matrix ***
a b c d e <-- classified as
64 0 2 0 1 a = A
0 47 1 2 3 b = B
8 0 46 5 5 c = C
4 4 0 62 8 d = D
2 0 1 5 52 e = E
Time taken to build model: 0.02 seconds
*** Stratified cross-validation ***
*** Summary ***
Correctly Classified Instances 285 88.5093 %
Kappa statistic 0.8554
Mean absolute error 0.054
Root mean squared error 0.195
Relative absolute error 16.9924 %
Root relative squared error 48.9155 %
Total Number of Instances 322
*** Detailed Accuracy By Class ***
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.914 0.038 0.841 0.914 0.876 0.849 0.976 0.957 A
0.918 0.015 0.918 0.918 0.918 0.904 0.990 0.961 B
0.813 0.035 0.852 0.813 0.832 0.792 0.970 0.907 C
0.889 0.041 0.878 0.889 0.883 0.844 0.972 0.941 D
0.900 0.016 0.940 0.900 0.920 0.898 0.975 0.957 E
Weighted Avg. 0.885 0.030 0.886 0.885 0.885 0.855 0.976 0.944
*** Confusion Matrix ***
a b c d e <-- classified as
53 0 4 0 1 a = A
1 45 1 2 0 b = B
7 1 52 4 0 c = C
2 1 3 72 3 d = D
0 2 1 4 63 e = E

Gözlemler

Eksik Değerler Yerine Tamamlanmış Olan Değerler



OPEN BANKING (AÇIK BANKACILIK) TÜKETİCİ DAVRANIŞLARININ GELECEĞİNİ DEĞİŞTİREBİLİR Mİ?

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Özet

Finans sektöründe adını sıkça duymaya başladığımız bir kavram olan Açık Bankacılık, artan rekabet koşulları, yenilikçilik ve şeffaflığı teşvik ederek tüketici davranışlarını yeniden şekillendirmeye hazırlanmaktadır. Uygulama Programlama Arayüzleri (API'ler) aracılığıyla tüketicilerin finansal verilerinin güvenli bir şekilde paylaşılmasını sağlayan Açık Bankacılık, bireylerin finansal davranışlarının kontrolünü ellerine almalarına yardımcı olma potansiyeli taşımaktadır. Açık Bankacılığın tüketici davranışları üzerindeki en önemli etkilerinden biri, finansal yönetim araçlarının daha fazla benimsenmesi olacaktır. Gerçek zamanlı finansal verilere erişim sayesinde tüketiciler artık kişiselleştirilmiş bütçe uygulamaları ve karşılaştırma web sitelerini kullanarak bilgiye dayalı kararlar alabileceklerdir. Bu bilgiye erişim, tüketicileri aktif olarak en iyi ürün ve hizmetleri aramaya teşvik ederek bankaları yenilik yapmaya ve eşit şartlarda rekabet etmeye yönlendirebilecektir. Ayrıca Açık Bankacılık, finansal hizmetlerin tüketicilerin günlük yaşamlarına sorunsuz bir şekilde entegre edilmesinin önünü açmaktadır. Müşterilerin yeni bankacılık alışkanlıklarını edinmesi, dijital cüzdanları ve temassız ödemeleri benimsemesi gelecek dönemler için muhtemeldir.

Davranışlardaki bu değişim, daha dijital öncelikli bir yaklaşıma geçiş hızlandıracaktır. Buna ek olarak, Açık Bankacılık sistemi müşteri sadakatini yeniden tanımlama potansiyeline sahiptir. Tüketiciler bir dizi finansal ürün ve hizmete erişim sağladıkça, kolaylık nedeniyle tek bir kurumda kalma olasılıkları azalacaktır. Bu aksıkanlık, bankaları müşterileri elde tutmak ve çekmek için müşteri deneyimine, değer katmaya ve kişiselleştirilmiş tekliflere öncelik vermeye zorlayacaktır. Sonuç olarak, open banking uygulamalarının tüketici davranışlarında bir dizi değişikliğe yol açması beklenmektedir. Bankalar da hızla gelişen yeni ortamda varlıklarını sürdürmeli inovasyona, müşteri deneyimine ve kişiselleştirmeye öncelik vererek bu paradigmaya uyum sağlamalıdır. Çalışmada, yeni bir kavram olan open banking (açık bankacılık) ile ilgili literatürdeki çalışmalar detaylı olarak incelenmiştir. Ayrıca dünya ve Türkiye uygulamalarından örnekler verilerek pratikteki yeri ile ilgili fikir verilmeye çalışılmıştır. Kavramın yeniliği ve uygulamaların hayatı henüz geçmesi sebebiyle çalışmanın özgün ve kendisinden sonraki çalışmalar için bir kaynak özelliği taşıdığı söylenebilir. Çalışmanın amacı open banking uygulamalarının tüketici davranışları üzerindeki muhtemel değişikliklere dair geleceğe yönelik bir projeksiyon oluşturmaktır.

Anahtar Kelimeler: Açık Bankacılık, Tüketici Davranışları, Pazarlama, İnovasyon

Abstract

Open Banking, a concept that has become increasingly prevalent in the finance sector, is poised to reshape consumer behaviors by fostering increased competition, innovation, and transparency. Through Application Programming Interfaces (APIs), Open Banking enables the secure sharing of consumers' financial data, carrying the potential to assist individuals in taking control of their financial behaviors. One of the most significant impacts of Open Banking on consumer behaviors will be the increased adoption of financial management tools. Access to real-time financial data will enable consumers to make information-based decisions using personalized budget applications and comparison websites. This access to information will potentially motivate consumers to actively seek the best products and services, urging banks to innovate and compete on equal terms. Moreover, Open Banking is paving the way for the seamless integration of financial services into consumers' daily lives. The adoption of new banking habits, digital wallets, and contactless payments is likely in the coming periods. This behavioral change will accelerate the transition to a more digitally-focused approach. Additionally, the Open Banking system has the potential to redefine customer loyalty. As consumers gain access to a range of financial products and services, the likelihood of staying with a single institution for convenience will decrease. This fluidity will compel banks to prioritize customer experience, value addition, and personalized offers to retain and attract customers.

Consequently, Open Banking applications are expected to lead to a series of changes in consumer behaviors. To sustain their presence in this rapidly evolving environment, banks must align with this paradigm by prioritizing innovation, customer experience, and personalization. The literature on open banking, a new concept, has been examined in detail in the study. Furthermore, examples from global and Turkish applications have provided insight into its practical implications. Due to the novelty of the concept and the fact that the applications are only now being implemented, it can be said that this study carries a unique and referential characteristic for subsequent works. The aim of the study is to create a projection for the future concerning the potential changes that open banking applications may have on consumer behaviors.

Keywords: *Open Banking, Consumer Behaviors, Marketing, Innovation*

1. GİRİŞ

Günümüzde hemen her konuda dijitalleşme oranı giderek artmaktadır. Teknolojinin ilerlemesi ile birlikte ticaretten iletişime, eğitimden eğlenceye, sağlıktan yönetime kadar hayatın hemen tüm alanlarından dijital izler görülmektedir. Dijitalleşmenin diğer teknolojik gelişmelerde olduğu gibi yıkıcı ve yapıcı etkilerinden bahsetmek mümkündür. Olumsuz pencereden bakan görüş, dijitalleşmenin hem kişiler hem de toplumlar arasındaki eşitlik dengesini bozduğu, güvenlik açılarını artırdığını, mahremiyet sorunları ve etik ikilemler gibi zorlukları da beraberinde getirdiğini savunmaktadır. Diğer bakış açısı ise dijitalleşmenin verimlilik, yenilik, kolaylık ve erişilebilirlik konularındaki etkilerine dikkat çekmektedir. Sektörler açısından düşünüldüğünde de dijitalleşmenin, genel olarak tüm ticari hayatı, işletmelerin kendi aralarındaki ilişkileri ve işletmeler ile müşteriler arasındaki iletişimini derinden etkilediği görülmektedir. Bu derin etki, internetin yaygın olarak benimsenmesi ve kullanımıyla beraber artmış, kesintisiz bağlantı ve gerçek zamanlı bilgi alışverişi, iş dünyasına, yeni fırsatlar ve paradigmalar kazandırmıştır. Bu değişimlerden en önemlileri arasında çevrimiçi işlemleri kolaylaştırma ve tüketici tabanlarını genişletme imkânları sayılabilir.

Günümüzde dijitalleşmenin geldiği noktada artık blockchain, nesnelerin interneti (IoT) ve yapay zekâ (AI) gibi gelişmiş teknolojilerden sıkça bahsedilmektedir. Söz konusu teknolojiler, veri analitiği ve tahmine dayalı

modelleme, işletmelere veri odaklı kararlar alma, eğilimleri belirleme ve müsteri tercihlerini tahmin etme gücü vererek ürün ve hizmetlerini daha etkili bir şekilde uyarlamalarını sağlamıştır. Bankacılık sektörü için de veriler vazgeçilmez bir enstrüman haline gelmektedir. Bankalarda dijitalleşme oranları yükseldikçe tüketici içgörüler, inovatif çözümler, risk yönetimi, şeffaflık gibi konular daha fazla ön plana çıkmaya başlamıştır. Bu durum open banking (açık bankacılık) uygulamaları ile giderek daha somut bir hâl almaktadır.

1.1. Open Banking (Açık Bankacılık)

Finansal hizmetler, son yıllarda diğer tüm sektörlerden daha fazla yıkıcı teknolojiler ile karşı karşıya gelmiştir. Gelinin noktada, tüketiciler artık kritik finansal kararlar almak için dijital bankacılık deneyimlerine güvenmektedir. Dijitalleşmenin yaygın etkisi, işletmelerin tüketiciler için değer yaratma biçiminde devrim yaratmıştır. Dijital teknolojilerin hızla ilerlemesi, internetin ve mobil cihazların yaygın olarak benimsenmesiyle birleştiğinde, tüketici deneyimi temelden dönüşüme uğramıştır ve geleneksel değer yaratma kavramları yeniden tanımlanmıştır. Dijitalleşme çağında işletmeler, stratejilerini teknolojinin gücünden yararlanacak ve müsteri değerini artıracak şekilde uyarlamak durumundadırlar. Tüketicilere kritik ve faydalı hizmetleri her zamankinden daha fazla sağlamak zorunda hissedilen bankalar bunu yapmak için açık bankacılık uygulamalarına yönelmektedir.

En genel tanımıyla açık bankacılık, tüketicilerin verdiği izinler ile kendilerine ait verilerin üçüncü taraflarla paylaşılmasıdır. Bankacılık sektöründe dijitalleşmenin bugün gelinen son noktası olarak ifade edilmektedir.

Türkiye İş Bankası (2020) açık bankacılık ya da diğer adlarıyla “Open Banking” ve Open Bank Data” terimlerini, tüketicilere ait finansal verilerin, yine tüketiciler için daha iyi bankacılık ve finans olanakları sunulması amacıyla üçüncü parti kuruluşlarla paylaşıldığı güvenilir bir hizmet modeli şeklinde tanımlamaktadır.

Açık bankacılık özel bir finansal ekosistem türüdür. Bu ekosistem bir dizi güvenlik profili, uygulama arayüzü ve yönerge ile yönetilmektedir (Laplante & Kshetri, 2021).

Açık bankacılık kavramı, finansal hizmetlerde birkaç ilkeye dayanan bir kavramdır. Bunlar, üçüncü taraf geliştiricilerin finansal kurumlar etrafında uygulama ve hizmetler oluşturmaya olanak tanıyan açık API’lerin kullanımı, hesap sahipleri için artan finansal şeffaflık seçenekleri ve bu ilkelere ulaşmak için açık kaynak teknolojisinin kullanılması olarak ifade edilmektedir (Mulesoft, 2023).

API, “uygulama programlama arayüzü” anlamına gelmektedir. API’ler, saklanan verilerin veya talimatların aktarılmasına izin vermek için bir uygulamanın diğerileyle “konuşmasına” izin vermektedir. API’ler, sosyal medya uygulamalarına yerleştirilmiş YouTube videolarından mutfak tezgahlarındaki akıllı hoparlöre kadar günlük hayatın hemen her yerinde mevcuttur. Farklı kişiler tarafından farklı zamanlarda geliştirilen yazılımların birbirleriyle etkileşime geçmesini sağlayarak işlevsellik ve üretkenliği artırmaktadırlar (Devers, 2023).

1.2. Geleneksel Bankacılığın ve Açık Bankacılığın Tarihçesi

Başar ve Coşkun'a göre (2006) bankacılığın başlangıç tarihlerini MÖ. 3500 yılına kadar dayandırmak mümkündür. Yapılan araştırmalarda Sümer, Babil ve eski Yunan medeniyetlerinde bankacılığa benzer işletmelerin yapıldığı belirlenmiştir. Paranın icat edilmesinin ardından denizciliğin ve ticaretin gelişmesine paralel olarak bankacılık sektöründe de gelişmeler başlamıştır.

Ticaretin gelişmesi, uluslararası bir nitelik kazanması, para ile ilgili kurumların oluşumunu zorunlu kılgıından, ortaya önce sarraflar çıkmıştır. Bu nedenle sarrafları bankerlerin ve bankaların öncüsü olarak nitelendirmek mümkündür. Banka sözcüğü de zaten İtalyanca ‘banco’ sözcüğünde, sarrafların üzerinde işlemlerini gerçekleştirdiği “masa, sira” sözcüğünden gelmektedir. Sarrafların uğraş alanlarını genişletmeleri, mevduat kabul etmelerinin yanı sıra transfer işlemlerini gerçekleştirip, tüketicilere kredi vermeleri ise bunların iş yerlerini ‘mevduat ve transfer bankaları’ durumuna dönüştürmüştür. Gerçek anlamı ile para

ticareti ise ancak mal ve sermaye ticaretine katılan sınıflarla, tefeciler ve tüccarlardan oluşan burjuvaziyle birlikte ortaya çıkmıştır. Ticaret sermayesinin gelişimi, banka denilen kurumu ekonomik yaşantısının önemli bir öğesi durumuna dönüştürmüştür. Sanayi devrimi ise bankacılığın hızlı gelişme sürecine girmesine yol açmıştır (Yetiz, 2016).

Açık bankacılık sistemi Birleşik Krallık tarafından başlatıldığı için İngiliz ticari bankacılık tarihine de kısaca bakmak faydalı olacaktır.

Baker ve Collins (2007) banka tarihçesinin güvenilir açıklamaları için “150 Yıllık Bankacılık Tarihi - Holmes & Green” ile “Barclays: Bankacılık İşi, 1690-1996 – Ackrill & Hannah” çalışmalarını referans olarak göstermektedirler. Her iki çalışma da büyük ölçüde kronolojik bir yaklaşımı benimsemektedir. Bankaların yaşam döngüsündeki aşamaları sunar ve uzun vadeli kurumsal ilerlemenin güçlü bir unsuru vardır. Her iki çalışma, ele alınan bankaların kurumsal stratejisi, kurumsal yapısı ve kurumsal yönetişimi konularına odaklanmaktadır - her iki kitabı da önemli bir gücü, belirli kurumsal gelişmeleri daha geniş ekonomik ve düzenleyici bağamlarla açık bir şekilde ilişkilendirmesidir.

Birleşik Krallıktaki güçlü bankacılık geleneği uzun yıllar sürekli gelişerek devam etmiş ve günümüzde ulaşmıştır. Bu sürekli iyileştirme ve yenilikçi yaklaşım sektör açısından 2015 yılında önemli bir adımı beraberinde getirmiştir.

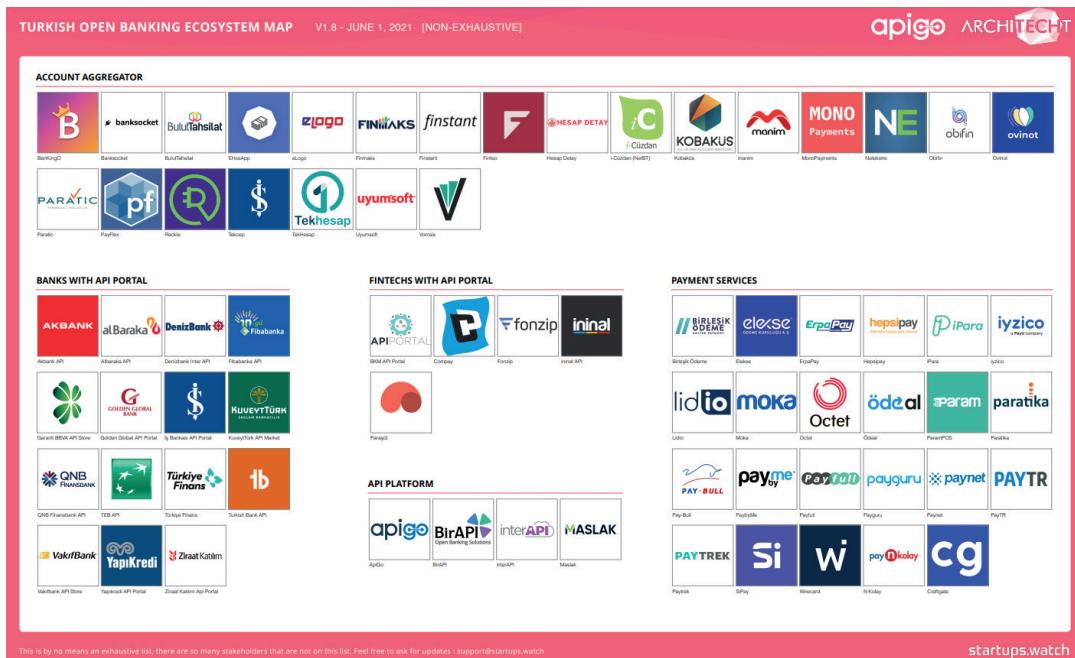
Birleşik Krallık tarafından bankacılık sektörüne inovatif bir dokunuş getirme, rekabeti ve fırsatları artırma isteği üzerine sunulan ve ilk olarak İngiltere'de hayata geçen bu model aslında 2015 yılında Avrupa Birliği'nin alakalı kurumlarında görüşülmüş ve revize edilmiştir. Ödeme Hizmetleri Direktifi 2 (PSD2- Payment Services Directive 2) olarak sunulan bu yeni yönerge Açık bankacılığın temellerini oluşturmuş ve üçüncü parti kurumların finans verilerine ulaşıp kullanıcı deneyimini geliştirilmesini sağlayacak bir stratejinin olmasını sağlamıştır. 2016 yılında ise İngiltere Rekabet ve Piyasalar Kurumu ülke içerisinde bulunan dokuz büyük bankayı ve hükümet tarafından lisans verilen girişimleri Açık Bankacılık Uygulama Kurumu (OBIE-Open Banking Implementation Entity) çatısı altında buluşturmuş ve dünyada Açık Bankacılık modeline geçen ilk ülke olmuştur (Türkiye İş Bankası, 2020; netBT, 2020).

Briones de Araluce ve Cassinello Plaza (2022) açık bankacılığın sektör için yeni olmasının yanı sıra akademi için de yeni olduğunu belirtmektedirler. İfadelerine göre 2016'dan önce, akademik dergilerde “open banking” terimini içeren sadece dört makale bulunmaktadır. Bu nedenle, open banking yeni bir araştırma konusu olarak kabul edilebilir. Araştırmacılar açık bankacılık ile ilgili detaylı bir literatür taraması yapmışlardır. Buna göre mevcut literatürü üç ana gruba ayırmışlardır. Söz konusu grupları düzenleyici, teknik ve yönetimsel başlıklar altında toplamışlardır. Düzenleyici literatür, open banking uygulamalarını destekleyen yasaları analiz etmektedir (Avrupa Birliği'nin İkinci Ödeme Hizmetleri Direktifi (PSD2), İngiltere'nin Open Banking Standartı, Avustralya'nın Tüketiciler Veri Hakkı, Singapur'un Kişisel Veri Koruma Kanunu, Hindistan'ın Aadhaar ve Birleşik Ödemeler Arayüzü, Hong Kong, Kanada, Brezilya [BCB Dairesel No. 4,015/2020] ve Meksika (Ley Fintech) gibi benzer düzenleyici metinler incelenmekte ve onaylanmaktadır). Teknoloji perspektifinden, mevcut literatür alt yapıya odaklanmakta ve open banking teknolojisinin müsteri perspektifinden kabulünü incelemektedir. Yönetimsel literatür, open banking nedeniyle perakende bankacılık piyasasında finansal hizmetlerin talep ve arzında yapısal değişiklikleri analiz etmektedir.

2. TÜRKİYE'DE AÇIK BANKACILIĞI EKOSİSTEMİ

Eylül 2020'de Türkiye ve MENA odaklı girişim analiz platformu startups.watch ile teknoloji şirketi Architech işbirliği ile hazırlanan “Turkish Open Banking Ecosystem Map” yayınlanmıştır (Fintech İstanbul, 2020). İlgili ekosistem haritası aşağıdaki gibidir.

Şema 1. Türk Açık Bankacılık Ekosistem Haritası



Kaynak: <https://fintechistanbul.org/>

3. AÇIK BANKACILIK SİSTEMLİNİN FAYDALARI VE TÜKETİCİ DAVRANIŞLARINA OLASI ETKİLERİ

Açık bankacılık sisteminin tüketicilere olan faydalari beş başlık altında incelenebilir. Bunlar finansal yönetim araçlarının daha fazla benimsenmesi, gerçek zamanlı finansal verilere erişim, kişiselleştirilmiş bütçe uygulamaları, karşılaştırmalı web siteleri kullanımı, bilgiye dayalı karar verme olarak sayılabilir. Böylelikle tüketiciler finansal davranışlarının kontrolünü ele alma potansiyeli yakalayacaklardır. Bu durumda yani tüketicilerin bilgiye erişiminin artması halinde en iyi ürün ve hizmetleri arayacaklardır. Sonučta bankalar da tüketicileri kazanmak için daha inovatif çözümler üretecek ve eşit şartlarda rekabet edeceklerdir.

Açık bankacılık sisteminin tüketiciler için sağladığı faydalar aşağıdaki gibi detaylandırılabilir.

3.1. Finansal Yönetim Araçlarının Daha Fazla Benimsenmesi

Açık bankacılık sistemi tüketicilerin çeşitli hesaplardan ve kurumlardan gelen finansal verilerini tek bir yerde birlleştirmelerine olanak tanır. Bu, finansal verilerinin kapsamlı bir görünümünü sağlayarak harcamaları takip etmeyi, harcama modellerini analiz etmeyi ve bütçe hedefleri belirlemeyi kolaylaştırır. Gerçek zamanlı işlem verilerine erişim sayesinde tüketiciler daha bilinçli finansal kararlar alabilirler.

Ayrıca açık bankacılık tarafından desteklenen finansal yönetim araçları, tüketicilerin farklı bankalardan veya finans kurumlarından birden fazla hesabı birbirine bağlamasına olanak tanır. Bu, bakiyeleri, işlemleri ve yatırımları izleme sürecini basitleştirir. Kullanıcılar varlıklarını ve yükümlülüklerini bütünsel olarak izleyebilir, bu da özellikle çeşitlendirilmiş finansal portföyleri olan bireyler için yararlıdır.

Bunun gibi faydalari sebebiyle açık bankacılık sisteminin yayılması ile birlikte tüketicilerin finansal yönetim araçlarını daha çok benimseyecekleri öngörülmektedir.

3.2. Gerçek Zamanlı Finansal Verilere Erişim

Açık bankacılık sistemi, tüketicilere gerçek zamanlı finansal verilere erişim konusunda avantajlar sağlamaktadır. Tüketiciler, güvenli API'lerden yararlanarak hesap bakiyeleri, işlemleri ve birden fazla kurumdaki finansal faaliyetleri hakkında güncel bilgileri anında alabilmektedirler. Finansal durumlarına

ilişkin bu gerçek zamanlı görünürlük, tüketicilerin hızlı bir şekilde ve anında bilinçli kararlar almalarını, harcamalarını doğru bir şekilde takip etmelerini, olası sorunları erkenden tespit etmelerini ve finansal refahlarını daha önce hiç olmadığı kadar kontrol altında tutmalarını sağlamaktadır.

3.3. Kişiselleştirilmiş Bütçe Uygulamaları

Açık bankacılık sisteminde tüketiciler, güvenli API'ler aracılığıyla çeşitli finans kurumlarındaki hesaplarını özel bütçeleme uygulamalarına bağlayabilirler. Bu uygulamalar harcama kalıplarını, geliri ve finansal hedefleri gerçek zamanlı olarak analiz ederek kişiye özel bütçeleme önerileri sunmaktadır. Bu da bireylerin kendilerine özgü mali durumları ve hedefleriyle uyumlu gerçekçi bütçeler oluşturmalarını sağlayarak paralarını daha etkili bir şekilde yönetmelerine ve daha fazla mali kontrol elde etmelerine yardımcı olmaktadır.

3.4. Karşılaştırmalı Web Siteleri Kullanımı

Açık bankacılık sisteminin tüketiciler için avantajlarından biri de karşılaştırmalı web sitelerinin kullanımının kolaylaştırılmasıdır. Açık bankacılık API'leri sayesinde tüketiciler finansal verilerini karşılaştırma platformlarıyla güvenli bir şekilde paylaşabilir. Bu platformlar, krediler, kredi kartları, sigorta ve daha fazlası gibi finansal ürünlerin kişiselleştirilmiş karşılaştırmalarını sunmak için gerçek zamanlı bilgilerden yararlanmaktadır. Tüketiciler doğru ve güncel verilere erişerek bilinçli kararlar verebilir, bireysel ihtiyaçlarına göre en uygun finansal ürünleri seçebilir ve sonuçta mümkün olan en iyi fırsatları elde ederken zamandan ve paradan tasarruf edebileceklerdir.

3.5. Bilgiye Dayalı Karar Verme

Açık bankacılık sisteminde gerçek zamanlı ve bütünsel bilgilerle donanmış olan tüketiciler, finansal faaliyetleri hakkında daha bilinçli seçimler yapabileceklerdir. İster doğru kredi kartını seçmek, ister bir yatırım yapmak veya borcu yönetmek olsun, doğru ve güncel verilere erişme yeteneği, tüketicilerin seçeneklerini tartmalarını ve finansal hedefleri ve tercihleriyle uyumlu kararlar almalarını sağlayacaktır. Bu durumun daha fazla kontrol hissi, güven ve nihayetinde daha iyi finansal sonuçlara yol açacağı tahmin edilmektedir.

Açık bankacılık ile birlikte tüketicilerin yeni bankacılık alışkanlıkları edinmesi, dijital cüzdanları ve temassız ödemeleri benimsemeleri gelecek dönemlerde olasılıklar dâhilinde görülmektedir. Davranışlardaki bu değişim, daha dijital öncelikli bir yaklaşım geçişine de hızlandıracaktır.

Buna ek olarak, Açık Bankacılık sistemi müşteri sadakatini yeniden tanımlama potansiyeline sahiptir. Tüketiciler bir dizi finansal ürün ve hizmete erişim sağladıkça, kolaylık nedeniyle tek bir kurumda kalma olasılıkları azalacaktır. Bu akışkanlık, bankaları müşterileri elde tutmak ve çekmek için müşteri deneyimine, değer katmaya ve kişiselleştirilmiş tekliflere öncelik vermeye zorlayacaktır.

4. SONUÇ

Dijitalleşme, işletmelerin birden fazla temas noktasında müşterileriyle sorunsuz bir şekilde bağlantı kurmasını, kişiselleştirilmiş ve etkileyici deneyimler sunmasını sağlamıştır. Şirketler web siteleri, mobil uygulamalar, sosyal medya platformları ve diğer dijital kanallar aracılığıyla müşterilerle gerçek zamanlı olarak etkileşime geçebilmekte, tercihlerini anlayabilmekte ve tekliflerini özel ihtiyaçlarını karşılayacak şekilde uyarlayabilmektedir. Bu kişiselleştirme ve etkileşim düzeyi, daha güclü ilişkileri teşvik etmekte, müşteri memnuniyetini artırmaktadır.

Ayrıca, dijital teknolojiler müşterilerin bilgiye daha önce görülmemiş bir şekilde erişmesini sağlayarak daha bilinçli satın alma kararları vermelerini mümkün kılmıştır. Çevrimiçi incelemeler, ürün karşılaştırmaları ve sosyal medya onayları, seçimleri etkileyen ve algıları şekillendiren müşteri yolculuğunun ayrılmaz parçaları haline gelmiştir. Dijitalşeyi benimseyen işletmeler, değerli içgörüler elde etmek, ürün ve hizmetlerini iyileştirmek ve üstün değer önerileri sunmak için müşterilerin ürettiği bu zengin veriden yararlanabilir.

Ayrıca dijitalleşme, sektör sınırlarını bulanıklaştırarak ve yeni iş modellerini mümkün kılarak değer

yaratmanın sınırlarını genişletmiştir. Birden fazla paydaşı birbirine bağlayan ve birlikte değer yaratmayı kolaylaştıran platformlar ve ekosistemler ortaya çıkmıştır. İşbirliğine dayalı platformlar, kitle kaynak kullanımı ve kullanıcı tarafından oluşturulan içerik, müşterilerin ürün ve hizmetlerin oluşturulmasına ve geliştirilmesine aktif olarak katılmalarını sağlayarak sahiplenme duygusuna ve algılanan değerin artmasına yol açmıştır.

Açık bankacılık uygulamaları müşteri değeri ile ilgili çalışmalarda bankacılık sektörü açısından önemli bir adımdır.

Verilerin üçüncü taraflarla paylaşılmasının etik tarafı, tüketiciye getirdiği dezavantajlar, güvenlik sorunları gibi meseleler bu çalışmada ele alınmamıştır. Ancak getirdiği avantajlar ve yenilikler ile birlikte gelecek dönemlerde her geçen gün dijitalleşme konusunda ilerleyen tüketicilerin açık bankacılık sistemlerini ve gerekliliklerini benimseyecekleri de düşünülmektedir.

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MUHASEBE ÖĞRENCİLERİNİN ONLINE EĞİTİMDE WEB TABANLI YAZILIM KULLANIMININ TEKNOLOJİ KABUL MODELİ İLE İNCELENMESİ

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Özet

Bilgi ve iletişim teknolojilerindeki gelişmeler ve internetin günlük hayatı yoğun kullanımını muhasebe mesleğinin de dönüşümünü etkilemiştir. İnternet teknolojisinden muhasebe süreçlerinde de yararlanılarak web tabanlı yazılımın kullanılmaya başlanması, muhasebe mesleğinin dijital uygulamalara hızlı entegrasyonuna katkı sunmuştur. Muhasebe mesleğinde bilgi ve iletişim teknolojileri açısından ortaya çıkan dönüşüm süreci, muhasebe eğitiminin de bu çerçevede gelişmesinde etkili olmaktadır. Özellikle Covid-19 Pandemisi ile birlikte online eğitimin zorunlu hale gelmesi internet tabanlı uygulamaların kullanımını tercih edilir konuma getirmiştir. Bu süreçte TÜRMOB (Türkiye Serbest Muhasebeci Mali Müşavirler ve Yeminli Mali Müşavirler Odaları Birliği) tarafından geliştirilen Luca web tabanlı yazılım da yoğun şekilde kullanılan bir muhasebe yazılımı olmuştur. Luca yazılımı kurulum ihtiyacının olmaması, eğitim üyeliğinde kısıtların konulmaması, kullanım kolaylığı, yapılan kayıtlara her ortamda erişilebilmesi gibi avantajları ile öne çıkan bir web tabanlı yazılımdır. Çalışmanın amacı, online eğitimde bilgisayarlı muhasebe dersi kapsamında web tabanlı yazılım (Luca Mali Müşavir Paketi) kullanan muhasebe öğrencilerinin web tabanlı yazılımlara bakışını değerlendirerek, muhasebe eğitimi müfredatı açısından önerilerde bulunmaktr. Bu kapsamında Sakarya Uygulamalı Bilimler Üniversitesi Sakarya Meslek Yüksekokulu'nda bilgisayarlı muhasebe uygulamaları dersini alan ve sınavlara aktif şekilde katılan 65 muhasebe öğrencisinin tamamına anket yöntemiyle ulaşılmıştır. Ankette demografik bilgiler yanında, teknoloji kabul modeli kullanılarak öğrencilerin web tabanlı yazılıma bakışını içeren sorular hazırlanmıştır. Ayrıca öğrencilere online eğitime dair genel sorular yöneltilmiş ve veriler Google form yardımıyla uzaktan toplanmıştır. Uygulanan ankete 53 geçerli geri dönüş alınmış ve verilen cevapların frekans değerleri üzerinden değerlendirme yapılmıştır. Araştırmaya katılanların; 39'u bayan, 14'ü erkektir ve 31'i hiç muhasebe üzerinde bir işyerinde çalışmadığını (staj dahil), 13'ü de bir yılın altında muhasebe deneyimi olduğunu belirtmiştir. Katılımcıların 20'si daha önce en az bir farklı muhasebe yazılımı kullandığını ifade etmiştir. Araştırma sonucunda öğrenciler web tabanlı yazılımın işlerini kolaylaştırdığını, dersteki performanslarını ve verimliliklerini artırdığını, gelecekleri için faydalı olacağını, yazılımı kullanmayı sevdiklerini ve başarılı şekilde kullandıklarını belirtmiştir. Ayrıca katılımcı öğrenciler bilgisayarlı muhasebe uygulamaları online derslerine canlı olarak katılmaya çalışıklarını ve ders notlarını takip ettiğini, ancak dersin online yapılmasından memnun olmadıklarını da belirtmiştir.

Anahtar Kelimeler: *Web tabanlı muhasebe yazılımı, online eğitim, teknoloji kabul modeli, Luca.*

Abstract

The developments in information and communication technologies and the intensive use of the internet in daily life have also affected the transformation of the accounting profession. The use of web-based software by making use of internet technology in accounting processes has contributed to the rapid integration of the accounting profession into digital applications. The transformation process in the accounting profession in terms of information and communication technologies is also effective in the development of accounting education within this framework. Especially with the Covid-19 Pandemic, the necessity of online education has made the use of internet-based applications preferable. In this process, Luca web-based software developed by TURMOB (Association of Chambers of Certified Public Accountants and Certified Public Accountants of Turkey) has also become an accounting software that is used extensively. Luca software is a web-based software that stands out with its advantages such as no need for installation, no restrictions on training membership, ease of use, and accessibility to the recordings in any environment. The aim of the study is to evaluate the view of accounting students using web-based software (Luca Financial Advisor Package) within the scope of computerized accounting course in online education and to make suggestions in terms of accounting education curriculum. In this context, all 65 accounting students who took the computerized accounting applications course at Sakarya University of Applied Sciences Sakarya Vocational School and actively participated in the exams were reached by questionnaire method. In addition to demographic information in the survey, questions including students' perspectives on web-based software were prepared using the technology acceptance model. In addition, general questions about online education were asked to the students and the data were collected remotely with the help of a Google form. 53 valid responses were received to the applied questionnaire, and the frequency values of the answers were evaluated. Participants of the research; 39 of them are female, 14 of them are male and 31 of them stated that they have never worked in accounting (including internship) and 13 of them stated that they have less than one year of accounting experience. Twenty of the participants stated that they used at least one different accounting software before. As a result of the research, the students stated that the web-based software made their work easier, increased their performance and productivity in the course, it would be beneficial for their future, they liked to use the software and they used it successfully. In addition, the participant students stated that they tried to attend the computerized accounting applications online courses live and they followed the lecture notes, but they were not satisfied with the online course.

Keywords: *Web-based accounting software, online education, technology acceptance model, Luca.*

1. GİRİŞ

İnternetin iş yaşamına dahil olmasına birlikte bilgi ve iletişim teknolojileri hiç olmadığı kadar hızlı bir gelişme süreci içine girmiştir. İnternet teknolojisi tüm sektörlerde bilginin oluşması, elde edilmesi, kaydedilmesi, işlenmesi ve iletilmesi faaliyetlerinin tamamında etkili olan önemli bir teknoloji konumuna gelmiştir. Özellikle 2019 yılının sonunda Çin'de ortaya çıkan ve tüm Dünya'yı etkisi altına alan Covid-19 Pandemi sürecinde ve sonrasında online çalışma ve eğitim sistemleri hayatımıza yerleşmiş durumdadır. Muhasebe mesleği ve eğitimi de bu süreçten hem etkilenen hem de bu süreci etkileyen en önemli alanlardan biri olmuştur. Çünkü iş yaşamı için ne kadar bir duraklama dönemi olsa da hem toplum hem işletmeler hem de devletler açısından parasal işlemler, vergi beyanları, sosyal güvenlik bildirimleri ve ödemeleri gibi mali süreçlerin durma olasılığından söz edilemezdi. Bu nedenle muhasebe meslek mensupları ara vermeden çalışmak durumunda kalmıştır.

Tam bu noktada birçok sektörde olduğu gibi muhasebe mesleği açısından da web tabanlı ve bulut teknolojisi ile belirli bir mekâna bağlı olmadan online olarak çalışabilen muhasebe yazılımlarına duyulan ihtiyaç artmıştır. Gelişen teknoloji ile birlikte muhasebe alanında kullanılan yazılımlar da dönüştürmektedir ve kullanıcıların ihtiyaçlarına uygun şekilde geliştirilmektedir. Muhasebe yazılımı tercihinde muhasebe işlem süreçlerini pratik hale getirmesinin yanında kullanıcıların ihtiyaç duyduğu her ortamda ulaşılabilirliğini sağlaması da önemli bir etken haline gelmiştir. Günümüzde bu özelliği bakımından web tabanlı yazılımlar muhasebe mesleğinde ve eğitiminde öne çıkan yazılımlar olarak dikkati çekmektedir.

Muhasebe eğitimi, işletmelerin faaliyet sonuçlarını ve finansal durumunu ortaya koyan bilgileri toplama, kaydetme, analiz etme, ulaşılan sonuçları hem ulusal hem de uluslararası mevzuat hükümleri doğrultusunda raporlama ve gerekli bildirimlerde bulunma konusunda yeterli bilgi ve beceriye sahip olan, piyasanın muhasebe alanındaki personel ihtiyacını karşılayacak meslek elemanları yetiştirmeyi amaçlamaktadır. Bu amaca bağlı olarak müfredatta yer alan muhasebe derslerinde öğrencilere kalıcı öğrenme sağlayacak bir çalışma yapmak gerekmektedir (Yıldız ve Akyel, 2017: 15-16). Günümüzde muhasebe meslek elemanlarında aranan en önemli niteliklerden biri de güncel bilgi ve iletişim teknolojilerini kullanabilme becerisidir. Bu açıdan özellikle üniversitelerdeki muhasebe eğitiminde, öğrencilere güncel teknolojilerin ve uygulamalarının öğretilmesi önem arz etmektedir (Erol Fidan, 2020: 95). Web tabanlı muhasebe yazılımlarını da muhasebe mesleğinin geleceğinde etkili olacak önemli ve güncel bir teknoloji olarak konumlandırmak mümkün görülmektedir.

Kahramanmaraş'ta 6 Şubat 2023 tarihinde gerçekleşen deprem felaketi sonrasında yükseköğretimde online eğitime geçilmiştir. Çalışmanın temelini de bu süreçte bilgisayarlı muhasebe dersinde online şekilde web tabanlı yazılım kullanan öğrencilerin bu eğitim yöntemine ve yazılıma bakışı oluşturmaktadır. Çalışmanın amacı, online eğitimde muhasebe öğrencilerinin web tabanlı yazılımlara bakışını değerlendirerek, elde edilen sonuçlar çerçevesinde muhasebe eğitimi açısından önerilerde bulunmaktır. Çalışmada öncelikle muhasebe eğitiminde web tabanlı yazılım kullanımı değerlendirilmiş, literatür incelemesi yapılmış ve teknoloji kabul modeli (TKM) tanıtılmıştır. Ardından araştırma bölümünde online eğitimde bilgisayarlı muhasebe dersinde web tabanlı yazılım olan Luca Mali Müşavir paketini kullanan muhasebe öğrencilerinin web tabanlı yazılıma bakışlarını ortaya koymaları istenmiştir. Öğrencilere teknoloji kabul modeli kullanılarak hazırlanan anket soruları ile online eğitime yönelik sorular yöneltilmiştir. Son bölümde elde edilen bulgular sunularak, muhasebe eğitimine yönelik önerilerde bulunulmuştur.

2. MUHASEBE EĞİTİMİ VE WEB TABANLI YAZILIM KULLANIMI

Muhasebe eğitimi süreçleri, ülkeler arasında farklılık göstermekte olup, mesleği icra edenlerin ihtiyaçlarının yön vermesi ve teknolojinin gelişme durumuna göre şekillenmektedir (Serçemeli ve Diğ., 2018: 981). Eğitim süreçleri bazen doğal yollar olan ihtiyaç ve bekłentiler çerçevesinde şekillenirken, bazen de pandemi, deprem, ekonomik krizler gibi olağanüstü durumların etkisi ile hızla şekillenebilmektedir. Örneğin yakın geçmişimizde yaşanan çok sayıda olağanüstü durum ve teknolojik gelişmelerin de izin vermesi ile online eğitim hayatımızın vazgeçilmezi haline gelmiştir. Muhasebe mesleği ve eğitimi de bu gelişmelere uyum sağlamış ve hem meslek mensupları hem de eğitim süreçlerinde web tabanlı yazılımlar yoğun şekilde tercih edilir hale gelmiştir.

Güncel teknoloji kullanımı, günümüzde işletmelerin rekabet gücünü, performansını ve verimliliğini en üst düzeye çıkarabilecek en önemli unsurlardan biri olarak kabul edilmektedir (Hashem ve Alqatamin, 2021: 65). Ancak güncel teknolojinin kabul edilmesi toplumun, işletmelerin ve devletlerin bu teknolojiyi benimseme eğilimleri ile teknolojiye iyimser, yenilikçi, rahatsız ve güvensiz yaklaşımı sonucuna bağlıdır (Kaya ve diğerleri, 2022: 370). Güncel teknolojinin muhasebe mesleği ve eğitiminde benimsenmesinde teknolojiye istenildiği zamanda, mekânda ve koşulda ulaşılabilmesi özelliği önemli bir etkendir (Öztürk ve Kutlu, 2017: 782). Bu açıdan da web tabanlı yazılımlar masaüstü yazılımlara göre daha değerli konumda görülmektedir. Bu bakımından muhasebe eğitiminde web tabanlı ve bulut teknolojisi temelli yazılımın öğretilmesi muhasebe

mesleği ile eğitimin entegrasyonu açısından önem arz etmektedir.

Dünya'da web tabanlı muhasebe yazılımları işletmeler ve muhasebe mesleği açısından yükselen bir değerdir. Dünya'da en çok kullanılan web üzerinden çalışan ve bulut tabanlı muhasebe yazılımları; FreshBooks, Zoho Books, QuickBooks, Bonsai, Xero, Pabbly, Wave, Sage 50cloud, Kashoo, OneUp'dır (www.softwaretestinghelp.com). Türkiye'de ise TÜRMOB (Türkiye Serbest Muhasebeci Mali Müşavirler ve Yeminli Mali Müşavirler Odaları Birliği) tarafından geliştirilen ve 2005 yılından bu yana piyasada olan Luca web tabanlı muhasebe yazılımı en çok kullanılan paket programlar arasındadır. Luca dışında Dia, Paraşüt, Rota, Bilsoft, OctoCloud gibi yazılımlar da web erişimli ve bulut tabanlı olarak öne çıkan ön muhasebe, finansal muhasebe ve ERP (Kurumsal Kaynak Planlaması) yazılımlarıdır.

Web Erişimli Ve Bulut Tabanlı Çalışan Muhasebe Yazılımlarının Avantajlarını aşağıdaki şekilde sayabiliriz (Popivniak, 2019: 174; www.parasut.com; www.dia.com.tr)

- Kurulum ve yedekleme maliyeti yoktur.
- Yazılıma internet olan her ortamda giriş yapılabilir ve veri yönetimi sağlanabilir.
- Gerçek zamanlı ve doğru bilgiye erişime olanak sağlar.
- Güncellemeler için ücret ödenmez. Yazılımda yapılan güncellemeler otomatik ve gerçek zamanlı olarak kullanıma sunulmaktadır.
- Yüksek veri güvenliğine sahiptir.
- Teknik desteği erişim kolaydır.
- Veriye her ortamdan ulaşmak mümkün olduğu için basılı evrağa ihtiyacı azaltır ve kâğıt tasarrufu sağlar.

Bu avantajların yanı sıra web tabanlı yazılıma geçişte bazı dezavantajları da vardır. Bunların başlıcaları; hızlı internet bağlantısına ihtiyaç, internete sürekli bağlantıdan dolayı güvenlik endişesi, teknolojik alt yapı eksiklikleri, farklı olan çalışma usulüne uyum sorunudur (Popivniak, 2019: 174). Bu dezavantajlara rağmen web tabanlı yazılımlara uyum sağlanması hem toplumsal hem işletmeler hem de devletler olarak bu alandaki gelecek teknolojik gelişmelere uyum noktasında da bir adım önde olmaya imkân sunmaktadır.

3. TEKNOLOJİ KABUL MODELİ

Teknoloji kabulü, toplumun yeni bir teknolojiyi veya sistemi kullanma isteği veya bir teknolojinin benimsenmesi olarak tanımlanabilir. Kişiler, yeni bir teknoloji ortaya çıktığında bu teknolojiyi benimseyip kullanma veya reddederek kullanmama davranışını gösterebilir. Bu sebeple kişilerin teknolojiyi kabul ve red davranışlarını etkileyen faktörlerin ortaya konulduğu çalışmalar önem arz etmektedir (Özaydın Özkara, 2022: 134-135). Çeyrek asırdan fazla bir zaman önce Fred Davis tarafından ortaya konulmuş olan teknoloji kabul modeli (TKM), kişilerin teknolojiyi kabulünü etkileyen faktörlerin araştırılmasında kullanılan yaygın bir modeldir (Kaya ve Diğerleri, 2022: 371).

TKM, teknoloji ürünleri kullanıcılarının davranışlarını, geniş bir bakış açısıyla açıklamaya çalışan bir modeldir. Modelin odak noktası, tutumların, niyetlerin ve kullanıcıların algıları üzerinde etkili olan dışsal faktörlerin ortaya koymaktır. TKM'nin temel unsurları; algılanan fayda, algılanan kullanım kolaylığı, kullanıma yönelik tutum, davranış niyetleri ve gerçekleşen davranıştan oluşmaktadır (Davis vd., 1989: 985). Çalışma oluşturulurken bu değişkenlerden yararlanarak anket soruları hazırlanmış ve uygulanmıştır.

4. ARAŞTIRMA

Kahramanmaraş'ta 6 Şubat 2023 tarihinde gerçekleşen deprem felaketi sonrasında yükseköğretimde online eğitime geçilmiştir. Bu kararla birlikte bilgisayarlı muhasebe gibi uygulamalı dersler de uzaktan yapılmak zorunda kalınmıştır. Araştırma, online şekilde yapılan bilgisayarlı muhasebe dersinde web tabanlı yazılım olan Luca Mali Müşavir paketini kullanan öğrencilerin bu eğitim yöntemine ve yazılıma bakışını

değerlendirmeye odaklanmıştır.

K. Araştırmmanın Amacı, Kapsamı ve Yöntemi

Çalışmanın amacı, online eğitimde bilgisayarlı muhasebe dersi kapsamında web tabanlı yazılım (Luca Mali Müşavir Paketi) kullanan muhasebe öğrencilerinin web tabanlı yazılımlara bakışını değerlendirerek, muhasebe eğitimi konusunda öneriler sunmaktadır. Bu kapsamda Sakarya Uygulamalı Bilimler Üniversitesi Sakarya Meslek Yüksekokulu’nda bilgisayarlı muhasebe uygulamaları dersini alan ve sınavlara aktif şekilde katılan 65 muhasebe öğrencisinin tamamına anket yöntemiyle ulaşılmıştır. Ankete katılanlara; kişisel bilgileri ve teknoloji kabul modelinden yararlanılarak web tabanlı yazılıma bakışını içeren sorular ile online eğitime dair genel sorular yöneltilmiştir. Veriler Google form yardımıyla uzaktan toplanmış olup, anketlere 53 geçerli geri dönüş (%82) alınmıştır. Elde edilen cevapların frekans değerleri üzerinden değerlendirme yapılmıştır.

L. Araştırmmanın Kısıtları

Araştırma Sakarya Uygulamalı Bilimler Üniversitesi Sakarya Meslek Yüksekokulu’nda bilgisayarlı muhasebe dersi kapsamında online olarak web tabanlı muhasebe yazılımı öğrenmekte olan öğrenciler üzerinde yapılmaktadır. Araştırma evrenini toplam 65 öğrenci oluşturmaktadır, geçerli geri dönüş de 53 öğrenci ile %82 oranında gerçekleşmiştir. Araştırma evrenini oluşturan öğrenci sayısının az olması nedeniyle veriler frekanslar üzerinden değerlendirilmiştir.

M. Araştırma Bulguları

Araştırmaya katılanların kişisel özellikleri, online eğitimde web tabanlı yazılım kullanımı algıları ve online eğitime bakışları ayrı tablolar halinde incelenmiştir. Araştırmaya katılanların kişisel özelliklerine ilişkin frekanslar Tablo I’de görüldüğü şöyledir:

Tablo 1. Katılımcıların Kişisel Özellikleri

		Frekans	Yüzde
Cinsiyet	Erkek	14	26,4
	Bayan	39	73,6
Yaş	19 Yaş Altı	5	9,4
	19-22	39	73,6
	23-26	4	7,5
	30 ve üzeri	5	9,4
Liseden Mezun Olunan Bölüm	Meslek Lisesi--Muhasebe	15	28,3
	Meslek Lisesi--Diğer Sosyal Bölümler	4	7,5
	Meslek Lisesi--Teknik Bölümler	4	7,5
	Anadolu Lisesi	19	35,8
	Diğer	11	20,7
Ailesinin Yaşadığı Yer	Köy	7	13,2
	İlçe	11	20,8
	Şehir	9	17
	Büyükşehir	26	49,1

Tablo I'deki bilgiler incelendiğinde araştırmaya katılan öğrenciler ile ilgili dikkat çekici olan durumları şu şekilde özetleyebiliriz:

- Öğrencilerin büyük çoğunluğu (%73,6) bayandır.
- Öğrencilerin büyük çoğunluğu (%73,6) 19-22 yaş aralığındadır.
- Öğrencilerin büyük çoğunluğu (%71,7) muhasebe eğitimi verilmeyen diğer liselerden mezun olmuştur.
- Öğrencilerin büyük çoğunluğu (%49,1) ailesi büyükşehirde ikamet etmektedir.

Tablo II'de katılımcıların muhasebe alanında çalışma deneyimleri, mesleğe devam etme düşünceleri ve yazılım kullanım durumları verilmiştir.

Tablo 2. Katılımcılara Ait Mesleki Bilgi

		Frekans	Yüzde
Muhasebe Alanında Çalışma deneyimi	Deneyimim yoktur	31	58,5
	1 yıldan az	13	24,5
	1 yıldan fazla 2 yıldan az	5	9,4
	2 yıldan fazla	4	7,5
Muhasebe Mesleğine Devam İsteği	Kesinlikle düşünmüyorum	1	1,9
	Düşünmüyorum	3	5,7
	Kararsızım	10	18,9
	Düşünüyorum	23	43,4
	Kesinlikle düşünüyorum	16	30,2
Luca Dışında Muhasebe Yazılımı Kullandınız mı?	Hiç kullanmadım	33	62,3
	Kısa süre kullandım	6	11,3
	Kullandım	11	20,8
	Çok sayıda yazılım kullandım	3	5,7

Tablo II'deki bilgiler incelendiğinde araştırmaya katılan öğrenciler mesleki bilgi ve düşüncelerini şu şekilde özetleyebiliriz:

- Öğrencilerin büyük çoğunluğunun (%58,5) muhasebe alanında deneyimi yoktur.
- Öğrencilerin büyük çoğunluğu (düşünüyorum 43,4, kesinlikle düşünüyorum 30,2) mezun olduktan sonra muhasebe mesleğine devam etmeyi düşünmektedir.
- Öğrencilerin büyük çoğunluğu (%62,3) Luca yazılımı dışında muhasebe yazılımı kullanmadığını ifade etmiştir.

Tablo III'de katılımcıların online eğitimden ve bilgisayarlı muhasebe dersinin online yapılmasından memnuniyet düzeyleri sunulmuştur. Araştırmaya katılan öğrencilerin online eğitimden ve bilgisayarlı muhasebe dersinin online yapılmasından memnun olmadıkları sonucuna ulaşılmıştır.

Tablo 3. Katılımcıların Online Eğitime Bakışı

Online Eğitime Bakış		Katılımcı Sayısı	Ortalama
S1	Online eğitimden genel olarak memnunum.	53	2,87
S2	Bilgisayarlı muhasebe dersinin online yapılmasından memnunum.	53	2,58

Tablo IV’de ise, Teknoloji Kabul Modeli’nden yararlanılarak hazırlanan sorular üzerinden algılanan fayda, algılanan kullanım kolaylığı, tutum ve algılanan performans boyutları ile katılımcıların memnuniyet düzeyleri incelenmiştir.

Tablo 4. Katılımcıların Takım İfadeleri

Algılanan Fayda		Katılımcı Sayısı	Ortalama
S1	Web tabanlı yazılım kullanmak işlemi kolaylaştırır.	53	3,89
S2	Web tabanlı yazılım kullanmak dersteki performansımı artırmaktadır.	53	3,79
S3	Web tabanlı yazılım kullanmak verilen ödevleri daha hızlı bir şekilde yapmamı sağlar.	53	3,72
S4	Web tabanlı yazılım kullanmak dersteki verimliliğimi artırmaktadır.	53	3,72
S5	Web tabanlı yazılım kullanmak dersin etkinliğini artırmaktadır.	53	3,96
S6	Genel olarak web tabanlı yazılım mesleki geleceğim için faydalıdır.	53	4,0
Algılanan Kullanım Kolaylığı		Katılımcı Sayısı	Ortalama
S7	Web tabanlı yazılımı öğrenmek benim için kolaydır.	53	3,53
S8	Web tabanlı yazılımı istediğim bilgiyi elde etmemeye izin verecek şekilde kullanabilirim.	53	3,66
S9	Web tabanlı yazılım kullanımımı benim için açık ve anlaşılması kolaydır.	53	3,40
S10	Genel olarak web tabanlı yazılım kullanımını kolay buluyorum.	53	3,47
Tutum		Katılımcı Sayısı	Ortalama
S11	Web tabanlı yazılımı kullanmak beni mutlu eder.	53	3,68
S12	Web tabanlı yazılımı kullanmayı severim.	53	3,68
S13	Web tabanlı yazılımı nasıl kullanacağımı öğrenmek benim için zevkti.	53	3,79
Algılanan Performans		Katılımcı Sayısı	Ortalama
S14	Görevlerimi yapmak için web tabanlı yazılımı başarıyla kullanıyorum.	53	3,62
S15	Web tabanlı yazılım kullanmanın ders performansındaki etkisinden memnunum.	53	3,75

Tablo IV'deki bilgiler incelediğinde araştırmaya katılan öğrencilerin online eğitimde web tabanlı yazılım kullanımı ile ilgili görüşlerinde dikkati çeken durumları şu şekilde özetleyebiliriz:

- Web tabanlı yazılım kullanımı öğrencilerin işini kolaylaştırmakta, dersteki performanslarını ve dersin verimliliğini artırmaktadır.
- Öğrenciler web tabanlı yazılım kullanımının meslekteki gelecekleri için çok faydalı olduğunu düşünmektedir.
- Web tabanlı yazılımın öğrenimi ve anlaşılmamasının çok kolay olmadığı düşünülmektedir.
- Web tabanlı yazılımı kullanmayı öğrenmenin zevkli olduğu ifade edilmiştir.
- Web tabanlı yazılım kullanmanın ders performansını olumlu etkilediği ifade edilmiştir.

SONUÇ

Günümüzde güncel bilgi ve iletişim teknolojilerini kullanabilme becerisi muhasebe meslek elemanlarında aranan en önemli niteliklerden biridir. Özellikle yükseköğretim muhasebe eğitimiinde, öğrencilere güncel teknolojilerin ve uygulamaların öğretilemesine önem verilmektedir. Bu bakımdan web tabanlı muhasebe yazılımlarını da muhasebe mesleğinin geleceğinde etkili olacak önemli ve güncel bir teknoloji olarak konumlandırmak mümkün görünmektedir. Ayrıca pandemi, doğal afet gibi olağanüstü zamanlarda online eğitimin zorunlu olduğu durumlarda web tabanlı yazılımların önemini daha da artacağı değerlendirilmektedir.

Araştırmaya katılan öğrencilerin büyük çoğunluğunun; ortaöğretimde muhasebe dersi görümediği, mesleki tecrübesinin olmadığı, gelecekte muhasebe mesleğini yapmak istediği ve Luca programından başka bir program kullanmadığı görülmektedir. Ayrıca genel olarak online eğitimden ve bilgisayarlı muhasebe dersini online yapmaktan memnuniyet düzeyinin düşük olduğu tespit edilmiştir.

Araştırma sonucunda online eğitimde muhasebe öğrencilerinin web tabanlı yazılım kullanmalarına bakışını aşağıdaki şekilde özetleyebiliriz:

- Öğrenciler web tabanlı yazılım kullanımının meslekteki gelecekleri için çok faydalı olduğunu ifade etmiştir.
- Öğrenciler web tabanlı yazılımı anlamalarının kolay olmadığını, ancak eğitimin zevkli geçtiğini belirtmiştir.
- Web tabanlı yazılım kullanmanın dersin performans ve verimliliğini artırdığını belirtmiştir.

Araştırmada elde edilen bulgular çerçevesinde; online eğitimin uygulamalı derslerde teorik içerikli derslere göre kabulünün daha düşük düzeyde olduğu görüşüne ulaşılmıştır. Bu nedenle yazılım temelli uygulamalı derslerin sıkıştırılmış da olsa yüz yüze gerçekleştirilmesinin daha faydalı olacağı görülmektedir. Online yapılmasının zorunlu olduğu durumlarda da web tabanlı yazılımların tercih edilmesinin uygun olacağı düşünülmektedir.

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SOSYAL MEDYA KULLANIMININ İŞLETMELERDEKİ ÖNEMİ

THE IMPORTANCE OF SOCIAL MEDIA USE IN BUSINESSES

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Özet

Çalışmada sosyal medya kullanımının işletmelerde çalışanlar üzerinde nasıl etki yaptığı ve çalışma performanslarına yansımاسının sonuçları değerlendirilmiştir. Teknolojinin gelişimi ve internetin yaşama girmesi ile sosyal ağlar aktif olmuştur. Genel olarak her geçen gün artan sosyal ağlar beraberinde sosyal medyayı oluşturmuştur. Yaşamın her anına giren ve bizleri müptela / etkisi altına alan sosyal medya iş ortamında da aktif olarak yer almaktadır. Telefon veya mail yolu ile herhangi bir sebeple ulaşılamayan kişiye sosyal medya üzerinden anında ulaşabilmektedir. Soru-yanıt almakla birlikte, fotoğraf, yer bildirimi ve doküman hatta imza dahı alınabilmektedir.

Bu durum gelişen teknoloji ile artan iş sorumluluğunu kolaylaştırmakta ve işe verimlilikte etki etmektedir. Artan rekabet ve iş dünyasının derinleşmesi, işlerin çeşitlenmesi ve ortaya konacak sonucun farklılıklarla özelleştirilerek piyasada yer alması sosyal medya kullanımının önemini göz önüne sermektedir.

Çalışmada 455 çalışana anket uygulanmış ve sosyal medya kullanımının işletmedeki verimliliğe nasıl yansığı ölçülmeye çalışılmıştır.

Anahtar Kelimeler: Sosyal Medya, İş Verimliliği, Gelişen Teknoloji

Abstract

This study aims to evaluate the effects of social media usage on employees in businesses and to also reflect on the results concerning employee performance. With the advancement of technology and the introduction of the internet, social networks have become an active part of our lifestyle. Generally, it can be said that social media was created because of the increasing usage of social networks in our day-to-day lives. Indeed, not only has social media entered every aspect of life, social media affects us in terms of active involvement in the business environment as well. For example, the individual who cannot be reached for any reason by phone or e-mail can be reached instantly through social media interaction. Additionally, social media technology allows us to send photographs, location notifications, multiple documents, receive questions and answers, and also obtain signatures.

Under these circumstances, the developing technology not only positively affects the productivity of the workplace environment but also expands and influences work responsibilities. Furthermore, the importance of social media can be traced through the increasing competition and overall intensity of the business world, the diversification of the workplace, and presentation of customized results that earn their place according to market specifics.

In this study, a questionnaire was supplied to 455 employees in order to measure how the use of social media reflected on the productivity throughout the business.

Keywords: *Social Media, Business Efficiency, Emerging Technology*

1.GİRİŞ

Teknolojinin gelişimi ve internetin yaşama girmesi ile sanal ağlar her an özel ve kamusal alanımızda vazgeçilmez bir yer almıştır. İletişim yaşamın her anında bizimle var olmakta ve her ortamda konuya şekil vermektedir. Her mecrada olduğu gibi temelde doğru bir iletişim olması gereklidir. Bu gereklilik de işletmeler ele alındığında, kurum içi iletişimimin, işletme yönetimi ve çalışan kişilerin doğru bir ilişki kurması için gerekli ve önemlidir. Sosyal ağlar sayesinde çalışanlar hem kendi aralarındaki ilişkide, hem de kurumsal iletilerin daha süratli aktarılmasında ve buna ek olarak tüm bilgilere erişebilmelerinde hız yakalamaktadırlar. (Okay ve Okay 2015: 281-299). Teknolojinin gelişimi, özellikle internetin teknoloji ile bütünleşmesi sosyal ağların kullanımını beraberinde getirmiştir ve kurum için iletişimine yöntem olarak çeşitlilik ve hız getirmiştir. (Gürel 2009).

Bir diğer yandan bireysel ilişkiler bağlamında sosyal medya kullanımının artması kişilerarası etkileşimin azalmasına neden olabiliyor. Yüz yüze konuşulabilecek iken e-mail veya sosyal ağlardan birinden gönderi yapmak tercih edilebiliyor. Bunun yanında geniş bir dinleyici kitlesinin olduğu bir ortamda katkıda bulunmak yerine metin mesajları gönderilebiliyor. Sosyal medyanın anında kullanılabilirliği duygusal ve düşünceleri geniş kitlelere dahi anında iletilebilirken bir yandan birebir yüz yüze sıcak iletişimleri de köreltebiliyor. (Diercksen ve diğerleri., 2013b).

Sosyal ağların dijital dünyada sanal yaşama hazırlama rolü etkin olarak görülebilmektedir. Yaşamın hızı, internet ve kullanımı ile ve de iletişim teknolojilerinin çeşitlenmesi ile daha da artmıştır. İnsanlığı atmosferi içine alan sosyal medya sağladığı yaşam kolaylığı ile özümsememiştir. Yaşamla o kadar bütünsüzmiş ve o kadar doğallaşmıştır ki iletişimde vazgeçilmez bir yaşam kaynağı haline gelmiştir. Doğallığın sanallıkla örtüğü mucizevi bir uyum ve kabul dengesi olarak yaşamımızda yer almıştır. İnternetin dolayısı ile sosyal ağlar ve sosyal medyanın yaşamda var olmaması gibi bir şey düşünülemez duruma gelmiştir.

Yaşamın her anında, her alanında hakim olan internet, sosyal ağlar, sosyal medya özel yaşam ve iş yaşamında vazgeçilmez, ayrı düşünülmeye bir yaşam parçası olmuştur.

Sosyal ağların sağladığı anında iletişim kolaylığı yoğun iş temposu içerisinde kolaylık sağlamaktadır. İş akışının hızını yoğun tempo içerisinde artırması sosyal ağların cazibesini ve kullanımını da artırmıştır. Yapılan araştırmalar, özellikle WhatsApp kullanımını anında gerçek zamanlı mesaj gönderimi sağladığından 21.yy'ın en popüler iletişim aplikasyonu olarak ortaya koymuştur (Ahada ve Lima, 2014, p.189).

Bugün WhatsApp üzerinden iş ile ilgili veya kişisel tüm bilgi ve belgeler, dökümanlar, fotoğraf da dahil

olmak üzere anında gönderilebiliyor. İş yeri içerisinde uzak bir noktada veya iş saatı içerisinde bulunduğuuz her ortamda iletilere erişebiliyor ve iletim yapılabiliyor. Kısacası, sosyal medya ile anında geribildirim yapılabiliyor.

2. TEORİK ÇERÇEVE

İnternetin ortaya çıkması ile aktif duruma gelen iletişim, tek yönlü olmaktan çıkışmış çok yönlü iletişim olanak sağlanmıştır. Internet sayesinde cep telefonu ve tabletler ile her ortamda iletişim gerçekleştirilir duruma gelmiştir. Öyle ki bu süratle gerçekleşen bağlantılar, insanlar arası iletişim ve etkileşimi farklılaştırmış ve her alanda yaşam biçimini değiştirmede etkin rol oynamıştır.

Bireyler arası iş ortamında kullanılan sosyal ağlar, işin hızını artırmakta ve mesajın gözden kaçmasını olanaksız hale getirmektedir. Bu aynı zamanda işletme ile tüketiciler arasında da kolaylık sağlamaktadır. Mangold ve Faulds'un belirttiği gibi "Sosyal medya; bloglar, şirket tartışma panoları, sohbet odaları, tüketiciler arası web siteleri, internet tartışma panoları ve forumları kapsayan çok geniş kapsamlı ve iki yönlü etkileşime dayalı çevrimiçi ağlardan oluşmaktadır." (2009; 358). Sosyal medya kullanımını çift yönlü aktif olunca, işletme-çalışan, çalışan-tüketici, sorun, görüş-öneri, noktasında daha bütüncül bir yaklaşım söz konusu olup, daha sağlıklı iş ortamı kurulmakta, daha faydalı bir üretim ve sunum için ortam oluşturabilmektedir. Bu anlamda da hem sürat gerçekleştirmekte hem etkileşim halinde iletişim akışı olmakta ve daha verimli iş ortamı ve tüketiciye daha tatminkâr hizmet sunumu ortaya çıkmaktadır.

İş ortamında telefon kullanımının mail gönderiminin önüne geçen sosyal ağ ve sosyal medya kullanımını bireysel özel iletişimde, kişilerarası iş amaçlı iletişimde de olmak üzere hem tek yönlü hem çift yönlü olabilmektedir.

Kara'nın da belirttiği gibi "etkileşim/karşılıklı iletişim ve mikro çip/mikro işlemci" kelimeleri, yeni iletişim ortamlarını tanımlamamıza ve anlamamıza yardımcı olan temel unsurlardır. Bir başka deyişle, yeni iletişim ortamları için ana belirleyiciler; dijitalleşme ve etkileşimdir."(2013, 14).

Dijitalleşme ile etkileşim kaçınılmaz olmuştur. Dijitalleşme ve etkileşim ile anında soru-cevap, yorum, aktarım, paylaşım ve yaşamın yönünü belirleme gerçekleştirmektedir. Bireyler, toplulukları aynı noktada buluşturan ve düşünce, duygular, hareket ve olayların vuku bulmasında etkin olan iki önemli olgu olarak yaşamda yer almaktadır. (Woodall ve Colby, 2011). Sosyal medyanın geleneksel medyaya göre daha cazip oluşunun dört nedeni olduğunu ve bunların; kullanıcıların iletişim istedikleri zaman geçmeleri, kullanıcıların sosyal medyada deneyimlerini paylaşarak iletişim ağlarını genişletebilmeleri, kullanıcıların her türlü konuda düşünce paylaşımı yapabilmeleri, kullanıcıların diğer sosyal medya kullanıcıları ile her konuda etkin bir şekilde bilgi alış-verişini içerdigini belirtmektedirler.

Kaskinan ve Saarima sosyal medyayı; Internet kullanıcılarının içerik, fikir, içgörü, deneyim ve perspektiflerini paylaşmak için kullandıkları metin, imaj, ses, video ve daha birçok formdaki çevrimiçi teknolojiler ve pratikler olduğunu vurgulamışlardır. (Aydoğan ve Akyüz, 2010, s. 94)

Fuchs sosyal paylaşım ağlarını kullanıcılarına kendi bağlantı listelerini sergilemelerine ve bilgilerinin yer aldığı profillerinin üretilmesine olanak sağlayan, farklı medya, bilgi ve iletişim teknolojilerini içinde barındıran web tabanlı platformlardır şeklinde tanımlanmıştır (2011, s. 141).

Sosyal medya yaşama öyle bir alan yaratmıştır ki bu alan içerisinde sınırlar ortadan kalkmıştır. Küreselleşmede önemi büyük olan sosyal medya bir anlamda da sosyal, siyasal, ekonomik ve kültürel pek çok değişikliğin gerçekleşmesine sebep olmuştur. Küreselleşme, sosyal medya ile hızlanmıştır.

Kullanım amacı ve içeriğine göre sosyal ağlar, sanal dünyalar olarak da tanımlanabilirken interaktif, geniş kitlelere ulaşımın yüksek ve manipülasyona açık olması genel olarak sosyal medyanın niteliklerini ifade etmektedir. Bu nitelikler ile de bireylerarası kişisel ve kurumlararası kitlesel iletişimlerde sosyal medya büyük önem taşımaktadır. Bireylerarası ilişkilerin yönlenmesinde ve bu ilişkilerin kurum içerisinde şekil

almasında hassas bir etkinliğe sahip sosyal medya kurum içi üretkenlik ve verimliliğe de yansımaktadır. Kurum içi paylaşılan belgeler, fotoğraflar, bilgiler ve işin süratle ilerlemesini sağlayan her aktarım kuruma olumlu yönde bir dönüş sağlamaktadır. Öyle ki sosyal medya sayesinde kurum ve tüketici arasında sağlanan iletişim de çift yönlü faydalar sağlamaktadır. Etkilik ve faydalar çerçevesinden bakıldığından sosyal medyanın üretkenlik ve verimliliğe de etki yaptığı söylenebilir. Üretkenlik, oluşumun, oluşturan faktörlere oranı yani girdi ve çıktı arasındaki oran olarak tanımlanırsa, verimlilikte en az girdi ile en çok çıktı ortaya çıkarmak olarak tanımlanabilir.

Eren ve Erol'un belirttiği gibi "verimlilik kavramının işletme yönetimi literatüründe tanımı, en az harcama ve özveride bulunarak mümkün olan en yüksek üretim veya hizmeti gerçekleştirmek" şeklinde olabilir (2001; s. 126).

İşteki tatmin ve memnuniyetin performansa yansığı ve bunun günümüz rekabet ortamında büyük önem taşıdığı kaçınılmaz bir gerektir. Sosyal medyanın iş hızına katkısı, üretim ve çalışanın verimliliğine destek vermektedir.

Bunun yanında çalışma saatleri içerisindeki bireysel kullanıcıların da verimliliği olumsuz etkileyebileceği tartışılmaktadır. Ancak iş ile ilgili olmayan, sadece bireysel merak ve sosyal çevre paylaşımını takip dışında sosyal medya içerisinde çeşitli sebeplerle gezinmek hem iş ortamındaki konsantrasyonun düşmesine, işten kopmaya hem de görevde odaklanamamaya neden olabilmektedir.

Çalışma saati süresince sosyal medyaya meşgul olmak, çalışanlar için düşük verimlilik düzeyine neden olan zamanın boş geçirilmesine katkı sağlayan bir faktör olabilir (Munene ve Nyaribo, 2013). Sosyal medyanın dezavantajlarından biri de yüz yüze iletişimini azaltıp, yalnızlığı artırmaktadır (Özdemir, 2014). Sosyal medyayı iş ortamı içerisinde çalışma kaynaklı kullanmak iş hızını, verimliliği ve başarıyla işi yürütme motivasyonu ile memnuniyeti ve de aidiyeti artıracaktır. Kullanım şekli ve içeriğinin çok önemli olduğu ve özel ile kamu arasında hassas bir çizgide olduğu göz ardı edilmemelidir.

Teknolojinin gelişimi ile internetin de kendini sürekli yenilemesi sosyal ağların çeşitlenmesine zemin, sosyal medyanın da yaşamın tam anlamıyla merkezine yerleşmesine temel olmuştur.

Solmaz ve arkadaşlarının da belirttiği gibi "Kendini sürekli yenileyen internet sosyal medya ile kendi içinde altın çağını yaşamaktadır. Bu çağ öyle bir çağdır ki insanların hayatlarına dokunmaktadır." (2013, s. 24).

İnternetin ve sosyal medyanın yaşamımıza girmesiyle bireylerin tercih ve kullanım hakkını artmıştır. Bireyler en önemli ihtiyaçlarından biri olan sosyal bağ kurma ve bir sosyal gruba ait olma ihtiyaçlarını sosyal medyayı kullanarak karşılamaktadırlar (Wang ve diğer., 2012).

Papacharissi ve Rubin'ın (2000), internet ve sosyal medyanın kullanma nedenleri üzerine yapmış oldukları araştırmaların, kişiler arası fayda, bilgi arama, eğlence, kolaylık ve zaman geçirme olduğunu göstermiştir.

Cha'nın (2010) yaptığı çalışmada sosyal ağların kullanımının ve bu kullanım süresinin artmasının kişiler arası faydayı yönlendirip artırdığı ortaya çıkarılmıştır.

Gao ve Feng (2016) de, sosyal medya durumunu beş kategoride sınıflandırmıştır. Bunlar; Bilgi arayışı, eğlence, sosyal etkileşim, kendini ifade etme ve izlenim yönetimi olarak ifade edilmiştir.

Sosyal ağlar ve sosyal medya kullanımını çeşitli şekillerde sınıflandırılarak ifade edilirken, bireyler arası iletişim ve etkileşim gücünün iş gücüne de yansımıya yaptığı söylenebilir.

3. METOD

Çalışmada sosyal medya kullanımının işletmelerdeki önemi ve bunun iş verimliliğine nasıl yansığını ölçebilmek için 455 çalışana anket uygulanmıştır. Ankette, cinsiyet-yaş, uyruk, çalışma yeri, kamu alanı, özel sektör, akademisyen, ofis çalışanı ve yönetici olmak üzere kriterler dikkate alınmıştır.

Sosyal medya kullanımının yarattığı bağımlılık, iş yaşamını nasıl etkilediği hız ve sürat bağlamında günlük rutinin bir parçası olduğu, hiyerarşik yapıyı nasıl bağladığı işlerin koordinasyonundaki etkinliği gibi faktörler değerlendirilmiştir ve sosyal medya kullanımının işletmeler üzerindeki etkisi ortaya çıkarılmaya çalışılmıştır. Çalışmanın uygulama alanı hem kamu hem de özel sektör olmuştur. Çalışma, kesin karşılaşmalıdır ve net sonuca götürülebileceği düşünüldüğünden hem alt hem de üstlere uygulanmıştır. Böylelikle sosyal medya kullanımının devlet veya özel iş yerlerinde nasıl kullanıldığı ve etkililiğinin gözlemlenmiş olacağı düşünülmüştür. Ortaya çıkacak sonucla sosyal ağların, sosyal medyanın yaşamı, iş ilişkilerini nasıl şekillendirmiş olduğu daha net değerlendirilmiş ve net bir sonuca ulaşılacağı kararına varılmıştır.

4. DEĞERLENDİRME

Çalışmada, kamu ve özel farklı alanlarda 455 çalışana uygulanan ankette katılımcıların demografik özelliklerine göre sonuçları, katılımcı kadınların (%56.7) erkeklerle göre (%43.3) daha fazla olduğu, katılımcıların yaşlarının 25-35 (%37.8), 36-46 (%34.7), İran (%2.4), İngiliz (%2) ve diğer (%2.9) ülkelerden olduğu, katılımcıların yarıdan fazlasının özel üniversitelerden (%52.1), devlet içinde çalışanların (%35.5) ve özel sektörden (%12.3) olduğu görülmüştür. Statüye göre değerlendirildiğinde akademisyenlerin (%54.7), ofis çalışanlarının (%9), yönetici pozisyonunda olan (%4.4) ve diğerlerinin (%31.9) olduğu analiz edilmiştir.

Analiz sonuçlarına göre sosyal medya kullanımının iş kurumu içerisindeki iletişim zincirinde büyük oranda kullanıldığı, kişiler arası özel kullanımların da yüksek oranında olduğu iş yeri işleyişinde aktivite organizasyonunda önemli bir oranda kullanımda yer aldığı, işin planlama ve koordinasyonunda büyük oranında sosyal ağlar ve sosyal medya kullanımının olduğu, hızla yol almakta da ayrıca önem taşıdığı ve bunun iş performansına olumlu yönde etki yaptığı değerlendirilmiştir.

Anket sonuçlarına göre iş yerinde karşılıklı/iki yönlü olumlu iletişimde sosyal ağların katkı sağladığı ve iş performansını olumlu etkilediği sonucu çıkmıştır.

Sosyal ağlar ve sosyal medyanın çalışanlar arasındaki ilişkiyi güçlendirdiği ve daha motive daha keyifli iş yaptıkları analiz edilmiştir.

Sosyal ağlar ve sosyal medyanın hız sağlama nedeni ile ise konsantrasyonun ve bağlılığın/aidiyet'in arttığı ve iş performansına olumlu yönde etki yaptığı ortaya çıkmıştır.

5. SONUÇ

Çalışmada, sosyal ağlar ve sosyal medyanın Kuzey Kıbrıs Türk Cumhuriyeti içerisinde kamu ve özel kesim olmak üzere işletmelerde kullanımının işletmeler için önemi üzerine çalışılmıştır.

Çalışmanın amacı sosyal ağlar ve sosyal medyanın kullanımı ve bu kullanımının iş performansına dolayısıyla işletmelerdeki verimliliğin ve üretkenliğin yükselmesinde önemini ortaya konmasında önemini vurgulanması olmuştur.

Teknolojinin gelişimi ile sosyal ağların ve sosyal medyanın özel ve sosyal yaşamımıza hükmetmesi ve nefes alışımız gibi öncelikli ve vazgeçilmez duruma gelmesi işletmelerin yaşamına ve rekabet içerisinde yol almalarında da aktif ve etkin bir rol oynamıştır. Değerlendirme bölümünden elde edilen sonuca göre sosyal medya kişiler arası iletişimini güçlendirmekle beraber iş performansını olumlu etkilemeye, çalışanlar arası ilişkileri de güçlendirerek, iş ortamını daha keyifli hale getirmektedir. Keyifli ve güclü olumlu etkileşimin olduğu iş ortamında da iş performansı yükselterek verimlilik artmaktadır. Bu olumlu akışla, sosyal medyanın getirdiği hız, konsantrasyon ve işe aidiyeti de olumlu yönde etkilemeye, üretkenliği de artırmaktadır.

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HAVAYOLU ULAŞIMI HİZMET KALİTESİNİN SERVQUAL YÖNTEMİYLE ÖLÇÜMÜ

*MEASUREMENT OF AIR TRANSPORTATION SERVICE QUALITY BY
SERVQUAL METHOD*

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ÖZET

Havacılık sektörü, küresel ekonomilerin ve ticaret ağlarının odağında gelişen ve geçmişten günümüze kadar uzanan köklü bir yapıya sahiptir. Bu nedenle hava taşımacılığını oluşturan bileşenlerin her biri sektörde ayrı bir öneme sahipken bu önemin gerekçesi olarak zamanla başlı başına bir pazar haline gelen havayolu ulaşımı rekabet piyasalarında yerini almıştır. Tüketicilerin kalite ve hizmet anlayışında her geçen gün daha fazla talepkâr olması ise hem rekabeti artıran bir etkiye sahip hem de kalitede ve hizmette işletmeleri sürekli yenilik ve gelişmelere açık hale getirmektedir. Algılanan hizmet kalitesinin, müşteri memnuniyet düzeyi ve hizmetin tekrar talebi üzerinde önemli bir etkiye sahip olması nedeniyle algı boyutu ve değer göstergelerini ölçmek, işletmelerin kendilerine yol haritaları çizme sürecinin bir parçası olmaktadır. Havayolu ulaşımındaki hizmet kalitesi ve algılanan kalite açısından araştırma amacıyla yönelik nicel araştırma yöntemlerinden anket tekniği kullanılarak bir çalışma ortaya konulmuştur. Bu anket çalışması için sorular çeşitli akademik yaynlardan derlenerek yeni bir ölçek oluşturulmuş ve bu ölçüge yönelik güvenilirlik-geçerlik analizleri yapılmıştır. Ölçeğin güvenilirlik ve geçerlik katsayıları kabul değerlerinde olduğundan ölçek çalışmada kullanılmaya karar verilmiştir.

Anahtar kelimeler: Havayolu Ulaşımı, Hizmet, Kalite

ABSTRACT

The aviation industry has a deep-rooted structure that develops at the center of global economies and commerce networks and extends from the past to the present. For this reason, while each of the components of air transportation has a separate importance in the sector, air transportation, which has become a market on its own, has taken its place in the competitive markets as the reason for this importance. The fact that consumers are becoming more demanding in terms of quality and service concepts both has an effect that increases competition and makes companies open to continuous innovations and developments in quality and service. Since perceived service quality has a significant impact on the level of customer satisfaction and repeat service demand, measuring perception size and value indicators is a part of the process of drawing roadmaps for companies. In terms of service quality and perceived quality in air transport, a study was conducted using the survey technique,

one of the quantitative research methods for research purposes. For this survey study, a new scale was created by compiling the questions from various academic publications, and reliability-validity analyses were made for this scale. Since the reliability and validity coefficients of the scale were at acceptance values, it was decided to use the scale in the study.

Keywords: Air Transportation, Service, Quality

GİRİŞ

Havayolu ulaşımı, ulaşım ağı içinde önemli bir yere sahiptir. Ulaşım bugün ekonomilerin ve ticari faaliyetlerin temelinde yer alır. Hem ülkeler arası ticari faaliyetlere hem de ülkelerin kendi ulaşım sahalarında Havayolu ulaşımı yük ve yolcu taşımak amacıyla kullanılmaktadır. Tarihsel süreçte bakıldığından Havayolu ulaşımı son yüzyılda gelişme gösteren ancak en çok değişimin yaşandığı bir sektör haline gelmiştir. Zaman ve hız açısından büyük avantajları olan Havayolu ulaşımı ve taşımacılığı diğer ulaşım hizmetlerine göre farklılıklar arz eder. Bu farklılıkların başında maliyetlerin yüksekliği ile verilen hizmetlerin çeşitliliği gelmektedir. Bu bağlamda Havayolu ulaşımında kalite ve hizmet öncelikli olmaktadır. Müşteri memnuniyeti ve bekłentilerinin de yüksek olması bu sektördeki hizmet anlayışının öncüllerinin belirleyicisi olarak kabul görmektedir. Bu nedenle Havayolu hizmetlerinde hizmet kalitesinin ölçümü önemsenmektedir.

Havayolu taşımacılığı ve ulaşım sektöründeki kalitenin ölçümlenmesi adına yapılan pek çok çalışma bulunmaktadır. Özellikle yolcuların Havayolu şirketlerinden aldığı hizmetleri değerlendirmeye bağlamında yapılan çalışmalarla hizmet kalitesi ve memnuniyet algısı sorgulanmaktadır. Bu çalışmada Havayolu hizmet kalitesi ölçümü için müşteri olarak kabul edilen hizmet alıcılarla yönelik planlanan çalışmada hizmet kalitesi ölçümü amacıyla sorular oluşturulmuştur. Bu soruların çeşitli çalışmalarдан alınan soru ve analiz sonuçlarından hareketle çerçevesi oluşturulmuş ve derlenen sorulardan uygulanacak anket soruları seçilmiştir. Bu bağlamda soruların güvenilirlik ve geçerlik analizleri de yapılmıştır.

Hizmet Kalitesi

Kalite, verilen bir hizmetin veya üretilen bir malın kullanıcı tarafından algılanan bir olgu olmasının yanı sıra bu mal ve hizmet sunan tarafın da belirlediği bir ölçütür. Kalite mal ve hizmetlerdeki etkinliğin ve performansın göstergesi olan bir araçtır. Hizmet üreten işletmeler için kalite algısını ölçmenin müşterilerin farklı değer yargılarından dolayı daha zor olduğu bilinmektedir (Pekkaya ve Akıllı, 2013). Hizmet kalitesi ise beklenen hizmet ve algılanan hizmet kalitesi olarak iki farklı yönyle ele alınmaktadır (Ling vd. 2005; Park, 2005; Saha ve Theingi, 2009; Kee Mun ve Ghazali, 2011; Ramez, 2012). Bu iki kalite algısı arasındaki ilişki müşterilerin davranışlarını belirleyen önemli bir belirteç olarak görülmektedir. Bu açıdan farklı hizmet kalitesi ölçüm araçları bulunmaktadır. Bu araçlardan hizmet sektöründe olması gereken hizmeti ölçmek amacıyla bilinen bir yöntem olan Parasuraman vd. (1988) tarafından geliştirilmiş SERVQUAL yöntemi de sıkılıkla kullanılmaktadır.

Hizmet pazarlaması anlayışına göre hizmet sektöründe yer alan işletmelerin çalışanlarının alt, orta ve üst kademelerinde yönetici olarak çalışanların tüketici bekłentilerinin neler olduğunu eksiksiz olarak bilemedikleri yapılan araştırmalarda ortaya çıkmaktadır (Zeithaml vd. 1988). Hizmet kalitesi anlayışının tüketicilerin sahip olduğu farklılıklar gereği birbirinden farklı olduğu tespit edilmiştir. Bu açıdan hizmet kalitesinin yüksek olması amacıyla pazar araştırmaları yapılması zorunlu hale gelmektedir (Lovelock, 1996: 470). Kısacası tüketicilerin istek ve ihtiyaçlarına cevap verebilmek amacıyla veri toplamak, sistematik bir yaklaşımla pazarlamam araştırması yapmak ve kapsamlı bir uygulama ile mümkün olması beklenir (Kotler ve Armstrong 1997: 109). Özellikle tüketicilerin istek ve şikayetlerini dikkate almak için müşterilerine

anket yoluyla ulaşarak veri toplayan hizmet işletmeleri bulunmaktadır.

Tüketicilerin algılan ve beklenen hizmet anlayışları arasındaki farklılıklar kayda değer ölçüde azaltılabilmesi için, tüketicilerin hizmet veren işletmeler tarafından doğru tanınması ve algılanabilmesi için pazarlama araştırmalarına ilaveten kalite çerçevesinde teknik ve fonksiyonel kalite ile işletme imajını dikkate almaları gerekmektedir (Okumuş ve Hilal, 2007). İşletme imajı, teknik ve fonksiyonel kalite kapsamında oluşan bir boyut olduğu için tüketicilerin istek ve ihtiyaçlarının teknik ve fonksiyonel kalitenin sağlanması pazarlama çalışmaları açısından iletişim araçlarının da etkin bir kullanımıyla olumlu bir hale dönüştürülebilmektedir. Bu açıdan birebir iletişim kanallarından olan kulaktan kulağa iletişim, hizmet sektöründe bu olumlu etkinin yayılmasını kolaylaştıracaktır (Kotler ve Armstrong 1997: 617). Bankacılık sektöründe yapılan bir çalışmaya göre sektörün genel olarak olumsuz bir imajı var ise aynı sektörde yer alan başka işletmelerin de olumlu bir işletme imajı yaratmasının zorlaşacağı ifade edilmiştir (Kavak, 1996: 197).

Tüketicilerin beklentilerini karşılanabilmesi için işletmenin bunu doğru olarak algılayamamasından kaynaklanan farkın doğru bir şekilde çözüme kavuşturulabilmesi için bir öneri ise işletmede iletişim uygulamasında aşağıdan yukarı ya da çalışan-yönetici ilişkisinin gelişmesi üzerine olması yönündedir (Zeithaml, Berry ve Parasuraman 1988: 38). Aşağıdan yukarıya iletişim sisteminin faydası örgütsel yapı içinde işleyen bir iletişim kanalı olarak tüketicilerin istek ve şikayetlerinin çalışanlar tarafından ilgili yöneticilere ulaştırılması için kolaylık sağlar (De Cenzo ve Robbins 1996: 38). Bu bağlamda tüketicilerle birebir iletişim kuran çalışanların tüketici beklentilerinin karşılanıp sorunlara çözüm bulunması açısından yöneticilerine faydalı bilgiler sunmaları mümkün olmaktadır (Bitner, Booms ve Mohr 1994: 96).

Müşteri Memnuniyeti

İşletmeler ürün ve hizmet sundukları müşterileri için şikayet ve beklentileri daha iyi anlayıp analiz edebilmek amacıyla hizmet kalitesi değerlendirmesi için çeşitli araştırmalar yapılmaktadır. Yoğun rekabet ortamında işletmelerin müşterilerine yönelik şikayet ve beklentilerini karşılamada hizmet kalitesini artırmak için girişişi çabaların tümü müşteri memnuniyeti kapsamında değerlendirilir. Yoğun rekabet ortamında başarılı olabilmek için bu beklenti ve istekleri karşılayabilmek ve şikayetlere çözüm sunarak bertaraf etmek gereklidir. Bu açıdan müşteri memnuniyeti ölçülmesi yaygın bir uygulama olarak pazarlama araştırmalarının önemli konularından biridir (Ofir and Simonson, 2001).

Müşteri memnuniyetinin ölçülebilmesi için pazarlamada iki yöntem kullanılır. Birincisi genel tatmin düzeyini ölçümlemek amacıyla Day (1977)'in ifadesine göre ürün ya da hizmetin kullanılmasından sonra sorulabilecek sorular şeklindedir. İkincisi ise müşterinin ürün ya da hizmetin çeşitli boyutları ile ilgili ifadelerin yer aldığı soruların sorulmasıdır. Çalışmalarda farklı sorular olsa da genel olarak bu bağlamda araştırmalar yapılmaktadır.

Havayolu ulaşımı

Havayolu taşımacılığı, ulaşım hizmetleri arasında maliyeti en yüksek ancak hız ve zaman açısından ilk sırada yer alan ve günümüz teknolojisiyle birlikte çok tercih edilen bir seçenek haline gelmiştir. Tarihsel sürece bakıldığından ulaşım hizmetlerinin en yeni ve en gelişmiş halidir. Bu nedenle verilen hizmet ve kalite her zaman ön planda olmaktadır. Hem taşımacılık hem de yolcu hizmetleri olmak üzere farklı hizmetlerin sunulduğu Havayolu ulaşımı önemli bir pazar ve hizmet alanıdır.

Havayolu ulaşımında hizmet kalitesi

Soruların oluşturulmasında dikkate alınan bazı göstergeler bulunmaktadır. Müşterilerin hizmet kalitesi beklentisini ölçmek amacıyla ideal bir havayolu işletmesinden beklentilerini dikkate alarak alt boyutta 10 adet Fiziksel Özellikler/Unsurlar bağlamında soru oluşturulmuştur. Aşağıdaki Tablo 1'de bu sorular yer almaktadır: “

Tablo 1. Fiziksel Özellikler/Unsurlar

1	Havayolu Sorusu	İdeal bir havayolu, rezervasyon ve bilet satış sisteminde modern teknoloji kullanarak hizmet vermelidir.
2	Yer Hizmeti Sorusu	İdeal bir havayolunun, uçak-terminal-uçak arası taşıma hizmeti sağlayan otobüsleri temiz, düzenli ve rahat olmalıdır.
3	Havayolu Sorusu	İdeal bir havayolu, modern görüntülü uçaklara sahip olmalıdır.
4	Havayolu Sorusu	İdeal bir havayolunun, uçuş sırasında uçakta servis edilen yiyecek ve içecekleri kaliteli ve çeşitli olmalıdır.
5	Havayolu Sorusu	İdeal bir havayolunun host/hostes ve pilotlarının üniformaları uygun, temiz ve düzgün görüntülü olmalıdır.
6	Yer Hizmeti Sorusu	İdeal bir havayolunun check-in, boarding, uçak yönlendirme ve bagaj teslim bantlarında görevli personellerinin üniformaları uygun, temiz ve düzgün görüntülü olmalıdır.
7	Havayolu Sorusu	İdeal bir havayolu, uçuş boyunca vakit geçirmek için yolculara sunulan internet, kitap, dergi, film, vb. eğlence sistemine sahip olmalıdır.
8	Havayolu Sorusu	İdeal bir havayolunun uçak koltukları rahat ve koltuk aralıkları geniş olmalıdır.
9	Havayolu Sorusu	İdeal bir havayolu, engelli, yaşılı, çocuklu, hamile, vb. yolcuların gereksinimlerini karşılayacak ekipman ve donanıma sahip olmalıdır.
10	Yer Hizmeti Sorusu	İdeal bir havayolunun uçak koltukları, uçak içi tuvaletleri vb. temiz ve düzenli olmalıdır.

İdeal bir Havayolu işletmesi için müşterilerin beklenilerinden bir alt boyut olarak belirlenen “Güvenilirlik” faktörü bağlamında toplam 9 soru seçilmiş ve ölçüye dahil edilmiştir. Sorular Havayolu ile ilgili olan ve yer hizmetlerini kapsayan sorular olarak iki kategoride ve tek faktör altında toplanacak şekilde dağılım yapılmıştır. “

Tablo 2. Güvenilirlik soruları

1	Yer Hizmeti Sorusu	İdeal bir havayolu, yolcuların bagajlarını zamanında, eksiksiz ve hasarsız teslim etmelidir.
2	Yer Hizmeti Sorusu	İdeal bir havayolu check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslimini taahhüt ettiği zamanda yerine getirmelidir.
3	N. Havayolu Sorusu	İdeal bir havayolu uçuş tarifesine uygun iniş ve kalkış gerçekleştirmelidir.
4	Yer Hizmeti Sorusu	İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli personelleri yolcunun problemini çözmek için samimi ilgi göstermelidir.
5	Yer Hizmeti Sorusu	İdeal bir havayolunun, varış meydanında bagaj teslim süresi kısa olmalıdır.
6	Yer Hizmeti Sorusu	İdeal bir havayolu, check-in bankosunda düzgün ve tam hizmet vermelidir.
7	Havayolu Sorusu	İdeal bir havayolu, geciken/kaybolan/zarar gören bagaj için yolcular lehine çözümler getiren prosedürlere sahip olmalıdır.
8	Havayolu Sorusu	İdeal bir havayolu, uçuş boyunca yolcularını doğru bilgilendirmelidir.
9	Yer Hizmeti Sorusu	İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolcuları doğru bilgilendirmelidir.

İdeal bir Havayolu hizmeti algısında heveslilik, isteklilik ve yanıt verebilirlik başlığı altında alınan hizmetin Havayolu ve yer hizmetleri açısından değerlendirilebilmesi için toplam 6 sorudan oluşan bir faktör belirlenmiştir. Tablo 3’te bu soruların dağılımı gösterilmektedir.

Tablo 3. Heveslilik/ İsteklilik /Yanıt Verebilirlik “

1	Havayolu Sorusu	İdeal bir havayolunun host/hostes ve pilotları yolculara hızlı hizmet vermelidir.
2	Yer Hizmeti Sorusu	İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolculara hızlı hizmet vermelidir.
3	Havayolu Sorusu	İdeal bir havayolunun host/hostes ve pilotları, yolculara her zaman yardım etme isteği içinde olmalıdır.
4	Yer Hizmeti Sorusu	İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolculara her zaman yardım etme isteği içinde olmalıdır.
5	Havayolu Sorusu	İdeal bir havayolunun host/hostes ve pilotları, başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap vermelidir.
6	Yer Hizmeti Sorusu	İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj alım bantlarında görevli çalışanları başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap vermelidirler.

Ölçeklerin güvenirlilik katsayıları, normal dağılım uyup uymadıkları ve birbirileri arasındaki ilişkileri incelenmiştir. Sonuçlar aşağıdaki tablolarda gösterilmiştir.

Tablo 4. Güvenirlilik Katsayıları ve Normallik Dağılım Sonuçları

	<i>Çarpılık</i>	<i>Basıklık</i>	<i>Cronbach's Alpha</i>
Beklenti soruları			
Fiziksel Özellikler/Unsurlar	-0,773	0,286	0,775
Güvenilirlik	-1,205	0,885	0,833
Heveslilik/İsteklilik/Yanıt Verebilirlik	-0,390	-0,250	0,843
Güvence	-1,129	1,584	0,842
Empati	-0,658	0,411	0,844
Algı soruları			
Fiziksel Özellikler/Unsurlar	-0,152	0,357	0,874
Güvenilirlik	-0,327	0,942	0,916
Heveslilik/İsteklilik/Yanıt Verebilirlik	-0,084	-0,178	0,900
Güvence	-0,165	-0,013	0,909
Empati	-0,016	-0,163	0,887

“Bir dağılıminın bakılarak normal bir dağılım gösterip göstermediği noktasında karar verilebilmesi için çarpılık ve basıklık değerleri dikkate alınır. Bu noktada basıklık ve çarpılık değerlerinin kesme noktaları

(sınırları) çarpıklık (Skewness) için mutlak değer olarak 3 ve basıklık (Kurtosis) için mutlak değer olarak 10'un üzerinde olmamalıdır (Kline, 2011). Çalışmadaki ölçekler normal dağılım göstermektedir. Ölçeklerin Cronbach Alpha değerlerinin 0,70 ile 0,99 arasında olduğu belirlenmiş ve bu da ölçeklerin güvenilir olduğunu göstermektedir (Tavakol ve Dennick, 2011). Genel olarak çalışmanın ölçeklerinin güvenilir olduğu sonucu çıkmaktadır.”

Tablo 5. Beklenti Sorularına İlişkin Soruların Güvenirlilik Katsayıları

	Değişken Silindiğinde C.Alpha Değeri
İdeal bir havayolu, rezervasyon ve bilet satış sisteminde modern teknoloji kullanarak hizmet vermelidir.	0,961
İdeal bir havayolunun, uçak-terminal-uçak arası taşıma hizmeti sağlayan otobüsleri temiz, düzenli ve rahat olmalıdır.	0,960
İdeal bir havayolu, modern görünüslü uçaklara sahip olmalıdır.	0,960
İdeal bir havayolunun, uçuş sırasında uçakta servis edilen yiyecek ve içecekleri kaliteli ve çeşitli olmalıdır.	0,960
İdeal bir havayolunun host/hostes ve pilotlarının üniformaları uygun, temiz ve düzgün görünüslü olmalıdır.	0,960
İdeal bir havayolunun check-in, boarding, uçak yönlendirme ve bagaj teslim bantlarında görevli çalışanlarının üniformaları uygun, temiz ve düzgün görünüslü olmalıdır.	0,960
İdeal bir havayolu, uçuş boyunca vakit geçirmek için yolculara sunulan internet, kitap, dergi, film vb. eğlence sistemine sahip olmalıdır.	0,961
İdeal bir havayolunun, uçak koltukları rahat ve koltuk aralıkları geniş olmalıdır.	0,960
İdeal bir havayolu, engelli, yaşlı, çocuklu, hamile vb. yolcuların gereksinimlerini karşılayacak ekipman ve donanıma sahip olmalıdır.	0,960
İdeal bir havayolunun uçak koltukları, uçak içi tuvaletleri vb. temiz ve düzenli olmalıdır.	0,960
İdeal bir havayolu, yolcuların bagajlarını zamanında, eksiksiz ve hasarsız teslim etmelidir.	0,960
İdeal bir havayolu, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslimini taahhüt ettiği zamanda yerine getirmelidir.	0,960
İdeal bir havayolu, uçuş tarifesine uygun iniş ve kalkış gerçekleştirmelidir.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolcunun problemini çözmek için samimi ilgi göstermelidir.	0,960
İdeal bir havayolunun, varış meydanında bagaj teslim süresi kısa olmalıdır.	0,960
İdeal bir havayolu, check-in bankosunda düzgün ve tam hizmet vermelidir.	0,960
İdeal bir havayolu, geciken/kaybolan/zarar gören bagaj için yolcular lehine çözümler getiren prosedürlere sahip olmalıdır.	0,960
İdeal bir havayolu, uçuş boyunca yolcularını doğru bilgilendirmelidir.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolcuları doğru bilgilendirmelidir.	0,960
İdeal bir havayolunun, host/hostesleri yolculara hızlı hizmet vermelidir.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolculara hızlı hizmet vermelidir.	0,960

İdeal bir havayolunun, host/hostes ve pilotları, yolculara her zaman yardım etme isteği içinde olmalıdır.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolculara her zaman yardım etme isteği içinde olmalıdır.	0,960
İdeal bir havayolunun, host/hostesleri başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap vermelidir.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap vermelidirler.	0,960
İdeal bir havayolunun, host/hostes ve pilotlarının davranışları, yolculara güven vermelidir.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanlarının davranışları yolculara güven vermelidir.	0,960
İdeal bir havayolunun, host/hostes ve pilotları yolculara karşı her zaman nazik ve saygılı olmalıdır.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolculara karşı her zaman nazik ve saygılı olmalıdır.	0,960
İdeal bir havayolunun, host/hostes ve pilotları yolcuların sorularına cevap verebilecek eğitim, bilgi ve beceriye sahip olmalıdır.	0,960
İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolcuların sorularına cevap verebilecek eğitim, bilgi ve beceriye sahip olmalıdır.	0,960
İdeal bir havayolunun uçuşlarının ertelenme / iptal olasılığı düşük olmalıdır.	0,960
İdeal bir havayolunun çağrı hizmeti çalışanları, yolculara karşı nazik, saygılı ve yolcuların sorularına cevap verebilecek bilgiye sahip olmalıdır.	0,960
İdeal bir havayolunun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolculara verdikleri hizmetlerde yolcularla kişisel olarak ilgilenmelidir.	0,960
İdeal bir havayolunun host/hostesleri, uçuş boyunca yolculara verdikleri hizmetlerde yolcularla kişisel olarak ilgilenmelidir.	0,960
İdeal bir havayolunun uçuş tarifesi, yolcuların talep ve ihtiyaçlarına uygun olarak düzenlenmelidir.	0,960
İdeal bir havayolu, yolcuların en ekonomik fiyat tarifeleriyle uçabilmeleri için gerekli düzenlemeleri yapmalıdır.	0,960
İdeal bir havayolunun check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolcuların özel istek ve ihtiyaçlarını anlamalıdır.	0,960
İdeal bir havayolunun yolcularına avantaj sağlayan sadakat programları olmalıdır.	0,960
İdeal bir havayolunda, fazla bagaj için alınan ücretler makul seviyede olmalıdır.	0,960
İdeal bir havayolunun web sitesi ve telefon uygulamasından alınan hizmetler, yolcuların bekłentisine uygun ve kolay kullanımlı olmalıdır.	0,960

Tablo 6. “Algı Sorularına İlişkin Soruların Güvenirlilik Katsayıları

	Değişken Silindiğinde C.Alpha Değeri
X Havayolu, rezervasyon ve bilet satış sisteminde modern teknoloji kullanarak hizmet verir.	0,960
X Havayolu'nun, uçak-terminal-uçak arası taşıma hizmeti sağlayan otobüsleri temiz, düzenli ve rahattır.	0,960
X Havayolu, modern görünüslü uçaklara sahiptir.	0,960
X Havayolu'nun, uçuş sırasında uçakta servis edilen yiyecek ve içecekleri kaliteli ve çeşitlidir.	0,960
X Havayolu'nun host/hostes ve pilotlarının üniformaları uygun, temiz ve düzgün görünüslüdür.	0,960
X Havayolu'nun, check-in, boarding, uçak yönlendirme ve bagaj teslim bantlarında görevli çalışanlarının üniformaları uygun, temiz ve düzgün görünüslüdür.	0,960
X Havayolu, uçuş boyunca vakit geçirmek için yolculara sunulan internet, kitap, dergi, film vb. eğlence sistemine sahiptir.	0,960
X Havayolu'nun uçak koltukları rahat ve koltuk aralıkları genişir.	0,960
X Havayolu, engelli, yaşılı, çocuklu, hamile vb. yolcuların gereksinimlerini karşılayacak ekipman ve donanıma sahiptir.	0,960
X Havayolu'nun uçak koltukları, uçak içi tuvaletleri vb. temiz ve düzenlidir.	0,960
X Havayolu, yolcuların bagajlarını zamanında, eksiksiz ve hasarsız teslim eder.	0,960
X Havayolu, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslimini taahhüt ettiği zamanda yerine getirir.	0,959
X Havayolu, uçuş tarifesine uygun iniş ve kalkış gerçekleştirir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolcunun problemini çözmek için samimi ilgi gösterir.	0,959
X Havayolu'nun, varış meydanında bagaj teslim süresi kısalıdır.	0,960
X Havayolu'nun, check-in bankosunda düzgün ve tam hizmet verilir.	0,960
X Havayolu, geciken/kaybolan/zarar gören bagaj için yolcular lehine çözümler getiren prosedürlere sahiptir.	0,959
X Havayolu, uçuş boyunca yolcularını doğru bilgilendirir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolcuları doğru bilgilendirir.	0,959
X Havayolu'nun, host/hostesleri yolculara hızlı hizmet verir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolculara hızlı hizmet verir.	0,959
X Havayolu'nun host/hostes ve pilotları, yolculara her zaman yardım etme isteği içindedir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolculara her zaman yardım etme isteği içindedir.	0,959
X Havayolu'nun, host/hostesleri başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap verir.	0,959

X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj alım bantlarında görevli çalışanları başka bir işe meşgul olsalar dahi yolcuların isteklerine cevap verir.	0,959
X Havayolu'nun host/hostes ve pilotlarının davranışları, yolculara güven verir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanlarının davranışları yolculara güven verir.	0,959
X Havayolu'nun, host/hostes ve pilotları yolculara karşı her zaman nazik ve saygılıdır.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolculara karşı her zaman nazik ve saygılıdır.	0,959
X Havayolu'nun, host/hostes ve pilotları yolcuların sorularına cevap verebilecek eğitim, bilgi ve beceriye sahiptir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolcuların sorularına cevap verebilecek eğitim, bilgi ve beceriye sahiptir.	0,959
X Havayolu'nun, uçuşlarının ertelenme/iptal olasılığı düşüktür.	0,960
X Havayolu'nun, çağrı hizmeti çalışanları yolculara karşı nazik, saygılı ve yolcuların sorularına cevap verebilecek bilgiye sahiptir.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları, yolculara verdikleri hizmetlerde yolcularla kişisel olarak ilgilendir.	0,959
X Havayolu'nun, host/hostesleri uçuş boyunca yolculara verdikleri hizmetlerde yolcularla kişisel olarak ilgilendir.	0,959
X Havayolu'nun, uçuş tarifesi, yolcuların talep ve ihtiyaçlarına uygun olarak düzenlenir.	0,959
X Havayolu, yolcuların en ekonomik fiyat tarifeleriyle uçabilmeleri için gerekli düzenlemeleri yapar.	0,960
X Havayolu'nun, check-in, boarding, bağlantılı uçuş yönlendirme ve bagaj teslim bantlarında görevli çalışanları yolcuların özel istek ve ihtiyaçlarını anlar.	0,959
X Havayolu'nun, yolcularına avantaj sağlayan üyelik programları vardır.	0,960
X Havayolunda, fazla bagaj için alınan ücretler makul seviyededir.	0,960
X Havayolu'nun, web sitesi ve telefon uygulamasından alınan hizmetler, yolcuların bekłentisine uygun ve kolay kullanımlıdır.	0,960

Tablo 7. Boyutlarda Hizmet Kapsamı Açısından Boşluk Skorlarının Değerlendirilmesi

		Boşluk (Analizi)
Fiziksel Özellikler/Unsurlar	Havayolu	-0,48
	Yer Hizmetleri	-0,51
Güvenilirlik	Havayolu	-0,79
	Yer Hizmetleri	-0,82
Heveslilik/İsteklilik/ Yanıt Verebilirlik	Havayolu	-0,15
	Yer Hizmetleri	-0,41
Güvence	Havayolu	-0,54
	Yer Hizmetleri	-0,56
Empati	Havayolu	-0,75
	Yer Hizmetleri	-0,35

Boyutlarda hizmet kapsamı açısından boşluk analizi skorlarına bakıldığından da müşterilerin sunulan hizmetlerden memnun olmadıkları ve algıladıklarının bekledikleri karşılamadığı görülmektedir. Yer hizmetleri hizmet kapsamında; empati boyutunda en fazla beklenileri karşıtlarken, havayolu kapsamında; heveslilik /isteklilik/ yanıt verebilirlik boyutunda en fazla bekleniler karşılanmıştır.

SONUÇ

Havayolu ulaşımında hizmet kalitesi ve algılanan kalitenin ölçülmesi amacıyla oluşturulan ölçek çalışması sonucunda alt boyutlarıyla birlikte ölçek tamamlanmış ve geçerlik güvenilirlik analizleri yapılmıştır. Bu çalışmanın kapsamı sadece Havayolu taşımacılığında hizmet kalitesi ve yer hizmetlerinde algılanan hizmet olarak belirlenmiş ve bu bağlamda sorular oluşturulmuştur. Sonuç olarak kullanılabilir bir ölçek uygulama için alana kazandırılmış ve uygulamak için hazırlanmıştır. Hizmet kalitesinin ölçümünün kapsamının sadece Havayolu şirketleri ile sınırlı olmadığı, bununla beraber yer hizmetlerinin de bu hizmet kalitesinde algılanan bir ölçüt olduğu sonucuna ulaşılmıştır. Dolayısıyla yer hizmetleriyle başlayan havayolu ulaşımındaki hizmet anlayışının nihai noktaya ulaşana kadar devam ettiği görülmektedir. Bu doğrultuda ölçek çalışmasının kapsamı belirlenmiş ve değerlendirmeler yapılmıştır. Boyut bazında yapılan değerlendirme sonucunda müşterilerin beklenilerinin karşılanmadığı, yer hizmeti kapsamında en fazla empati boyutunda beklenilerin karşılandığı tespit edilmiştir. Algılanan hizmet ve kalitenin bu sorular çerçevesinde ölçümlenmesi ve sonraki çalışmalarda da kullanılmak üzere bu alanda katkı sağlayacağı düşünülmektedir.

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THE ART OF PSYCHOLOGISM BY CHINGIS AYTMATOV IN THE STORY“JAMILIA”ON THE BACKGROUND OF ART AND AESTHETIC EXPERIENCE OF THE KYRGYZ AND WORLD LITERATURE

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Abstract

This article examines the psychologism of the novel “Jamilia” by Chingiz Torekulovich Aitmatov, the writer’s skill in uncovering the dialectic of the hero’s soul in the context of the artistic and aesthetic experience of the Kyrgyz and world literature, including Pakistani and Russian, in the depths of which he found the roots of his literary style of psychologically naturalistic narrative. It has been revealed, that the psychological description was not an instrument of episodic significance for this outstanding world-known writer. For him psychologism is a consciously chosen aesthetic principle, means of literary exploration. The dialectic study of the human soul, a deep insight into the very essence of personality became for Chingiz Aitmatov in his story “Jamila” as an unshakable artistic rule, which he invariably adhered to in all other his works. In fact, he considered the psychological analysis as an independent line which permeated the entire plot of the work from the very beginning up to the end. Actually, Chingiz Aitmatov’s world fame came to him not suddenly, but through his own difficult personal evolution and transformation, at times rather painful changes in his literary conscience. Thus, for the first time the internal conflicts of the writer, his personal drama in the process of his literary revival and transition to a new paradigm of writing have been also under this study. It has been shown, that the reach writer’s legacy marked by the genuine psychologism and humanism became a cultural asset of not only Kyrgyz people, but of the entire world humanity, including Pakistan and Russia, promoting mutual understanding between different nations for the enhancement of their interstate relations.

Keywords: Aitmatov, Faiz, psychological analysis, means of psychologism, realism.

INTRODUCTION

It is a well-known fact, that literature and art are the main types of human spiritual activity. And every activity has its own distinctive qualities, generic properties. One of the main generic properties of a literary work is psychologism. The object of reflection in literature is a person. He also consists of biological basics and the inner world, social psychology. Since a person is the subject of oral, verbal art, then literature cannot bypass human psychology. There is no literature itself without psychological truth, reliability of a person's representation. Without psychologism, literature cannot convey the truth about a person. Actually, literature cannot exist without psychologism. That is why the theory of literature considers the concept of psychologism to be a generic property of the literary words. The integral system of psychological means one can find in the famous story "Jamila" by the outstanding Kyrgyz and world writer Chyngyz Torekulovich Aitmatov.

How did his story "Jamila" so suddenly appear in Kyrgyz literature? This particular question has been raised by all the authors and literary critics who wrote about the story "Jamila". Some of them considered such an unfettered naturalness, a lyric-romantic style flowing from the very heart as stemmed from the rustic simplicity of the author -a highlander, a native of the periphery. Thus, Keneshbek Asanaliev was the first among Kyrgyz literary critics to note the artistic achievements and innovation of "Jamila". He, in particular, was of the following opinion: "The power of Aitmatov's story lies in the fact that the author was able to expressively reveal the inner dialectic of the soul of a person who realized his human happiness and fought for it relentlessly." [Asanaliev, p. 69]. And the skill of depicting love by the great writer was compared with the grass growing violently in the spring or as "a melody from the heart" [Sadykov, p. 93].

However, the roots of the naturalness of Chyngyz Aitmatov's narrative lie in the depths of world literary culture. According to the correct notes of the writers Viktor Levchenko and Abdikadyr Sadykov, the style of the Kyrgyz writer cannot be taken simplistically: "Aitmatov's story, although perhaps unassuming in appearance, is complex in design, carefully thought out, comprehended: it is not as simple, as it may be seemed" [Levchenko, p. 23]. As for Abdikadyr Sadykov, he also adds: "In appearance, the form (of the work) is compact, besides, in the Kyrgyz name it is defined as "melody", although this name does not attract other people. However, when it comes to the inner nature of the story, we notice that every detail is extremely thoughtful and put in its place" [Sadykov, p.120]. Thus, we should understand that the manner of presentation of the story "Jamila", its naturalness, free, relaxed flow is in fact a consciously planned, organized art, a phenomenon stemming from the inner culture of the writer who mastered the secrets of the literary representation of world realism. And in this inner culture the great creative heritage of the outstanding Soviet, Russian, Kyrgyz novelist and diplomat Chingiz Torekulovich Aitmatov is very close to the creative legacy of his best friend - the Pakistani poet Faiz Ahmad Faiz. In fact, we may say, that they represented "two main personalities of Eurasian friends...whose rich literary and social activities contributed to the enhancement of interstate cooperation in the field of culture, science and public relations, peoples convergence in the Eurasian space as a whole" [Serenko, p. 175].

In fact, it has been said and written a lot about the influence of the world best advanced, mature literature examples on Aitmatov's works. However, only few people discuss and even less analyze the process of Ch. Aitmatov's transition from one shore to another, his preparation for making a leap from the narrative manner that took place in Kyrgyz literature to the culture of written realism, about the inner "kitchen" of this. It has been not researched up till now the internal conflicts of the writer, the personal drama of Chingiz Aitmatov in the process of his literary revival and transition to a new paradigm of writing.

During the Republican Meeting of Young Writers in 1963 under the motto "Young Citizens of Literature" Chingiz Aitmatov shared his memory with the new talented generation: "Once, I had absolutely no idea what a bad book meant. I thought, how could it be that a book was bad? And then, later on, when I started writing by myself, I really didn't understand the disputes between the critics" [Aitmatov, 1988, p.19]. According to these revelations, it is clear, that Aitmatov in his youth, though for some period of time, also

lived in the atmosphere of childish, youth innermost concepts, in the embrace of a literary idyll. Such a perception of the surrounding world could not be developed without the influence of the Soviet ideology, which presented everything in an idealized form. However, the idealized ideas of the young Chyngyz about books and literature in general have slowly undergone radical changes.

He did not appear as an unexpected star in the literary horizon. He went through a complex and difficult process of his hitherto established views and ideas transformation, at times rather painful changes in his literary conscience. His following words reflect the difficult period of that time: "As soon as I began to comprehend the problems of the internal structure of literature, to realize the difference between an imaginative, literary word and the empty, meaningless words, characterized in the work by genuine beauty and artificial decoration; since that time, when I began to critically evaluate them, I started to treat my own work differently..."[Aitmatov, 1988, p. 15].

The art of comprehending the literary canons does not come overnight. For this, a person should read a lot, work a lot and have enough knowledge about the main works of world art. In other words, the main provision for this is the writer ability to develop a literary taste in himself. In other words, it means to have an inner culture, a rich and sensitive inner world, a high self consciousness. Talent is a certain inner capabilities of a person. And in order to realize these opportunities, the necessary conditions are needed. And in case the writer does not have the inner potential for this, necessary talent, high culture, does not have experience of the advanced art samples influence in his sphere, then such opportunities, alas, will not be realized. As for the question of the main conditions for the cultivating of a young writer talent, the most accurate answer is culture and tireless work, diligence and undying interest in culture.

It is difficult to train a person specifically for "being a writer." His efforts should be aimed at making a teacher for himself. And we all need to realize, that for this purpose it is important to learn constantly everyday lessons, to learn from the "living life" itself, as it is a universal creative law. Secondly, God himself ordered us to learn from artistic creativity and arts. A writer should critically rethink every book read by him, every watched by him movie or a play, analyze them all deeply and diligently, drawing lessons from each work. As much as it is useful to learn to write well by the example of a good book, it is also useful to learn how not to write after reading a bad book." [Aitmatov, 1988, p. 19-20]. These Aitmatov's words at the mentioned above Republican meeting of young writers were addressed to the audience gathering in a big hall. And this appeal was neither the duty maxim of a speaker standing on a high tribune, nor a manifestation of didactics or moralizing notations. Obviously, it would not be a mistake or an exaggeration to note, that it was a kind of a confession to a large audience by a great writer who created such famous works as "Jamila", "My Topolek in a Red Kerchief" and "The First Teacher", already a master of words at that time, who passed a difficult school of life and literary formation. He revealed to his young colleagues not some bookish, theoretical positions, but precious grains of his own everyday life and literary experience, passed through the very heart of him. It is logical to assume that, on a mature reflection, this confession of Chin-giz Aitmatov is a mirror of the writer's worldview, his inner world and spiritual state, a reflection of those processes which occurred in his mind. What can we see in this "mirror"? The processes of awakening have slowly began to take place in the worldview of the young writer, liberation from illusory, romantic ideas about books, literature, critical rethinking and problems of the literary word, and his own works skeptical attitude to supposedly ideal phenomena and creations in literature. The intellectual world of the young writer turned into a kind of arena of confrontation between familiar, trivial concepts and some new views. Thus, it became clear to the naked eye that the writer had entered a period of an active search and fierce creative efforts. In other words, between the lines we can also read the subtext lurking on the other side of the "confession" of Ch. Aitmatov.

While the writing person starts to comprehend the inner structure of literature more and more deeply and begins to realize all the differences between the figurative, literary word and empty, meaningless verbal chatter, as well as between the genuine beauty characterized in the work and its artificial decoration, the

concept of developing one's own literary taste, as an original, unique and unmistakably recognizable face, gradually begins to form his literary creativity. First of all, Chyngyz Aitmatov was deeply aware by himself that any talent is just an opportunity, and for its disclosure it is necessary to work selflessly with the sweat of thy brow, to conduct an endless intimate dialogue with the best samples of the world literature and art, without which it is impossible to comprehend the inner hidden secrets which will not be revealed by themselves; that a person seeking to master the profession of a writer must become a teacher for himself. Considering mastering of the literary word art as a sacred duty, Ch. Aitmatov submitted that "A writer should critically rethink every book he has read, every movie or a play he has watched, deeply and diligently analyzing them, extracting lessons from each work." [Aitmatov, 1988, p. 21].

Thus, in his quest for a writer's resurgence, Ch. Aitmatov suffered a genuine inner intellectual drama by himself. And as a result of such an endless and relentless spiritual work, the master of the word has acquired "inner culture, inner world and inner originality." [Aragon, p. 50]. Moreover, as a result of this long creative process, full of hidden difficulties and obstacles, he set off his voyage in the ocean of the world literature like his famous "White Steamer". And only after going through a long individual experience with its difficult literary school, long-suffering quests and mistakes along the way, by mastering, as mentioned above, "literary taste", "inner culture", Chyngyz Aitmatov was able to write his famous masterpiece of the whole planet literature - the story "Jamila". Actually, by achieving such great and productive results, the world-famous writer had now the full moral rights to give his advice to the young colleagues.

To sum it up, it should be noted, that all ideas and thoughts contained in the report, which Chyngyz Aitmatov made in 1963, were not just beautiful phrases torn out of books, but a personal position tested by his own hard experience, his strong inner conviction. And nowadays, considering all mentioned above facts and events, it is not difficult to understand that the unique writer talent, enriched by the position of a great artist in the context of the "problems of the inner literature structure", his literary and aesthetic views and multifaceted knowledge, led him to the creation of the story "Jamila", which became a work of world literature classics many decades ago.

Meanwhile, the library of works which Ch. Aitmatov thoughtfully read and comprehended is of wide range, downright huge, and covers the literature of both the East and the West. It is enough to innumerate at least the most famous of them: "Manas" and "Iliad", "Er-Toshtyuk" and "The Word about Igor's Regiment", Tugelbai Sydykbekov and Mukhtar Auezov, Honore Balzac and Leo Tolstoy, Fyodor Dostoevsky and Victor Hugo, William Shakespeare and Alexander Pushkin, Anton Chekhov and Guy de Maupassant, Ivan Turgenev and Charles Dickens, Gustave Flaubert and Ivan Bunin, Mikhail Sholokhov and Thomas Mann, Leonid Leonov and William Faulkner, Mikhail Lermontov and Abai Kunanbayev, Rasul Gamzatov and Kaisyn Kuliayev, Omar Khayyam and Faiz Ahmad Faiz, Jenijok and Gabriel Garcia Marquez, Valentin Rasputin and many others. The great writer absorbed a kind of the artistic "juices" of these outstanding word masters' best works by studying creative legacy of his great predecessors, classics of the world literature, as well as masterpieces of known to him contemporary authors, including his old Pakistani friend and famous poet Faiz Ahmad Faiz. It should be mentioned, that being good friends and "colleagues in pen and spirit", they were also initiators of founding in 1967 the International Association of Writers of Asian and African Countries, in which they had been jointly worked for more than 25 years [Serenko, p. 176].

Once, while answering the question about whom he was mostly literarily influenced by, Ch. Aitmatov replied: "It is difficult to single out someone specifically. Apparently, these were Tolstoy, Chekhov, Dostoevsky, and all Western classics, and probably it's time to combine their universal experience. That's why I look at the classics as the sun. After all, it warms the whole universe with its rays. For me, Thomas Mann, Shakespeare, and Dostoevsky are the same sun. But how the sun's rays reach me it is not so important" [Aitmatov, 1976, p. 159]. In the spirit of the above Aitmatov's answer, the great Kazakh writer Mukhtar Auezov also submitted: "Literary influence is not an easy thing. Only those who do not understand this, suppose to touch it with their hands, and due to this, they confuse the concept of influence with imitation.

The writer organically absorbs the real influence and it manifests itself in a multifaceted way, invisible to the naked eye, in the very depth of the writer's creativity" [Sadykov, p.118].

As it can be seen from the above citations, both great writers expressed their very deep and wide-ranging views on the problem of literary influence. Metaphorically speaking, the plant receives vitality from the sun's rays, air, water and soil - in a word, from the surrounding Abadan. And all these factors together contribute to the organism's life and development. Strong talents in literature also resemble plants (after all, weak, feeble writers remain in captivity of epigonism, purely mechanical imitation of ready-made models, their diligent copying). Mighty talents, on the other hand, are influenced by a variety of the literary samples, and like a plant reaching for the sun, they absorb the "juices" of various literary trends into their body and roots, gaining strength day by day and scattering the crown. Genuine literary influence awakens the inner potencies of true talent, hitherto dormant forces and, like a flint striking sparks, inflames the artistic gift. The genially talented persons do not become either imitators or sub-echoes of already existing samples. Truly gifted artists revive themselves as a literary personality with the help of the artistic external influence, as if being newly born in this world. The example of high literary models becomes for them an "inner vision". This is precisely the essence of literary influence. Actually, Chyngyz Aitmatov is a writer who independently revived himself in line with the high aesthetic laws of the world classics. It is exactly thanks to Ch. Aitmatov's literary revival, that a new stage in the evolutionary development of our national literature began. And the work characterizing this new stage was the world-famous "Jamila".

Although visually, at first glance, it may seem that this story is quite simple, this work is still written according to the laws of the world realistic art in its internal structure. No wonder, Viktor Levchenko noted that the story "is complex by the concept, thoroughly thought out" [Levchenko, p. 23]. It was in this Aitmatov's work that the image of a woman was fully psychologized and individualized for the first time in Kyrgyz literature. The evolution of the plot in the story "Jamila" is determined by the development of characters. In this story, the emancipated female image has been for the first time separated from the author's authority and even dictate, starting to act independently and live a purely individual life. This is an irrefutable proof of the establishment of a realistic image culture in Kyrgyz literature. And the whole globe witnessed how the world-famous French writer Louis Aragon, who knew perfectly well the European culture of the literary word, subtly felt the filigreed and written out in accordance with the classical world fiction canons each word and phrase, each detail of the narrative. He was highly impressed by the manner and style of presentation unexpected from a young Kyrgyz writer and expressed his admiration of this beautiful story:

"I read the story "Jamila", translated from Kyrgyz, in the Soviet magazine "New World" on August 1958. The author's name was unfamiliar to me. I made inquiries and found out a number of facts, very simple, revealing nothing. We are talking about an aspiring author.

... And here, in this proud Paris, the Paris of Villon, Hugo Baudelaire, the Paris of Kings and Revolutions, the centuries-old Paris of Artists, where every stone – a reminder of some story or legend, in a city where there were so many lovers that if you decide to name them, it will turn out like in a song: "I don't know who to start with...", in this Paris, which has seen everything, read everything, experienced everything, for me suddenly there was no "Werther", nor "Berenice", nor "Antony and Cleopatra", nor "Manon Lescaut", nor "Education of Feelings", nor "Dominica", it is because I read "Jamila", and thus Romeo and Juliet, Paolo and Francesca, Ernani and Dona Sol did not exist for me... as in the summer of the third year of the war, on an August night in 1943, somewhere in the valley of the Kurkureu River, I met Daniyar and Jamila with their grain-laden chaises and the boy Seit, who tells the story of these young people..." [Aragon, p. 23].

CONCLUSION

Thus, it will be not an exaggeration to say, that Chyngyz Torekulovich Aitmatov's legacy, including his famous story "Jamila", marked by the genuine psychologism and humanism has a planetary dimensions. The author's rare talent to uncover the dialectic of the hero's soul, to penetrate deep insight into the very essence

of personality by means of psychologism became the main characteristic feature of his unique naturalistic narrative literary style. Actually, his reach creative legacy based on national traditions and peculiarities as well, as on universal artistic and aesthetic principles belongs not only to Kyrgyzstan, but to the whole world, including such regionally close countries as Pakistan and Russia with these three states' shared historical and socio-cultural memory, facilitating for further understanding between different nations and the enhancement of their interstate relations.

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COGNITIVE FLEXIBILITY AS A PREDICTION OF CAREER COMPETENCY IN UNIVERSITY STUDENTS

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Abstract

The aim of this study is to investigate the perceived level of career competency of university students in terms of perceived socio-economic disadvantage (SED), gender, and class level. In addition, this study aims to test whether cognitive flexibility level is a significant predictor of career competency using a relational scanning model based on the general scanning model. The study group of this research consists of 333 university students studying in various departments of universities in Turkey during the 2022-2023 academic year. Of the participating university students, 250 are male (45.8%) and 296 are female (54.2%). To collect research data, a personal information form containing closed-ended questions about the participants' demographic characteristics was used, which was developed by the researchers. In addition, the "Career Competencies Scale" was used to determine the students' level of career competency, and the "Cognitive Flexibility Scale" was used to determine their level of cognitive flexibility. In the analysis of the data, besides descriptive statistics, independent groups t-test was used to demonstrate differentiation according to gender variable, one-way analysis of variance (ANOVA) technique was used to demonstrate differentiation according to perceived SED and class level variables. Pearson correlation coefficient was calculated to reveal the relationship between students' career competencies and cognitive flexibility levels. Regression analysis technique was also used to determine the level of cognitive flexibility in predicting career competencies. The significance level was set at .05 in the study. According to the findings obtained through research, significant differences were found in the levels of cognitive flexibility and career competence among university students in terms of gender. Regarding the socio-economic level, it was observed that there was only a significant difference in the alternative sub-dimension of cognitive flexibility between groups, and the difference was in favor of students with a middle socio-economic status. It was also found that there was a significant relationship between the sub-dimensions of cognitive flexibility and career competence among students, and that cognitive flexibility was a significant predictor of career competence. Based on the findings, recommendations have been developed.

Keywords: *Cognitive Flexibility, Career Competence, University Students.*

INTRODUCTION

When the literature on career development is examined, it can be seen that in recent years, group work and curriculum discussions have been conducted to develop various career skills of individuals (e.g., Kuijpers & Meijers, 2012; Ondima et al., 2013; Stebleton et al., 2020). These studies not only aim to raise awareness about interests and values but also include competencies such as career exploration, job search methods, and building social networks, indicating the need for these competencies. These characteristics, simply defined as career competencies, describe the knowledge, skills, and abilities at the core of an individual's career development (Akkermans et al., 2013).

Career competencies have been examined in both employees (Ahmad & İmam, 2022; Akkermans & Tims, 2017; Zhang et al., 2022) and university students (Grosemans & Cuyper, 2021; Presti et al., 2022; Stremersch et al., 2021) in the literature. Research conducted with employees shows that career competencies can be an important factor associated with positive indicators of career development, such as career success (Talluri & Uppal, 2022), career satisfaction (Kong et al., 2012), career commitment (Ahmad & İmam, 2022), and career dedication (Saraswati et al., 2021).

Although career competencies emerged in the world of employees, they are also addressed, especially in the context of preparing for the workforce, among university students. Research conducted with university students has reported that career competencies are associated with their successful management of the transition from school to work (Grosemans & Cuyper, 2021; Presti et al., 2022; Stremersch et al., 2021). Therefore, it can be said that developing career competencies from the entrance to university can serve as a preventive and developmental intervention in preparing students for the workforce. In this case, it is important to investigate the relationship between students' levels of career competencies and other related characteristics. One of the characteristics believed to be associated with career competencies is cognitive flexibility.

Cognitive flexibility is defined by Martin and Anderson (1998) as a) being aware that there are suitable options and accessible alternatives in every situation, b) being flexible and willing to adapt to the situation, c) having the belief or self-perception that one can be flexible. Studies related to cognitive flexibility indicate that it is considered as an important aspect of interpersonal communication and the way individuals approach problem-solving and events. It has been found to be positively related to positive constructs and negatively related to negative constructs as a healthy personality trait (Asıcı & İkiz, 2015, Türe & Sarıçam, 2016). Individuals with high levels of cognitive flexibility are observed to be flexible in terms of communication, aware of their options in communication and problem situations, proactive, sensitive, confident in communication, and tolerant of disagreement and uncertainty (Martin & Rubin, 1995; Martin & Anderson, 2001).

University students face various problems, from adapting to a new environment and system to interpersonal relationships, and they try to solve them. In this context, it is thought that university students with high levels of cognitive flexibility will also have high levels of career competencies, which are important characteristics for transitioning from school to work. In this regard, the aim of the research is to examine the relationships between cognitive flexibility and career competencies and determine whether cognitive flexibility significantly predicts career competencies. To achieve this goal, the following questions have been addressed:

1. Do cognitive flexibility and career competency levels of university students significantly differ according to their genders?
2. Do cognitive flexibility and career competency levels of university students significantly differ according to their socio-economic backgrounds?
3. Is there a significant relationship between the levels of cognitive flexibility and career competency among university students?

4. Does the level of cognitive flexibility among university students significantly predict their level of career competency?

By investigating these questions, the research aims to contribute to the understanding of the role of cognitive flexibility in the development of career competencies among university students. The findings of this study can inform educational and career development programs to enhance students' cognitive flexibility and, consequently, their preparation for the workforce.

METHOD

Participants and procedure

The study group of the research consists of 546 university students studying in Turkey. Some characteristics of the study group of the research are shown in Table 1 and Table 2 below.

Table 1. Distribution of the participants by gender

Gender	Frequency	%
Female	296	54.2
Male	250	45.8
Total	546	100.0

54.2% of the students participating in the research are female and 45.8% are male.

Table 2. Distribution of the participants by SES

SEL	Frequency	Percent
Low SEL	115	21.1
Medium SEL	409	74.9
High SEL	22	4.0
Total	546	100.0

21.1% of the students are at low socioeconomic level, 74.9% at medium and 4% at high socio-economic level.

Data collection tools

Personal Information Questionnaire: The questionnaire asked university students their gender, SES, and their degree.

Cognitive Flexibility Inventory: Developed by Dennis and Vander Wal (2010), CFI was adapted into Turkish by Gülmüm & Dağı (2012). It is prepared to measure the ability of individuals to produce alternative, harmonious, appropriate and balanced thoughts in difficult situations. It consists of twenty items and has two subscales. The Cronbach's alpha value in the first and last measurement of the alternatives subscale was 0.91. The Cronbach's alpha values of the control subscale were 0.86 in the first measurement and 0.84 in the last measurement. This scale was developed to clarify the concept of 'cognitive flexibility', which is not clearly defined in the literature, and to take measurements over the clarified concept. It is thought that as the score obtained from the scale increases, cognitive flexibility also increases (Dennis & Vander Wal, 2010).

Career Competencies Questionnaire (CCQ): Career competencies were measured with the 21-item Career Competencies Questionnaire (CCQ; Akkermans et al., 2013). The items were measured on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). The CCQ items reflect six underlying career competencies: reflection on motivation was measured with 3 items (e.g., "I know what I like in my

work”; $\alpha = .83$), reflection on qualities was measured with 4 items (e.g., “I know my strengths in my work”; $\alpha = .92$), networking was measured with 4 items (e.g., “I know how to ask for advice from members of my network”; $\alpha = .87$), self-profiling was measured with 3 items (e.g., “I am able to show others what I want to achieve in my career”; $\alpha = .86$), work exploration was measured with 3 items (e.g., “I can actively search for the developments in my area of work”; $\alpha = .86$), and career control was measured with 4 items (e.g., “I can make clear career plans”; $\alpha = .88$). The items of the CCQ have been shown to be positively related to related concepts such as general self-efficacy, task performance, and perceived employability (Akkermans et al., 2013).

Process

A questionnaire prepared by the researcher and administered to the students via Google Forms was used as a data collection tool for the research. t-test and analysis of variance techniques were used to determine the differentiation according to demographic variables. Pearson Product Moments Correlation coefficients were calculated to examine the potential relationships between cognitive flexibility and career competence, which are the variables of the study. Multiple Regression Analysis was used to determine the explanation ratios of the independent variables to the dependent variable.

Findings

The findings of the study are presented in this section. Firstly, an independent samples t-test analysis was conducted to examine the differentiation of cognitive flexibility and career competency levels among university students based on gender. The findings of this analysis are provided in Table 3.

When examining the findings in Table 3, it can be observed that in the cognitive flexibility control subscale, the mean score of males ($=24.00$) is higher than the mean score of females ($=22.16$). The calculated t-value ($t=-3.769$, $p<.005$) testing the significance of the difference between the mean scores of the groups indicates that the difference in the mean scores between the groups is significant at the .005 level. Therefore, male students have significantly higher levels of cognitive flexibility control compared to female students. In the cognitive flexibility alternatives subscale, it is observed that the mean score of females ($=48.18$) is higher than the mean score of males ($=44.65$). The calculated t-value ($t=3.438$, $p<.005$) testing the significance of the difference between the mean scores of the groups indicates that the difference in the mean scores between the groups is significant at the .005 level. Therefore, female students have a significantly higher level of cognitive flexibility in terms of alternatives compared to male students.

Regarding the Reflection on Motivation subscale of the Career Competency Scale, it is observed that the mean score of females ($=11.37$) is higher than the mean score of males ($=10.73$). The calculated t-value ($t=-2.798$, $p<.005$) testing the significance of the difference between the mean scores of the groups indicates that the difference in the mean scores between the groups is significant at the .005 level. Therefore, female students have a significantly higher level of reflection on motivation compared to male students.

Table 3. t-test results regarding the differentiation of students' cognitive flexibility and career competencies by gender

Variables	Gender	N	Mean	Std. Dev.	t	p
Control	Female	296	22.16	5.692	-3.769*	,001
	Male	250	24.00	5.686		
Alternatives	Female	296	48.18	11.100	3.438*	,001
	Male	250	44.65	12.895		
Reflection on motivation	Female	296	11.37	2.468	2,798*	,005
	Male	250	10.73	2.879		
Reflection on qualities	Female	296	14.83	3.293	3,659*	,001
	Male	250	13.70	3.977		
Networking	Female	296	12.32	3.971	-.802	.423
	Male	250	12.58	3.605		
Self-profiling	Female	296	10.85	2.652	1,692	,091
	Male	250	10.45	2.914		
Work exploration	Female	296	10.27	2.839	.356	.722
	Male	250	10.18	2.849		
Career Control	Female	296	14.25	3.671	2.995*	.003
	Male	250	13.24	4.180		

*. p< 0.05

According to the findings in Table 3, in the Reflection on Qualities subscale of the Career Competency Scale, it is observed that the mean score of females (=14.83) is higher than the mean score of males (=13.70). The calculated t-value ($t=-2.798$, $p<.005$) testing the significance of the difference between the mean scores of the groups indicates that the difference in the mean scores between the groups is significant at the .005 level. Therefore, female students have a significantly higher level of reflection on qualities compared to male students. In the Career Control subscale of the Career Competency Scale, it is observed that the mean score of females (=14.25) is higher than the mean score of males (=13.24). The calculated t-value ($t=-2.995$, $p<.005$) testing the significance of the difference between the mean scores of the groups indicates that the difference in the mean scores between the groups is significant at the .005 level. Therefore, female students have a significantly higher level of career control compared to male students. However, in the networking, self-profiling, and work exploration subscales of the Career Competency Scale, the difference in mean scores between the groups is not significant at the .005 level, as seen in Table 3.

One-way analysis of variance (ANOVA) was conducted to test the differentiation of cognitive flexibility and career competency levels of university students based on their socio-economic levels. The findings of this analysis are provided in Table 4.

When examining the findings in Table 4, it can be observed that there is no significant difference in the mean scores between groups in the reflection on motivation, reflection on qualities, networking, self-profiling, work exploration, and career control subscales of the career competency scale at the .005 level. Therefore, it can be concluded that there is no significant differentiation in the levels of career competency among university students based on their socio-economic levels.

In the cognitive flexibility scale, the difference in mean scores between groups is also not significant at the .005 level, as seen in Table 4. However, in the cognitive flexibility alternatives subscale, the calculated F-value ($F=6.423$, $p<.005$), testing the significance of the difference in mean scores between groups, indicates that the difference in mean scores between groups is significant at the .005 level.

Table 4. F-test (ANOVA) results regarding the differentiation of students' cognitive flexibility and career competencies according to SEL

		N	Mean	Std. Deviation	F	p	Scheffe
Control	Lower SEL	115	23.71	5.714	1,118	,328	2>1
	Medium SEL	409	22.83	5.760			
	Upper SEL	22	22.59	5.917			
Alternatives	Lower SEL	115	43.72	12.952	6,423	,002*	2>1
	Medium SEL	409	47.61	11.619			
	Upper SEL	22	42.00	12.720			
Reflection on motivation	Lower SEL	115	11.10	2.785	.306	.736	2>1
	Medium SEL	409	11.09	2.630			
	Upper SEL	22	10.64	3.125			
Reflection on qualities	Lower SEL	115	14.58	3.765	.443	.642	2>1
	Medium SEL	409	14.25	3.609			
	Upper SEL	22	14.00	4.209			
Networking	Lower SEL	115	12.25	3.722	.173	.841	2>1
	Medium SEL	409	12.49	3.776			
	Upper SEL	22	12.50	4.857			
Self-profiling	Lower SEL	115	10.58	2.844	.366	.694	2>1
	Medium SEL	409	10.67	2.747			
	Upper SEL	22	11.14	3.121			
Work exploration	Lower SEL	115	10.22	2.711	.047	.954	2>1
	Medium SEL	409	10.22	2.890			
	Upper SEL	22	10.41	2.702			
Career Control	Lower SEL	115	13.74	3.869	.56	.946	2>1
	Medium SEL	409	13.78	3.945			
	Upper SEL	22	14.05	4.391			

*. p<0.05

When examining the results of the Scheffe analysis conducted to determine the source of the difference in mean scores, it is observed that the level of cognitive flexibility alternatives among students with a moderate socio-economic level is higher than that of students with a lower socio-economic level.

To determine the level of relationship between cognitive flexibility and career competencies among university students, a Pearson correlation analysis was conducted. The findings of the analysis are presented in Table 5. When examining the findings in Table 5, it can be observed that there is a positive and significant relationship between the cognitive flexibility scale's alternatives subscale and the reflection on motivation ($r=0.462$, $p<0.001$), reflection on qualities ($r=0.525$, $p<0.001$), networking ($r=0.383$, $p<0.001$), self-profiling ($r=0.546$, $p<0.001$), work exploration ($r=0.436$, $p<0.001$), and career control ($r=0.398$, $p<0.001$) subscales of the career competency scale. Therefore, it can be said that as the level of cognitive flexibility alternatives increases, the level of career competencies also increases.

On the other hand, a negative and weak relationship is observed only between the control subscale of the cognitive flexibility scale and the reflection on qualities subscale in Table 5. No significant relationship was found between the control subscale and the other subscales of the career competency scale.

Table 5. The relationship between students' cognitive flexibility and career competencies

			1	2	3	4	5	6	7	8
1. Control	r		1							
	p									
2. Alternatives	r	-.224**		1						
	p	.000								
3. reflection on motivation	r	-.027	.462**		1					
	p	.532	.000							
4. reflection on qualities	r	-.092*	.525**	.757**		1				
	p	.031	.000	.000						
5. Networking	r	.030	.383**	.486**	.562**		1			
	p	.486	.000	.000	.000					
6. Self-profiling	r	.002	.546**	.685**	.744**	.633**		1		
	p	.960	.000	.000	.000	.000				
7. Work exploration	r	.004	.436**	.568**	.646**	.622**	.732**		1	
	p	.920	.000	.000	.000	.000	.000			
8. Career Control	r	-.008	.398**	.580**	.610**	.512**	.677**	.673**	1	
	p	.851	.000	.000	.000	.000	.000	.000		

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results of multiple linear regression analysis, conducted to determine the predictive power of the cognitive flexibility dimensions (control and alternatives) on the scores obtained from the career competency subscales (reflection on motivation, reflection on qualities, networking, self-profiling, work exploration, and career control), are presented in Table 6, Table 7, Table 8, Table 9, Table 10, and Table 11.

Table 6. Regression Analysis Results for the Prediction of reflection on motivation Competencies

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	5.245	.648		8.091	.000
Control	.038	.018	.081	2.073	.039
Alternatives	.107	.009	.480	12.353	.000
R ² =.469	R ² =.222		F=76,553	P<.001	

a. Dependent Variable: Reflection on motivation

According to the findings in Table 6, the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the reflection on motivation subscale of career competencies ($R^2=0.222$, $F=76.553$, $p<0.001$). This finding indicates that the combined effect of cognitive flexibility's control and alternatives dimensions explains 22.2% of the variance in scores related to reflection on motivation. Among the independent variables, alternatives ($\beta=0.480$) is the strongest predictor, followed by control ($\beta=0.22$).

In Table 7, the findings indicate that the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the reflection on qualities subscale of career competencies ($R^2=0.276$, $F=103.390$, $p<0.001$).

Table 7. Regression Analysis Results for the Prediction of reflection on qualities Competencies

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	6.438	.854		7.542	.000
Control	.017	.024	.026	.696	.487
Alternatives	.161	.011	.530	14.155	.000
R ² ,525	R ² =.276		F=103,390	P<,001	

a. Dependent Variable: reflection on qualities

This finding suggests that the combined effect of cognitive flexibility's control and alternatives dimensions explains 27.6% of the variance in scores related to reflection on qualities. Among the independent variables, alternatives ($\beta=0.530$) is the strongest predictor, while control ($\beta=0.026$) alone does not reach significance ($p>0.005$) in predicting reflection on qualities.

Table 8. Regression Analysis Results for the Prediction of networking Competencies

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	4.569	.955		4.784	.000
Control	.080	.027	.122	3.013	.003
Alternatives	.129	.013	.410	10.165	.000
R ² ,401	R ² =.161		F=51.956	P<,001	

a. Dependent Variable: Networking

Based on the findings in Table 8, the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the networking subscale of career competencies ($R^2=0.161$, $F=51.956$, $p<0.001$). This finding indicates that the combined effect of cognitive flexibility's control and alternatives dimensions explains 16.1% of the variance in scores related to networking. Among the independent variables, alternatives ($\beta=0.410$) is the strongest predictor, followed by control ($\beta=0.122$).

Table 9. Regression Analysis Results for the Prediction of self-profiling Competencies

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	3.053	.631		4.842	.000
Control	.063	.018	.131	3.583	.000
Alternatives	.132	.008	.575	15.761	.000
R ² ,560	R ² =.314		F=124.201	P<,001	

a. Dependent Variable: Self profiling

According to the findings in Table 9, the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the self-profiling subscale of career competencies ($R^2=0.314$, $F=124.201$, $p<0.001$). This finding suggests that the combined effect of cognitive flexibility's control and alternatives dimensions explains 31.4% of the variance in scores related to self-profiling. Among the independent variables, alternatives ($\beta=0.575$) is the strongest predictor, followed by control ($\beta=0.131$).

Table 10. Regression Analysis Results for the Prediction of work exploration Competencies

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	3.975	.696		5.714	.000
Control	.053	.019	.107	2.719	.007
Alternatives	.108	.009	.460	11.677	.000
R ² ,448	R ² =.201		F=68.184		P<.001

a. Dependent Variable: work exploration

The findings in Table 10 indicate that the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the work exploration subscale of career competencies ($R^2=0.201$, $F=68.184$, $p<0.001$). This finding suggests that the combined effect of cognitive flexibility's control and alternatives dimensions explains 20.1% of the variance in scores related to work exploration. Among the independent variables, alternatives ($\beta=0.460$) is the strongest predictor, followed by control ($\beta=0.107$).

Table 11. Regression Analysis Results for the Prediction of Career Control Competencies

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	6.114	.986		6.201	.000
Control	.058	.028	.085	2.115	.035
Alternatives	.136	.013	.417	10.353	.000
R ² ,406	R ² =.165		F=53.616		P<.001

a. Dependent Variable: Career Control

According to the findings in Table 11, the cognitive flexibility scale, including the control and alternatives dimensions as predictor variables, significantly predicts the career control subscale of career competencies ($R^2=0.165$, $F=53.616$, $p<0.001$). This finding indicates that the combined effect of cognitive flexibility's control and alternatives dimensions explains 16.5% of the variance in scores related to career control. Among the independent variables, alternatives ($\beta=0.417$) is the strongest predictor, followed by control ($\beta=0.085$).

CONCLUSION

In the research, it was found that the cognitive flexibility levels of university students significantly differ based on gender. Female students demonstrated significantly higher levels of alternative thinking compared to male students, while male students exhibited significantly higher levels of control. Additionally, female students showed significantly higher levels of reflection on motivation, reflection on qualities, and career control competencies compared to male students. Regarding the differentiation of cognitive flexibility and career competency levels based on socioeconomic status, the results indicated a significant difference only in the alternative thinking dimension of cognitive flexibility. It was found that students with a middle socioeconomic status had higher levels of alternative thinking compared to those with a lower socioeconomic status.

Another result obtained in the research pertains to the relationship between cognitive flexibility and career competencies. Accordingly, a positive significant relationship was found between the alternative thinking dimension of cognitive flexibility and all dimensions of career competencies. However, a negative low

relationship was identified only between the control dimension of cognitive flexibility and the reflection on qualities dimension. Hence, it can be stated that students with higher levels of alternative thinking in cognitive flexibility also exhibit higher levels of career competencies.

The findings regarding the predictive role of cognitive flexibility on career competencies support this view. The results indicate that the level of cognitive flexibility is an important predictor of career competencies. This finding suggests that enhancing cognitive flexibility is crucial in increasing career competencies, which are essential for university students' transition from school to work. Therefore, it is recommended to implement psycho-educational programs in career counseling services for university students that aim to improve their cognitive flexibility and assist them in developing career competencies. Additionally, it is necessary to support these findings with experimental studies.

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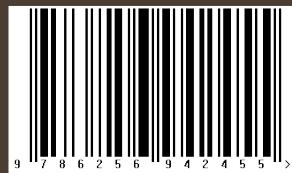
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