T.R.

ISTANBUL SABAHATTIN ZAIM UNIVERSITY

GRADUATE EDUCATION INSTITUTE

DEPARTMENT OF BUSINESS ADMINISTRATION

EXPLORING UNIVERSITY STUDENTS' ATTITUDES TOWARD ARTIFICIAL INTELLIGENCE: THE RELATIONSHIP BETWEEN PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AND TECHNOLOGY-INDUCED UNEMPLOYMENT ANXIETY

MASTER THESIS

Burak SAKALOĞLU

Istanbul

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Istanbul

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This study has been approved in partial fulfillment of the requirements for MA Degree in Business Administration

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DECLARATION OF SCIENTIFIC ETHICS AND ORIGINALITY

This is to certify that this MA thesis dissertation titled "**Exploring University Students' Attitudes Toward Artificial Intelligence: The Relationship Between Perceptions of Artificial Intelligence and Technology Induced Unemployment Anxiety**" is my own work and I have acted according to scientific ethics and academic rules while producing it. I have collected and used all information and data according to scientific ethics and guidelines on thesis writing of Sabahattin Zaim University. I have fully referenced, in both the text and bibliography, all direct and indirect quotations and all sources I have used in this work.

Burak SAKALOĞLU

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ABSTRACT

EXPLORING UNIVERSITY STUDENTS' ATTITUDES TOWARD ARTIFICIAL INTELLIGENCE: THE RELATIONSHIP BETWEEN PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AND TECHNOLOGY-INDUCED UNEMPLOYMENT ANXIETY

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This research aimed to measure the relationship between university students' attitudes towards artificial intelligence and their technological unemployment anxiety, based on the studies in the literature that artificial intelligence can lead to unemployment and the situations that affect unemployment, such as technology, that cause unemployment anxiety in university students. In this context, the research population comprises university students in Istanbul in the 2023-2024 academic year. The research was carried out on data collected by survey method using convenience sampling method from 332 students from 27 different state and foundation universities and their 39 different departments. The survey distributed as a data collection tool consists of a Demographic Information Form, General Attitudes towards Artificial Intelligence Scale, and Technological Unemployment Anxiety Scale. The collected data were analyzed using SPSS 25 and AMOS 25 statistical programs, and Linear Regression, One-way ANOVA, and Independent Samples tests were applied to the data during hypothesis testing. As a result of the research, positive general attitudes towards AI among students significantly predict lower levels of technological unemployment anxiety. At the same time, students' attitudes towards artificial intelligence differ depending on their gender, and male students have a more positive attitude. On the other hand, it was concluded that students' technological unemployment anxiety did not significantly differ according to their gender, grade point average, and grade level.

Key terms: Artificial Intelligence, Unemployment Anxiety, University Students

ÖZET

ÜNİVERSİTE ÖĞRENCİLERİNİN YAPAY ZEKÂYA YÖNELİK TUTUMLARININ İNCELENMESİ: YAPAY ZEKÂ ALGILARI VE TEKNOLOJİ KAYNAKLI İSTİHDAM KAYGISI ARASINDAKİ İLİŞKİ

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Yüksek Lisans, İşletme

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Bu araştırma literatürdeki yapay zekanın işsizliğe yol açabileceğine dair yapılmış olan araştırmalar ve teknoloji gibi işsizliği etkileyen durumlarının üniversite öğrencilerinde işsizlik kaygısına yol açtığına dair yapılan araştırmalardan yola çıkarak üniversite öğrencilerinin yapay zekaya karşı olan tutumları ile teknolojik işsizlik kaygısı yaşamaları arasındaki ilişkiyi ölçmeyi amaçlamıştır. Bu bağlamda araştırmanın evrenini İstanbul'daki 2023-2024 akademik yılındaki üniversite öğrencileri oluşturmaktadır. Araştırma, 27 farklı devlet ve vakıf üniversitesi ile 39 farklı bölümde öğrenim gören toplam 332 öğrenciden kolayda örnekleme yöntemi kullanılarak anket yöntemiyle toplanan veriler üzerinde gerçekleştirilmiştir. Veri toplama aracı olarak dağıtılan anket Demografik Bilgi Formu, Yapay Zekaya Yönelik Genel Tutum Ölçeği ve Teknolojik İşsizlik Kaygısı Ölçeğinden oluşmaktadır. Toplanan veriler SPSS 25 ve AMOS 25 istatistik programları kullanılarak analiz edilmiş ve hipotez testleri sırasında verilere Linear Regresyon, One-way ANOVA ve Independent Samples t-Test uygulanmıştır. Araştırma sonucunda öğrencilerin yapay zekaya yönelik pozitif genel tutumlarının, düşük teknolojik işsizlik kaygı seviyelerini anlamlı düzeyde yordadığı; öğrencilerin yapay zekaya yönelik tutumları cinsiyete göre anlamalı şekilde farklılaştığı ve erkek öğrencilerin daha olumlu bir tutuma sahip olduğu görülmüştür. Öte yandan, öğrencilerin teknolojik işsizlik kaygısının cinsiyet, not ortalaması ve sınıf düzeyine göre anlamlı bir farklılık göstermediği sonucuna ulaşılmıştır.

Anahtar Kelimeler: Yapay Zekâ, İşsizlik Kaygısı, Üniversite Öğrencileri

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LIST OF ABBREVIATIONS

AI: Artificial Intelligence

AGFI: Adjusted Goodness-of-fit

ANNs: Artificial Neural Networks

CFA: Confirmatory Factor Analysis

CFI: Comparative Fit Index

ECVI: Expected Cross Validation Index

GAAIS: General Attitudes Towards Artificial Intelligence Scale

GAD: Generalized Anxiety Disorder

GAN: Generative Adversarial Networks

GFI: Goodness Of Fit

GPA: Grade Point Average

ITI: Incremental Technical Improvement

LTS: Lack of Technical Skill

NLP: Natural Language Processing

RMSEA: Root Mean Square Error of Approximation

SAD: Social Anxiety Disorder

TD: Technological Disruption

CHAPTER I

INTRODUCTION

1.1. The Statement of the Problem

From the past to the present, all technological developments in the world have resulted in strategic decisions for businesses and institutions. As a result, some structural changes have been required. Nowadays, rapidly developing artificial intelligence is changing how people do things in many areas. Artificial intelligence, which has acquired deep learning based on the knowledge that humans have accumulated over many years, can make complex decisions in some cases and has become better at doing jobs than humans (Agrawal, Gans, and Goldfarb: 2019: 2). Due to this, discussions about the future and current state of employment have begun in academia and companies. Discussions are on the agenda about what will happen to the jobs of people working in that position if existing jobs can be done better and more economically by artificial intelligence. In previous technological developments, it has been observed that some unemployment occurred due to the development of machines and automation, and the issue of unemployment has been discussed for decades. Today, studies are showing that artificial intelligence, one of the latest breakthroughs in technology, may lead to unemployment (Acemoglu and Restrepo, 2018: 25). It can be predicted that this resulting unemployment will undoubtedly threaten those working in their current jobs.

Moreover, one of the most important effects is that it can affect the career plans of university students who have yet to start working or are both studying and working. How will university students' attitudes towards the development of artificial intelligence affect students psychologically towards this change? What steps will governments, institutions, and universities take against this change? Questions like these are a matter of curiosity. Considering these questions, some studies in the literature show that artificial intelligence will cause unemployment.

Moreover, there are also studies on university students' unemployment anxiety. However, not many studies measure university students' attitudes toward artificial intelligence and unemployment anxiety. For these reasons, this research will examine

the relationship between university students' attitudes toward artificial intelligence and unemployment anxiety as a problem due to the lack of literature.

1.2. The Objective of the Study

Since the tools came with technological developments, automation systems can do people's jobs and replace them. Technological developments have been associated with employment, and it has been observed to be a vital factor (Acemoglu, 1997: 1). Artificial intelligence, one of the latest technological developments, is predicted to change people's lives significantly. One of these changes is unemployment (Nguyen and Vo, 2022: 42), which affects people's psychology. Due to the development of artificial intelligence technologies, working people are concerned about losing their jobs in the future (Civelek and Pehlivanoğlu, 2020: 68). This research measures the relationship between university students' perspectives on artificial intelligence and unemployment concerns. It aims to be a resource for universities and decision-makers to take steps in this area.

1.3. The Importance of the Research

Some studies in the literature have measured the unemployment anxiety of university students. Research on unemployment anxiety and hopelessness in university students was conducted with 732 students from different Turkish universities (Yalçın, 2022: 131). Moreover, some studies in the literature examine the relationship between personality traits and people's attitudes toward artificial intelligence. A team of researchers led by Kaya examined the relationship between personality traits and attitudes toward artificial intelligence of 350 Turkish people (Kaya et al., 2022: 1).

In the literature review, insufficient research measures the relationship between people's attitudes toward artificial intelligence and unemployment concerns. This indicates that this research will fill an essential point in the literature. Moreover, if there is a relationship between students' attitudes toward artificial intelligence and unemployment anxiety based on the results obtained after measuring this relationship, universities and government institutions can provide opportunities and resources for students to adapt AI to their current education. Being a pioneer and a source is important for this research.

1.4. The Assumptions of the Study

It was assumed that the research participants, the university students, answered the questions sincerely.

1.5. The Limitations of the Study

Due to cost and time constraints, the research was limited to university students at Istanbul in the 2023-2024 academic year.

1.6. The Research Questions and The Hypotheses of the Study

The study explores the relationship between university students' attitudes toward artificial intelligence (AI) and unemployment anxiety. The following research questions guide the investigation:

1. Do university students' general attitudes towards artificial intelligence significantly affect their levels of technological unemployment anxiety?
2. Do university students' general attitudes towards AI significantly differ according to their gender?
3. Do university students' technological unemployment anxiety significantly differ according to their gender?
4. Do university students' technological unemployment anxiety significantly differ according to their GPA?
5. Do university students' technological unemployment anxiety significantly differ according to their year of the study?

In the context of the research's questions, hypotheses are posited:

1. Positive general attitudes towards AI among students significantly predict lower levels of technological unemployment anxiety.
2. University students' general attitudes towards artificial intelligence differ significantly according to their gender.
3. University students' technological unemployment anxiety levels differ significantly according to their gender.
4. University students' technological unemployment anxiety levels differ significantly according to their GPA.

5. University students' technological unemployment anxiety levels differ significantly according to their year of the study.

1.7. Descriptions

Artificial intelligence systems can be briefly defined as an activity aimed at making machines smart. AI can also produce predictions, recommendations, or decisions. These estimates It does this by providing deep learning from machine and human-based data. This system is often used for goals such as perceiving different languages, perceiving, and responding to emotions, proving mathematical theorems, creating designs and music, and playing and designing games (Nilsson, 2009: 13).

Anxiety is generally an anticipatory emotional state that causes feelings of tension and anxious thoughts in people. In certain instances, it manifests as physiological alterations like elevated blood pressure. Individuals suffering from anxiety disorders frequently encounter persistent worries and intrusive thoughts, and they could even steer clear of future-related circumstances out of fear. Anxiety is generally considered a future-oriented, prolonged response focused on a prevalent threat (Wilt, Oehlberg, and Revelle: 2011: 988). Unemployment anxiety is the situation where people have anxious thoughts about losing their current jobs or that people who are not yet working will not be able to find a job in the future.

CHAPTER II

LITERATURE REVIEW

2.1. Artificial Intelligence

2.1.1. Definition of Artificial Intelligence

The broad field of artificial intelligence (AI) study aims to create intelligent robots and systems that can do jobs that typically require human intelligence and expertise (Ahuerma, 2022: 1947). Many subfields fall under the branches of artificial intelligence, such as robotics, computer vision, machine learning, natural language processing, and more. AI systems with these subfields enable machines to detect images, comprehend plain language, learn from experience, operate robots, and generate creative material using models, data, and algorithms (Pannu, 2015: 79).

While artificial intelligence offers numerous advantages and uses across multiple fields, including education, healthcare, business, entertainment, and security, it also presents some ethical and societal issues, including privacy, bias, accountability, and human-machine interaction. In recent years, enormous progress has been made in artificial intelligence, mostly because large datasets, reliable computing infrastructure, and advanced algorithms are now widely available. Recent advances in AI, such as deep learning, reinforcement learning, generative models, and transformers, have made it possible for machines to perform on par with humans in a variety of activities, including language translation, image recognition, speech synthesis, and game playing (Dutta, 2018).

In simpler words, machines with artificial intelligence are capable of handling challenging tasks. It involves creating solutions that resemble people. Based on artificial intelligence systems, it picks up the best technique from those it has learnt and uses it after learning how the task is done. Artificial intelligence also makes use of human-specific abilities like reasoning, learning, comparing, communicating, and making decisions. It is also currently preferred in the majority of enterprises and manufacturing processes because of the lack of drawbacks like human error and forgetfulness.

2.1.2. History of AI

Artificial intelligence originated from the attempt made by classical philosophers to describe the human mind as a symbolic system. At a symposium conducted at Dartmouth College in Hanover, New Hampshire, in 1956, the term "artificial intelligence" was first used, creating the discipline. Since then, artificial intelligence has made considerable progress, overcoming challenges, noteworthy advancements, and overcoming barriers (Nilsson, 2009: 77).

Early History of AI (1940s-1970s)

The earliest electrical computers were created in the 1940s, and Alan Turing, Kurt Gödel, and Alonzo Church's mathematical models of computing and logic inspired these machines. Because he developed the well-known Turing test, a standard for determining whether a machine is intelligent enough to mimic a human (Piccinini, 2003: 24). Turing is particularly regarded as one of the forerunners of artificial intelligence. To solve issues in a range of domains, such as games, logic, mathematics, and natural language, the first artificial intelligence algorithms were developed in the 1950s and 1960s. These algorithms employed rule-based and symbolic techniques. Here are some of the tools and features of the first AI systems (Nilsson, 2009):

- Logic Theorist (1956): An application that established propositional logic theorems and proposed new theories.
- General Problem Solver (1957): An application that used heuristic search and means-ends analysis to solve various problems.
- SAINT (1961): It was developed as a program to answer algebraic word problems.
- STUDENT (1963): A computer software that could resolve calculus issues and explain the solutions naturally.
- ELIZA (1966): A program that could converse with a human in natural language, simulating a psychotherapist.
- Dendral (1967): An organic chemistry expert system that could deduce a molecule's structure from mass spectrometry data.
- SHRDLU (1970): A program that could comprehend queries and commands in normal language and manipulate blocks in a virtual world.

These early artificial intelligence systems showed the viability and promise of building computers capable of carrying out activities requiring human intelligence. But they also had to contend with several drawbacks, including the fragile nature of the symbolic representations, the challenge of learning and retaining vast volumes of information, the deficiency of common sense and contextual awareness, and the ineffectiveness of the search and inference algorithms.

AI Winter and Revival (1970s-1990s)

Due to several causes, including the introduction of new paradigms and techniques, the availability of additional data and computer resources, and shifting societal and corporate expectations and needs, artificial intelligence had periods of collapse and comeback between the 1970s and 1990s (Nilsson, 2009: 408). The creation of expert systems, or AI systems that encode the knowledge and reasoning of human experts in a particular field, like finance, engineering, or medicine, was one of the major trends during this time. Expert systems use an inference engine, which applies rules to facts to derive conclusions or suggest actions, and a knowledge base, which contains facts and rules. Several well-known expert systems and their uses include (Nilsson, 2009):

- MYCIN (1972): An expert system for blood infection diagnosis and antibiotic recommendation.
- PROSPECTOR (1978): Mineral exploration and discovery expert system. • XCON (1978): A computer system configuration expert system.
- R1 (1982): A computer components ordering expert system.
- CYC (1984): A large-scale endeavor to develop a general-purpose expert system capable of encoding and reasoning with common sense information.
- Deep Blue (1997): Using evaluation functions and brute-force search, this machine's program overcame one of the world's chess masters Garry Kasparov.

Expert systems have successfully shown the ability and value of artificial intelligence in resolving practical issues and offering knowledgeable support to human users. However, they also confronted a few difficulties, including the bottleneck in information acquisition, the upkeep and upgrading of the knowledge base, the rationale

and explanation of the findings, and the integration and interoperability of various systems.

The emergence of connectionism, an AI paradigm that views the brain as a network of interconnected neurons that can learn from data and adapt to changing settings, was another significant trend during this time. Artificial neural networks (ANNs), which are computer models made up of layers of nodes that carry out basic mathematical operations and are coupled by weighted links that carry signals, are the foundation of connectionism. The following are some of the major advancements and successes of connectionism and ANNs (Nilsson, 2009):

- Backpropagation (1986): A learning method that can modify a multilayer ANN's link weights according to the expected and actual output discrepancy.
- NETtalk (1987): A neural network capable of learning to pronounce words in English through reading.
- TD-Gammon (1992): Using temporal difference learning, a reinforcement learning technique, a neural network could learn to play backgammon at a high level.

Since connectionism and ANNs could manage noisy and incomplete data, learn from examples, and feedback, and generalize to new situations, they provided a different and complementary viewpoint to symbolic and rule-based AI. They did, however, have certain drawbacks, including the inability to be transparently interpreted, the requirement for substantial volumes of data and processing, and the vulnerability to adversarial and overfitting attacks.

AI Boom and Beyond (2000s-present)

In this period, many factors, including the availability of vast amounts of data, the rise in computational power and parallel processing, the creation of new algorithms and architectures, and the emergence of new applications and domains, contributed to the rapid and unprecedented growth and innovation in AI that occurred in the 2000s and 2010s. One of the most significant developments of this era was the rise of deep learning, a branch of machine learning. Deep learning uses deep neural networks (ANNs) with several hidden strata and their ability to extract complex and abstract characteristics and representations from data. Deep learning has produced amazing

outcomes and innovations across a range of tasks and fields, including (Youheng, 2023: 26):

Image recognition: Convolutional neural networks, neural style transfer, and generative adversarial networks are a few techniques that deep learning models use to produce and edit images with a high level of quality and accuracy, including segmentation, detection, and production.

Natural language processing: By utilizing methods like recurrent neural networks, transformers, and pre-trained language models, deep learning models can comprehend, produce, translate, and summarize natural language documents and speech.

Computer vision: Using methods like semantic segmentation, face detection, object detection, and action recognition, deep learning models can identify, track, and interact with faces, objects, scenes, and actions.

Speech recognition: Using methods like voice conversion, text-to-speech, and speech-to-text, deep learning models can synthesize, transcribe, and alter speech signals.

Reinforcement learning: Using strategies like Q-learning, policy gradients, and actor-critic methods, deep learning models can learn to optimize their behavior and accomplish their objectives.

- Some new artificial intelligence systems have developed the influence of the abovementioned systems, which have developed rapidly after the 2000s. Some selected examples of these advanced systems are as follows:
- Watson (2011): It was tested on the US quiz show Jeopardy! to test Watson's capabilities using natural language processing, information retrieval, and machine learning. It won twice the total amount Ken Jennings and Brad Rutter won in the competition (Tesauro, et al., 2013: 242).
- AlphaGo (2016): A computer program developed by Google DeepMind AlphaGo, faced world champion Lee Sodol in the game Go in 2016 to understand its abilities. AlphaGo had a 4-1 advantage and won the game because of artificial intelligence technology like deep neural networks and Monte Carlo tree search. (Curran, Sun, & Hong, 2020: 2).
- GPT-3 (2020): Using a deep neural network with billions of parameters, this large-scale pre-trained language model created by OpenAI can produce natural language texts on various subjects and tasks.

- DALL-E (2021): An OpenAI generative model that uses a transformer-based neural network to produce realistic visuals and images from descriptions in spoken language.

2.1.3. Artificial Intelligence Types

As seen in its historical development, artificial intelligence has acquired different features in different periods and surprised humanity with its different features. The features of artificial intelligence that touch different areas can be examined through artificial intelligence types. This classification is divided into capability-based and functionality-based (Ch'ng, 2023: 33).

Capability Based

Artificial intelligence can be categorized using capability-based AI, which considers the machine's functions and capabilities. Three categories of AI exist in terms of capabilities: Artificial narrow intelligence (ANI), artificial general intelligence (AGI), and artificial super intelligence (ASI).

Artificial narrow intelligence is AI that is made to concentrate on a certain task and look extremely intelligent when performing it. Though it may seem to think, these systems are not conscious beings. This system, also known as artificial weak intelligence, performs the desired and specified tasks using machine learning and neural network algorithms. Weak AI is constrained by the rules imposed upon it and can only behave in accordance with them. Some examples of this type of artificial intelligence include image recognition software, driverless cars, and voice command systems. In such systems, artificial intelligence can recognize the relevant content and perform its function through specified commands. The artificial intelligence applications we witness today are this type of artificial intelligence.

Artificial general intelligence is the artificial intelligence that will be able to understand the world and every person and apply it in a different field by learning how to do a wide variety of tasks by applying the data and experiences collected from previous situations to different situations. This system, also known as strong artificial intelligence, can work in a very human-like manner and assist people. These types of systems are still being studied; for example, ChatGPT, which draws attention with its humanoid features, is a system that develops every day in this field.

Artificial superintelligence, which is also known as strong artificial intelligence, is capable of independent thought and brain-like tasks. Strong artificial intelligence aims to create machines with cognitive capacities that are functionally equivalent to those of humans. In other words, it is an artificial intelligence that can learn human capabilities on its own, like a human or even superior to a human, and put these capabilities into practice. Currently, this type of artificial intelligence is only speculation and science fiction; humanity has not yet witnessed this type of artificial intelligence.

Functionality Based

Functionality-based AI is about how an artificial intelligence applies its learning abilities and procedures to interpret information, react to stimuli, and communicate with its surroundings. It is a kind of stage of AI in how AI learns and uses information. Based on this perspective, it can be listed according to four functionality types: reactive machines, limited memory, theory of mind, and self-awareness.

Reactive machines which are the basic types of artificial intelligence systems cannot use previous experiences to recommend current decisions or future actions because they have no memory. Considering their capabilities, these are the most basic artificial intelligence tools. They perform the desired task based on the limited information given, and other than that, they cannot learn and process historical data. For instance, an artificial intelligence tool that faces its opponent in a chess match works with a reactive machine system. Given the limited information loaded, it is expected to make counter moves to its opponent's moves.

Limited memory AI can return to their past experiences and information and use this information to make future and current decisions, and they can create the response they need to give based on their previous experiences in the field. These types of artificial intelligence have been practiced on data recorded in the past and developed over time. They can respond to current demands and create predictions for the future with their experiments and the information they have acquired over many years. These days, artificial intelligence applications and technologies such as chatbots and AI assistants are examples of limited memory artificial intelligence.

The theory of mind artificial intelligence is an AI that gets closer to humans and human emotions by adding features not found in limited memory AI. This kind of artificial

intelligence, which is a very advanced technology, is expected to be able to understand some abstract meanings, such as people's emotions, thoughts, expectations, and beliefs, and to be able to interact socially. Studies of this type of artificial intelligence are ongoing, but it cannot be said that it is functional. For instance, it can understand the commands you give to the AI assistants, known as limited memory, and used at a certain level, you need to tell it your feelings by writing, but it is predicted that an AI assistant enriched with the theory of mind can understand people's emotions.

Self-aware artificial intelligence is an artificial intelligence that knows itself, as its name suggests, going one step further than theory-of-mind artificial intelligence. In this type of artificial intelligence, machines or robots have the consciousness that they are conscious of who they are and comprehend the qualities that lie inside, situations and conditions, and even perceive human emotions. The creation of this type of artificial intelligence, which resembles a complete human, is being discussed from several angles because the effects it may have cannot be fully predicted. While there are discussions that even the current form of artificial intelligence is taking over people's jobs, self-aware AI will take over people's jobs to a large extent. Moreover, there are ideas that robots and artificial intelligence, considered science fiction, will take over the world and occur in this type of artificial intelligence.

2.1.4. Elements of Artificial Intelligence

As seen in the historical development of artificial intelligence and types of artificial intelligence, artificial intelligence is similar to human development in its beginning and development. It is seen that artificial intelligence, one of whose main goals is to be as similar to humans as possible, develops by imitating human development. Thanks to some sub-elements, artificial intelligence has achieved this development and what it can do in its current state. These elements include deep learning, expert systems, generative adversarial networks (GANs), robotics, machine learning, natural language processing (NLP), cognitive computing, and computer vision.

2.1.4.1. Deep learning

Deep learning, a sub-branch of machine learning, is more advanced than artificial neural networks and benefits from these neural networks. Deep learning responds to what is requested by learning from large volumes of data in databases by using artificial neural networks. The most important difference between Deep Learning and

machine learning is that deep learning reaches results by processing large amounts of data. Due to its complex structure, it requires many systems and hardware with high computing power to process this high data. While machine learning uses structured information, deep learning analyzes large data sets and transforms them into a structured form (Abbas and Hurry, 2023: 104). Most artificial intelligence tools witnessed today benefit from deep learning to achieve the desired results. Moreover, thanks to its ability to process very high-capacity data, deep learning can make inferences in a much shorter time than data that a human can analyze and make inferences in a very long time. Because of this feature, it reduces the human need for data processing and analysis.

2.1.4.2. Expert Systems

Expert systems are programs created in the field of expertise of a particular field, such as medicine or finance, in the light of information obtained from the way existing human experts in that fieldwork can achieve the desired result. Expert systems emerged from studies carried out to conceptualize the way humans do business and the process of information processing by human intelligence to be carried out automatically by the machine (Shubhendu and Vijay, 2013: 30). The first expert system was designed for a medical purpose, analyzing chemical compounds known as Dendral. This system, known as the first expert system, was developed by Edward Feigenbaum and Joshua Lederberg. The system was first developed at Stanford University in 1965, but the system was updated, and additions were made in later years. Since expert systems are programs that analyze information about a specific problem and solve issues in industries like engineering, consulting, and medical, they can meet the need for experts in that field. Since such systems can do the work that a few experts can do alone, they are preferred because they have a cost advantage over humans in commercial activities.

2.1.4.3. Generative Adversarial Networks (GANs)

Generative Adversarial Networks (GAN) is a system, which can be called a neural network modeling, that produces and creates examples from neural networks and existing examples in the most appropriate way to achieve the desired result. GANs, an element of the field of machine learning, are systems that produce the desired results in matters such as prediction, classification, and problem-solving. This system creates

highly realistic results, such as images and videos based on requested keywords or verbal data (Abbas and Hurry, 2023: 107). While doing these operations, they also benefit from other systems, such as natural language processing (NLP). GANs are currently the basis of the most well-known applications as they serve in various fields such as entertainment, design, and art and in meeting artificial intelligence tools with the end user.

2.1.4.4. Robotics

As mentioned, one of artificial intelligence systems' focal points is exhibiting human-like thoughts and behaviors. Robotics comes into play in part of this purpose, from producing knowledge to moving and having a body. In addition to being a component of artificial intelligence, robotics emerges through fields such as mechanical engineering and electrical engineering. These engineering branches generally deal with robot design, production, and use. When the produced robotic system is combined with artificial intelligence and artificial intelligence components such as computer vision, robotic systems, natural language processing, and machine learning, artificial intelligence emerges. Equipped with sensors, arms, feet, or physical features appropriate to the desired task, artificial intelligence robotics enable machines to exhibit human-like intelligence and behavior. Such equipped machines can perform tasks autonomously, independent of humans. These robots are used in industries, healthcare and even space research (Shubhendu and Vijay, 2013: 31). Artificial intelligence-supported robots such as Curiosity Rover are used in space exploration, which can be dangerous and fatal for humans.

2.1.4.5. Machine Learning

Machine learning, one of the most important subcomponents of artificial intelligence, allows computers to learn from data without a command, thanks to mathematical and statistical modeling. Computers that learn using algorithms can also make decisions and make predictions together with other components of artificial intelligence such as natural language processing and computer vision. Machine learning is discussed under three main headings: supervised, unsupervised, and reinforcement learning (Abbas and Hurry, 2023: 104).

As the name suggests, supervised learning learns under supervision by creating training sets on known labeled data. After this training, the machine that learned the

algorithm is tested with known outputs. This type of machine learning is expected to make the desired predictions against the designed task based on the learned data.

Unsupervised learning tries to achieve the desired result by analyzing data sets that are not determined, collected for a purpose, and unlabeled. It explores machine learning algorithms to accomplish the task without human intervention and guidance. Unsupervised learning, which learns through systems whose results are unknown, discovers hidden groupings on its own, thanks to algorithms.

Reinforcement learning is a system that learns with the characteristics most similar to humans in terms of learning. In this learning system, just like humans learn from their environment by trial and error, the machine learns by interacting with its environment and improving itself using its experiences. In this method, the machine, reinforced with punishments and rewards, just like in humans, tries to produce the most suitable result for the created environment. The machine is reinforced with rewards to improve its ability to achieve the most accurate movement and result. The system that has learned in this way can adapt to changes in the environment and desired results and tries to reach the optimum result by trial and error in line with the desired result.

With these well-equipped machine learning methods and the ability to achieve the desired results quickly, it is used in areas such as production, health, data analysis, and financial analysis.

2.1.4.6. Natural Language Processing

A subfield of artificial intelligence called natural language processing (NLP) makes it possible for machines to comprehend, analyze, and respond to spoken or written input. By using NLP, machine learning, and deep learning models, it processes the languages of the entered text or verbal input thanks to its algorithms and produces the data for the desired result. The main purpose of NLP is to make the communication between humans and machines most effective in terms of language. At the same time, the NLP system is the building block of applications that produce solutions for communicating with people from different languages thanks to its ability to detect and process different languages. These highly advanced artificial intelligence systems have capabilities such as perceiving speech, translating speech into different languages, understanding the sentiments of text or voice input, and producing the desired result from these inputs. Some popular artificial intelligence applications today can communicate with people

one-on-one, thanks to NLP. For example, chatbots that can respond to people's text or verbal input, search engines that sense the search we make in search engines and offer suggestions on their own, voice assistants that communicate with us in our cars and phones at any time, answer our requests and produce solutions, Artificial intelligence applications that translate a video recorded in its current language into a different language with the same voice (Abbas and Hurry, 2023: 105). Thanks to such features, many NLP-based artificial intelligence applications are used in many sectors, such as customer services, education, and search engines.

2.1.4.7. Cognitive Computing

Cognitive Computing uses advanced technologies to simulate how humans think and communicate, aiming to make artificial intelligence's interaction with humans more natural and like human-to-human interaction. Cognitive computing attempts to optimize human-machine interaction with machine learning, neural networks, natural language processing, and other artificial intelligence elements. Cognitive Computing, along with artificial intelligence technologies such as machine learning and natural language processing, can learn, reason, and understand natural language, process large amounts of data, including text, images, and audio, and achieve the desired result. Thanks to these features it is one of the most important building blocks of artificial intelligence programs that people interact with. This artificial intelligence technology learns by making inferences from its experiences and can adapt to the desired situations and turn into a better version of itself over time, thus adapting to the users and producing solutions according to the user's sensitivities for the desired results.

2.1.4.8. Computer Vision

Artificial intelligence's field of computer vision enables machines to recognize things and circumstances by processing and analyzing images around them like a human. With artificial intelligence tools like deep learning, machine learning, and computer vision, it acquires the image, processes, analyzes, and understands the data, and can extract data from images containing numerical problems. This way, data can be produced that is suitable for the desired result from images or videos. The Computer Vision system is very similar to the human system; in the human vision system, the eye sees first and transfers the information it sees to the brain, then the brain processes the image and gives the command to take the necessary action. In the computer vision

system, the image is first captured by a camera or by an image uploaded to the system. Then, the computer vision system processes and analyzes the image for the desired result. Then, the system gives output according to the analyzed data and the desired result. While performing these steps, it uses techniques such as object detection, image classification, semantic segmentation, instance segmentation, key point detection, and video classification (Abbas & Hurry, 2023: 106). For example, it can detect faces and objects in the picture with an object detection feature. Thanks to image classification, objects or living things in the picture or video can be classified according to their types. With all these listed features, computer vision usage is very wide. For example, its facial recognition feature is used in phones and security systems. Thanks to its object recognition feature, it is used in autonomous vehicles, agriculture, games, and industrial production.

2.1.5. Artificial Intelligence Usage Fields

As seen in the history of artificial intelligence, artificial intelligence has made very important breakthroughs over the years. As can be seen in artificial intelligence techniques, artificial intelligence, equipped with different techniques, has improved its humanoid features daily in its historical development. This development has caused changes in both the public and private sectors over time, and public institutions and companies in the private sector have increased their investments in Artificial Intelligence. At the same time, thanks to the artificial intelligence features mentioned in the artificial intelligence techniques section, artificial intelligence has started to perform some tasks in institutions. The fields where artificial intelligence functions can be listed are automotive, e-commerce, education, law, home appliances, art, healthcare, agriculture, gaming, transportation, social media, personal assistant, finance, astronomy, and security.

2.1.5.1. Automotive

The use of artificial intelligence in the automotive industry can be handled in two different ways: the first is the part that includes the production, distribution, marketing, and quality control processes of the automobile, and the second is the hardware and features part of the vehicle that customers experience. First, high-tech robots have been in production in the automotive industry for many years. Artificial intelligence-supported robotic systems have performed most stages by dozens of people for many

years. In this way, no room is left for any human error that may occur during the production stages and a production standard is established. The production efficiency of companies increases because artificial intelligence-supported robots can do the work that would take dozens of people for a longer time, with better quality, in a shorter time. Moreover, thanks to artificial intelligence-supported software, companies that measure customer expectations and characteristics can deliver their vehicle marketing to the right people on the right platforms, thus conducting more efficient marketing. Another important automotive industry strategy is managing the supply chain efficiently and accurately. With artificial intelligence-supported software, companies can measure customer expectations and manage their supply chains most efficiently so that the vehicles are in the right place at the right time. Another important step in the automotive industry is quality control processes. At this stage, companies use artificial intelligence-supported robotic systems to minimize human-caused errors. Another area of use for artificial intelligence in the automotive industry is the hardware dimension of the vehicle. The use of artificial intelligence in the hardware features of vehicles positively affects the driver's usage experience. For example, with the voice assistant used in vehicles, drivers can perform many operations manually in vehicles without artificial intelligence equipment, without being distracted, thanks to the artificial intelligence assistant. Moreover, accidents that may arise from driver error or distraction can be prevented thanks to equipment such as lane assist, emergency braking, cruise control, fatigue warning systems, and autonomous driving (Soegoto, Utami, and Hermawan: 2019: 3).

2.1.5.2. E-commerce

Using artificial intelligence by e-commerce companies provides advantages to companies in several ways. Artificial intelligence software that collects customers' internet browsing information, such as cookies, can offer special advertisements to customers, highlight products according to their interests, and offer personalized campaigns after processing this collected information. Moreover, e-commerce companies can answer customers' instant questions and positively affect the customer experience, thanks to artificial intelligence-supported assistants and chatbots for live support. Companies prefer such uses for e-commerce, thanks to the cost and time advantage. Instead of employing dozens of people to analyze customers' data under normal conditions, companies can analyze customers' data quickly with artificial

intelligence-supported computers and offer them special advantages (Chenxing, et al., 2023: 4). Thanks to artificial intelligence-supported assistants, they reduce customers' waiting times increase customer satisfaction and gain a cost advantage with fewer customer service personnel.

2.1.5.3. Education

The use of artificial intelligence in education can be evaluated in terms of teachers and students. Teachers can create more creative and interesting content in their lessons thanks to artificial intelligence-supported tools, and with artificial intelligence-supported applications, they can measure students' performances and offer them special programs. Thanks to artificial intelligence-supported auditing applications, they can report projects that they can control over a long period, as well as plagiarism and mistakes in projects, in a very short time. From the students' perspective, students can access information more quickly. They can ask the questions they need to ask their teachers or the issues they need support to artificial intelligence-supported applications and receive support such as question-solving and subject explanation (Shubhendu and Vijay, 2013: 30).

2.1.5.4. Law

Artificial intelligence in law is being discussed as an alternative, especially for judges who make decisions. Studies show that artificial intelligence programs can make highly accurate decisions thanks to deep learning, which learns the defenses, decisions, and other details of all previously heard cases. Moreover, it is predicted that the use of artificial intelligence in the field of law in the future will offer advantages such as faster hearing of cases in terms of time, more transparent processing of the litigation process, and thanks to deep learning and artificial neural networks, examining all past cases related to the subject of the case in detail and specializing in that subject (Alarie, Niblett, and Yoon: 2018: 109).

2.1.5.5. Home Appliances

The smart home concept generally addresses the issue of using artificial intelligence in home appliances. Thanks to artificial intelligence-supported home appliances developed by utilizing artificial intelligence features such as deep learning, image processing, and sound processing, houses that live and respond to people's wishes are created. In homes with these features, people can adjust the house's temperature, order

food, and manage appliances such as ovens, dishwashers, and televisions with voice commands from artificial intelligence-powered voice assistant. Moreover, products such as cleaning robots can clean people's homes without effort by providing optimum cleaning by processing data such as image processing, recognizing, and recording the area they are in and the frequency of contamination of the house. Thanks to the artificial intelligence-supported camera and alarm systems, when an unwanted movement is detected in the house, the alarm can be activated and the relevant security institutions can be notified (Guo, et al., 2019: 403).

2.1.5.6. Art

Another area of use of artificial intelligence is art. It can produce visual and audio data thanks to programs equipped with artificial intelligence features such as natural language processing, image processing and deep learning. For example, in artificial intelligence applications such as Dall-E, the desired image can be defined in writing to create an image, and new images can be produced by using existing works to create an image that has never existed before (Chatterjee, 2022: 3). Moreover, in some other artificial intelligence applications, requests can be defined in detail in writing and videos can be created. Poems or scenarios that have never been created before can be created thanks to such artificial intelligence programs. These features allow artificial intelligence applications to provide creative content for artistic activities such as film, theatre, painting, and music.

2.1.5.7. Healthcare

Artificial intelligence has significant contributions to the health sector, which can have a direct impact on human life, as well as other sectors. Artificial intelligence offers convenience to doctors, drug developers, and end consumers in healthcare thanks to its capabilities, such as machine learning, natural language processing, deep learning, and image processing. Thanks to artificial intelligence-supported applications, patients can make a preliminary diagnosis by defining the symptoms of their diseases in the application without even meeting with the doctor. Pathologists and radiologists can benefit from artificial intelligence algorithm-supported systems such as convolutional neural networks (CNN) to detect cancer and other diseases (Bohr and Memarzadeh, 2020: 30). The combination of artificial intelligence and wearable technologies provide people with data such as heart rhythm, blood oxygen rate, and fat rate to take

preventive measures against possible diseases. Moreover, by utilizing the deep learning capabilities of artificial intelligence, it can develop new drugs and produce treatments by processing the effects of past treatments, the effects of drugs, and information in the literature. With image-processing capable artificial intelligence programs, patients' image-based results such as MRI and Tomography can be examined.

2.1.5.8. Agriculture and Livestock

Artificial intelligence is used in the agriculture and livestock sectors to increase efficiency and quality. Artificial intelligence has a wide range of uses in agriculture and livestock, with systems developed using components of artificial intelligence such as ANN, expert systems, machine learning, fuzzy logic, and robotics. Artificial intelligence-supported systems installed in the field can provide farmers with predictions of the right time for planting by combining both weather conditions and values such as soil moisture and temperature. Moreover, it can provide information about the correct time and conditions by analyzing the status of the products for fertilization and irrigation. In addition, it can provide data for the detection of creatures harmful to crops and correct pesticide methods. These systems, which process data such as temperature, humidity, soil nutrient content, and nitrogen of the soil or the place of production throughout the year, provide data to the producer for instant decisions and potential yield estimates. Another stage, determining the right time and weather conditions for harvesting, can ensure the highest level of productivity. In greenhouse cultivation, robots equipped with cameras and necessary equipment can perform the harvesting process in the production area, which is equipped with robotic systems. In addition, artificial intelligence systems are used to keep efficiency at a high level in processes such as classification, transportation, and storage from harvest to the end consumer. As an example of these systems, the artificial intelligence system called PEST is used to detect pests in plants. In the field of livestock, the most efficient animal husbandry is aimed at barns equipped with cameras, sensors, and robotic systems that are powered by AI (Jha et al., 2019: 4). These systems can optimize the physical properties of the barn, such as temperature and humidity, for the animals, adjust the amount of feed and water that the animals should consume in the most optimum way, monitor their feeding patterns, and change their nutritional content periodically. With these systems, maximum efficiency is achieved in the field of livestock.

2.1.5.9. Gaming

One of the sectors where artificial intelligence components are used most is the gaming industry. When games are designed in this sector, where the end user's experience is very important, it is aimed for the user to adapt to the world of the game as much as possible. The artificial game world created for this purpose should contain as much natural content as possible. Game developers benefit from artificial intelligence's capabilities such as natural language processing, deep learning, and artificial neural networks. In this way, they can humanize the emotional reactions of game characters, make their lip synchronization real-time and human-like, and enable them to interact naturally like humans (Westera, et al., 2019: 353). Thanks to these features, they can offer the end user a more realistic gaming experience. Moreover, game developers gain both time and cost advantages thanks to artificial intelligence features.

2.1.5.10. Transportation

Another area most affected by artificial intelligence technologies is the transportation field. A safer, more efficient, cost-effective, and sustainable transportation network is aimed at utilizing almost all components of artificial intelligence in different areas of transportation. One of the most important effects of AI in transportation is that it plays a role in planning, designing, and controlling public transportation, thanks to ANN-equipped systems, to the people and institutions that regulate transportation. Thanks to the prediction capabilities of artificial intelligence, route optimization of public transportation can be made. Thanks to the passenger predictions that will accumulate at the stops according to the hours, artificial intelligence optimizes parameters such as what time the vehicles should depart, at which stop, and the frequency of trips. For passengers, artificial intelligence-supported programs and applications are informed by making predictions about which stop the vehicle will be at what time. This way, passenger waiting times are reduced, and more people-oriented transportation is provided. Another artificial intelligence effect related to public transportation is metro trains with autonomous driving. Trains equipped with AI systems can operate as if they were under human control. Another area where AI-supported systems contribute is logistics companies that carry out intensive expeditions. It allows companies to create the most efficient routes by measuring the traffic situation on previous and existing routes in their logistics activities. Another important contribution of AI to transportation is navigation systems and applications (Abduljabbar, et al., 2019: 11).

Navigation systems draw the most optimum route for passengers by analyzing previous data or the current traffic situation and can create alternative routes. Thanks to using alternative routes and avoiding traffic during rush hour, traffic flows more smoothly in cities.

2.1.5.11. Social Media

The use of AI in social media can be examined in two ways: companies and users. Thanks to artificial intelligence in social media applications, companies process users' historical and current data and try to bring the content that best suits the users' desires and expectations. Moreover, advertisements for the products and services that the user may like most are presented to the user according to the user characteristics resulting from the processing of user data. Moreover, thanks to AI-supported detection systems, companies can examine posts on social media platforms and instantly detect unwanted content such as violence, propaganda, racist, and sexist content and intervene. Social media platforms offer users entertainment or editing features using artificial intelligence features such as object, voice, and face detection. With these opportunities AI offers to social media companies, companies can carry out their marketing activities more efficiently, faster, and cost-effectively by employing fewer people. At the same time, they can increase the user experience and make users more loyal thanks to the content they offer in line with users' expectations. In addition, using artificial intelligence instead of manpower to detect unwanted content offers companies a cost advantage and prevents these contents from being overlooked due to human error. On the user level, content producers can produce more creative and interesting content with the artificial intelligence tools offered. Thanks to the content presented according to personal expectations, users can meet their expectations without wasting time. Thanks to the use of artificial intelligence-supported language translation systems in social media applications, users can instantly translate posts made in different languages into their own language (Sadiku et al., 2021: 16). Thanks to the rapid blocking of violent, racist and propaganda content posts by artificial intelligence-supported systems, users can have a safe online interaction.

2.1.5.12. Personal Assistant

The other area where AI is most frequently used in daily life is personal assistants. Voice assistants, the most common personal assistants, offer convenience to

individuals with NLP and automatic speech recognition (ASR) systems. Thanks to these systems, applications can respond to individuals' requests entered verbally or textually. The most popular such assistants are Apple's Siri, Google Assistant, Microsoft Cortana, and Amazon Alexa. These assistants can perform activities such as searching online, setting an alarm, reading the weather forecast, turning on a camera, and managing integrated home appliances in line with the wishes of individuals (De Barcelos Silva et al., 2020: 1). Thanks to these assistants, which are examples of human-machine interaction, people can perform some tasks more efficiently in a shorter time, which they would spend a long time in daily life or business life.

2.1.5.13. Finance

Artificial intelligence also significantly impacts the financial sector, which requires a lot of data processing and analysis. With many components of artificial intelligence, AI is used in many areas in the finance sector, thanks to processing large data sets, analyzing, and making predictions. With the ability to process big data, the risks of fund investments, credit risks, stock market investments, and other investments can be evaluated and decided easily and quickly with both time and cost advantages. Moreover, companies and banks can automate their own payment and document transactions with artificial intelligence systems, and bank customers can also automate their routine tasks, such as paying loan debts and paying bills. With such contributions made by artificial intelligence to the financial sector, companies and banks gain cost advantages by employing fewer workers in their routine work. Moreover, in this sector where very large data sets need to be processed, major decisions are made because of the processing of these data, and thanks to AI, errors that may arise from human error regarding these decisions are minimized. In addition, thanks to AI processing data much faster than humans, companies gain flexibility by making faster decisions (Najem, et al., 2022: 634).

2.1.5.14. Astronomy

Artificial intelligence in astronomy, along with the machine learning and robotic components of AI, provides great convenience to scientists. Thanks to AI-supported systems, scientists can process images and data containing big data coming from space more quickly and easily and detect star features and new planets more easily. Moreover, due to the diversification of the data obtained, the use of data mining, big

data applications, machine learning, and artificial intelligence applications has increased. At the same time, analysis of large data sets resulting from the increased use of radio signals is also done with AI systems. Robotics-supported artificial intelligence systems are used to discover life on other planets, another important astronomy subject. For example, robotic systems equipped with AI, such as Curiosity, have been sent to explore Mars or other planets. These AI-supported systems provide the field of astronomy with the advantage of both cost and more accurate results by processing large data sets in a shorter time and with fewer errors than humans. Another benefit is that they work more efficiently in difficult space and planetary exploration conditions, which are dangerous for humans (Shubhendu and Vijay, 2013: 31).

2.1.5.15. Security

Another important area that uses AI is the field of security, especially cybersecurity. The data produced by end users on social media applications, shopping sites and public sites is increasing daily. One of the most important assistants in protecting this data is AI. With AI systems supported by machine learning and other AI components, computers take precautions against elements such as malicious data capture, misuse of users' data, and sharing of unauthorized data. Moreover, in applications and sites, verifications are carried out, and security is ensured with systems such as biometric authentication and facial and fingerprint recognition, which are equipped with systems such as conventional artificial neural networks and deep learning. At the same time, such systems determine whether people are real or fake, and abnormalities in data traffic on the network are detected. AI-supported systems can detect and identify many attacks that humans cannot easily detect. Moreover, AI systems can discover existing or future weaknesses or vulnerabilities of people or artificial intelligence-supported applications and websites. At the same time, they can detect and attack against attacks and viruses (MIJWIL, et al., 2022: 101). As can be seen from these features, artificial intelligence not only closes the errors that may arise from human error in the security field but also performs tasks that would take many technical staff and a very long time in a shorter time and with less cost.

2.1.6. Advantages and Disadvantages of Artificial Intelligence

After the detailed sectoral usage analysis of AI, the following can be said: Artificial intelligence has giant impacts, as seen in daily life, institutions, and especially companies. However, while these factors can appear as advantages, they can sometimes be disadvantages.

As seen from its usage areas and features, AI has many positive effects on human life. These advantages can be listed as follows (Bhbosale, Pujari, and Multani: 2020: 228);

AI can do complex, data-intensive, and very difficult tasks faster, in less time, and more easily than humans.

Unlike humans, AI can do several demanding tasks simultaneously. In addition to performing tasks that require huge data analysis and workload simultaneously, AI can perform these tasks with a very high accuracy rate. In this way, error diagnosis systems provide an advantage in jobs where people are likely to make mistakes, as the error rate is low. It can work 24/7 because it is exempt from the sleep, fatigue, and other physical conditions that a person needs in terms of working conditions and duration.

Most AI tools, other than AI tools such as robotic systems, work through computers. Due to these conditions, these systems can work in much smaller areas than the space and space available to people.

AI can access and analyze very large data sets and make more accurate future predictions than humans.

In conditions where humans are physically challenged, such as space, AI can perform its duties thanks to its risk advantage and immunity from many physical needs. In this way, it can provide an advantage in making discoveries and providing new data.

In addition to its positive effects, AI negatively affects human life. The disadvantages can be listed as follows (Bhbosale, Pujari, and Multani: 2020: 229);

As in every field, the risk of misuse and theft of information is quite high in this field. More and more people's personal data is processed daily through the increasing use of AI in society. Personal data can be misused through cyber-attacks and data theft, causing massive problems.

Systems and technologies containing artificial intelligence technologies are created at high costs. Robotic systems, especially those with artificial intelligence technology,

are created by combining many different engineering fields and disciplines, and they have high-cost parts in terms of materials. Moreover, AI technologies are unstable; they need to renew themselves with a focus on human life, and these renewals and updates involve extra costs.

Although artificial intelligence works to imitate humans, its current state is far from human emotionality.

It increases technological dependency due to the increase in the use of AI and the increase in applications developed for the end user. Moreover, it causes laziness in the young generation due to AI applications that can perform many activities that are performed manually in daily life and are handled with effort.

Since the data produced by artificial intelligence according to its working system is based on data previously produced by humans, AI can give results that are sexist, racist, prejudiced or have different tendencies.

Another aspect of AI systems that may have negative consequences is "Blackbox AI". This indicates that there is no transparency into how AI systems realize the results they produce. For this reason, it may have negative effects on human life.

One of the biggest disadvantages that AI will create, and the most discussed aspect of AI is unemployment. AI systems adapted to existing jobs in many fields are replacing many workers.

2.1.7. Artificial Intelligence Ethics

Considering the historical development processes and usage areas of artificial intelligence, its impact and usage are increasing daily. Moreover, despite the advantages of AI, it also has disadvantages, such as violation of the confidentiality of personal data and unemployment, and it is predicted that it may cause bigger problems in the future. One of the most important criteria and concerns for AI systems, whose exact results are still unclear, is the development of AI systems for the benefit of humanity. Despite the legal and ethical problems that may arise in this direction, research on AI's ethics is being conducted in the scientific world. This research in the scientific world and the steps taken by technology companies have also mobilized states in the field of AI and enabled them to take steps to regulate laws to control these problems in the field of AI.

Several important and comprehensive scientific meetings and conferences have been held in recent years on the ethical dimension of artificial intelligence. Asilomar Principles emerged from the Future of Life Institute's January 2017 Asilomar Conference. The Conference on the Socially Responsible Development of Artificial Intelligence, which took place at the University of Montreal in 2017, produced the Montreal Declaration. The ethical principles delineated in the March 2018 European Commission ruling on artificial intelligence, robotics, and "autonomous." The Asilomar conference, held in 2017, presents the most comprehensive principles among these conferences. In addition to ethical principles, it also includes principles for research issues, ethics and values, and long-term issues (Pehlivanlı, 2021: 35).

The first research principle is the research goal: Rather than being a pointless pursuit of advancement, artificial intelligence research should be directed toward improving humanity. Second, research funding: The money and resources allocated to artificial intelligence research ought to be used to address issues in the social sciences, computer science, economics, law, and ethics. For instance, how will artificial intelligence systems be made stronger without being exposed to hacking or malfunctioning? How might automation improve our well-being while protecting people's resources and sense of purpose? Third, the link between science and policy: Researchers studying artificial intelligence and decision-makers should have a positive and healthy dialogue. Fourth, research culture: It is important to encourage cooperation, transparency, and trust among AI developers and researchers. The last of the principles for research are avoidance of race: AI developers must actively collaborate to ensure that security standards are not compromised.

The first of the principles regarding ethics and values is safety: AI systems must be safe and secure throughout their operational lifecycle. Second, failure transparency: the source of any harm caused by an AI system needs to be identified. Third, judicial transparency: An appropriate explanation and competent supervision are required whenever an autonomous system participates in judicial decision-making. Fourth, responsibility: Artificial intelligence system designers and developers have moral accountability for the outcomes of their work, including misuse and inappropriate use. Fifth, value alignment: Fully autonomous AI systems should be created with human values in mind, with their objectives and actions throughout the operation reflecting these values. Sixth, human values: Systems with artificial intelligence should be

developed and run in a manner that complies with freedoms, human rights, cultural variety, and human dignity. Seventh, personal privacy: Humans must be able to view, manage, and control data when artificial intelligence systems can generate and handle it. Eighth, liberty and privacy: Using artificial intelligence on personal data should not unnecessarily restrict people's actual or perceived freedom. The ninth is benefit sharing: As many people as possible should profit from artificial intelligence technologies. Tenth, shared prosperity: All humanity should benefit from the economic wealth of artificial intelligence. Eleventh, human control: To fulfill human objectives, people must decide whether and how to give AI decision-making authority. The twelfth principle is non-subversion: Advanced AI systems should be granted authority that respects rather than undermines the civic and social processes that are essential to society's well-being. Thirteenth, arms race in AI: Preventing an arms race in deadly autonomous weaponry is imperative.

The first of the principles of the conference regarding long-term issues is capability caution: Since there is no consensus, we should refrain from making firm conclusions about the top bound of AI's capabilities. Second, the importance: Advanced AI must be planned and handled with the necessary resources and care since it has the potential to significantly change the course of Earth's history. Third, risks: Planning and mitigation should be done since artificial intelligence systems can provide existential or catastrophic threats. Fourth, recursive self-improvement: Strict security and control mechanisms should be applied to AI systems intended to reproduce or improve themselves recursively, resulting in rapid gains in quantity or quality. Fifth is the common good: Rather than serving a single state or group, superintelligence should only be developed in the interest of universally accepted ethical principles and the welfare of all people.

2.2. Unemployment

A person is considered unemployed if they can work, can work, and are looking for work at market wage conditions but cannot obtain employment despite their desire to work. As to this definition, an individual must actively seek employment to be classified as unemployed, indicating a desire to work. In addition, the individual must be able to work, meaning the person cannot be incapable of working due to physical or mental limitations. Another contributing issue is his inability to obtain employment in the market that pays a wage commensurate with his abilities. Those who meet these

requirements and the age requirement are classified as unemployed (Murphy and Topel, 1997: 295).

The unemployment rate in a region or country is the ratio of the unemployed population divided by the population in the labor force. This coefficient, which shows the rate of unemployed people in the total workforce, is an important economic indicator for the macro decisions countries will make. The change in unemployment rates indicates the steps that countries will take seasonally or conjecturally and the policies they will implement economically or socially. Although the unemployment rate alone expresses a lot about the stability of the country's economy, it is insufficient for a definitive decision unless the reasons for unemployment are known in detail. Because unemployment may occur due to resource imbalance in the economy, seasonal or cyclical fluctuations in the labor market, or it may also result from technological developments (Scarpetta, 1996: 44).

Unemployment occurs when the jobs offered in the market do not meet the demand of job seekers. In other words, it is caused by supply and demand not being equal. There are different types of unemployment because this imbalance can occur from different economic conditions and circumstances. In this context, unemployment is examined under two headings: disguised and open unemployment. Open unemployment is divided into 5 headings under itself; these are frictional, structural, cyclical, seasonal, and technological unemployment.

2.2.1. Disguised Unemployment

People who appear to be employees on paper within businesses are working deliberately or unintentionally below normal levels, which is called disguised unemployment. In other words, disguised unemployment is caused by workers who work less efficiently than expected. In the case of disguised unemployment, there is no deficiency in the organization's production capacity when these hidden unemployed employees, who appear to be employees, are laid off. In other words, without additive changes, such as technological developments that can increase the organization's efficiency, the business's newly employed employees do not contribute to production (Yıldız, 2014: 13).

The disguised unemployment rate is higher in Turkey and similar countries where practices such as unemployment benefits are low. In countries where these practices

are low, there is deceptive employment, that is, a working class that appears to be working but, as a result, cannot have a positive impact on production and production volume. Although unemployment rates decrease in countries with high hidden unemployment, there is no real increase in the country's GNP. Although a large portion of employment in our country and other developing countries appears to be working in agricultural production, some studies have shown that if many employees withdraw from agricultural production, there will be no decrease in current production. The disguised unemployment rates of developing countries are high for such reasons (Yıldız, 2014: 14).

2.2.2. Open Unemployment

Open unemployment is the ratio of people willing to work and looking for work in the workforce. In other words, it refers to those looking for a job but cannot find one under the current wage system. The literature has examined open unemployment under five headings: frictional, structural, cyclical, seasonal, and technological unemployment (Yıldız, 2014: 3).

2.2.2.1. Frictional Unemployment

Frictional unemployment is a type of unemployment that results from being unemployed for a short or long time due to a change of employment. This type of unemployment cannot be eliminated because the employee cannot find a new job that suits the person's wishes as soon as the person leaves the job, and it occurs at very high rates. Different industries, cities and starting and leaving work between times occur due to irregular departures and new job searches (Yıldız, 2014: 3).

The unemployment situation continues until the unemployed, who are included in the frictional unemployment category, meet their demands, such as better wages and better locations. While the main reason for frictional unemployment is wages, it can also arise from reasons such as the location of the workplace (Axtell, Guerrero, & López, 2019: 185), the physical or social benefits provided by companies, and the corporate culture of the workplace. Another factor that causes frictional unemployment is that students who graduate from universities or other educational institutions become unemployed because they cannot find a job according to their wishes and desires immediately or in the short term.

A proportional decrease in frictional unemployment is expected because the opportunities to find a job will decrease when the country's economy is in crisis or contraction because employees are less expected to leave their current jobs and find a job with better conditions. At the same time, frictional unemployment is expected to be high since graduates will have limited employment opportunities in economic periods when it is difficult to find a job. In addition, frictional unemployment is a natural element in country economies unless it turns into structural unemployment under certain conditions (Yıldız, 2014: 4).

2.2.2.2. Structural Unemployment

Long-term unemployment that results from a discrepancy between the supply and demand of jobs in the market is known as structural unemployment. Structural unemployment may arise from reasons such as the inconsistency of economic programs created by states or the inability of companies to keep up with changes in the market (Herz & Van Rens, 2011: 3). In cases where policies regarding education and worker training implemented over time cannot find a response in the labor market, a mismatch between employee skills and the skills required by jobs may arise. For these reasons, while skilled workers cannot be found for some jobs, there may be more workers than necessary in the market for some jobs. Unemployment occurs because the excess workers in other sectors cannot be transferred to the jobs for which there is a demand for workers due to talent transfer difficulties (Gilpatrick, 1966: 204).

In addition to the main reasons for structural unemployment, other factors affect structural unemployment in the literature. The first is the lack of workers suitable for the current job opening and their failure to train them. Moreover, unemployment occurs because of changes in the economic programs of countries or the main source of the economy. Another factor is that, in line with the regional investment plans of countries, there is a job gap in some regions, but there are no suitable personnel for that job in that region, but they are in another region. Another of the biggest factors affecting structural unemployment is demographic changes. The young population is not employed due to a lack of experience. Unemployment is due to women joining the workforce and the fact that women's job leaving and finding cycles are longer than men's. The immigrant population who migrates to countries and are refugees cannot be included in normal business planning but start working. The older working population continues to work in countries with early retirement even though they are

retired. Based on unemployment benefits, people prefer to remain unemployed rather than work for lower wages than they want and lose their unemployment benefits. The unemployment experienced by some people looking for a job while they receive training to gain the necessary skills also affects structural unemployment (Standing, 1983: 138).

Another reason for structural unemployment is that in today's societies' the young population gravitates towards popular professions rather than needed professions and professions that suit their abilities. Due to this situation, there are vacancies in needed jobs, but in popular jobs, there is a backlog and unemployment due to high demand. Based on the information above, structural unemployment is divided into two branches: occupational structural unemployment and geographical structural unemployment. Countries take some steps to prevent and solve structural unemployment. In the case of geographically based unemployment, they announce incentives to transfer the necessary workforce to the regions in need, and they undertake the necessary expenses. They aim to reduce unemployment in the regions by incentivizing companies and investors to open factories in regions with some special workforce. Regarding occupational unemployment, they open private vocational schools and train unemployed individuals in certain fields for needed jobs. Moreover, they provide extra incentives for unemployment in some important sectors, directing the population to receive education in needed sectors (Yıldız, 2014: 6).

2.2.2.3. Cyclical Unemployment

Cyclical unemployment is the unemployment situation that occurs depending on the conditions of the country's economies in a certain period. During periods of economic recession, companies look for fewer workers due to the decrease in demand in the market, and even companies with less workload compared to normal periods begin to lay off workers during these periods (Abraham & Katz, 1986: 508). Conjectural unemployment is when people become unemployed due to the reasons mentioned during certain periods of economic stagnation, but this unemployment is expected to be short-term, and if it occurs for a long time, it becomes difficult for the economy and unemployment figures to return to their previous state (Chen, et al., 2011: 15). These periods of periodic unemployment can create advantages for some companies. Companies looking for workers for special positions and cannot find workers under

normal conditions can hire employees fired from other companies to fill vacant positions in their own companies at less cost.

2.2.2.4. Seasonal Unemployment

Seasonal unemployment is a type of unemployment that occurs due to seasonal changes or weather conditions. When the demand for a product or service decreases, it occurs because people working in seasonal jobs become unemployed. This type of unemployment is common in sectors that experience seasonal fluctuations, such as agriculture and tourism. In the agricultural sector, people working in tea harvesting work in the summer months and are unemployed in the other months, and in other agricultural activities, people working depending on the product and the season are unemployed when they are not examples of seasonal unemployment. In the service sector, tourism employees in regions with winter tourism being unemployed when summer comes or employees in summer tourism regions being unemployed in winter are examples of seasonal unemployment. People may want to work in another job or remain unemployed when their season ends. In this regard, seasonal unemployment can be voluntary and involuntary (Mourdoukoutas, 1988: 315). Even if unemployed people involuntarily apply for other jobs to avoid unemployment when the season ends, they remain unemployed due to job deficiencies arising from skill differences or structural unemployment.

2.2.2.5. Technological Unemployment

Technological unemployment is unemployment that occurs because of technological developments and industrial changes. Technological unemployment occurs when technological developments, robots and machines replace the human workforce. In this process, which started with the machines that developed especially after the Industrial Revolution and became able to do the jobs that people could do, the need for people for some jobs decreased (Rotman, 2013: 1). Discussions about the emergence of unemployment with the development of technology have continued since those years. These discussions have increased even more with the rapid development of technology, especially in the last few decades.

Some academic circles argue that developing new technologies does not create unemployment because they create new job areas. So basically, there are two views, on one side there are those who look optimistically at the impact of technology on

unemployment, and on the other side, there are those who look pessimistically (Yıldız, 2014: 10). Those who are pessimistic about the effect of technology on unemployment argue that technology increases unemployment, that machines have begun to do the work done by unskilled workers, and that with the emergence of new job opportunities, new job opportunities have emerged for more skilled workers. New engineering fields offer new job opportunities, such as technical staff and machine managers. However, unqualified employees must lose their current jobs because they cannot gain the necessary skills and training in the short term. According to those who are optimistic about the effects of technology on unemployment, although technology may create unemployment in the short term, the jobs that will be created with the new opportunities offered by developing technologies will provide more employment in the long term (Postel-Vinay, 2002: 737).

The effects of technology on unemployment in different phases from the past to the present have been discussed from different perspectives. Today, this debate progresses through AI technologies, the most advanced technologies in today's world. As the fields of artificial intelligence such as machine learning, robotics and deep learning are advancing day by day, they have become able to perform human jobs in different fields. Therefore, AI has a negative impact on existing human job opportunities (Kim, Kim, and Lee: 2017: 1).

2.3. Anxiety

Anxiety is when a person reacts in advance to a stressful situation in the future. Under normal circumstances, it is important and necessary for human life to have a certain level of anxiety about some situations (Craske, et al., 2011: 369). It is normal and sometimes vital for a presenter to be anxious before making a public presentation, for a football player before his football match, and for a racer before a race to be anxious about the situations the person might reasonably encounter. A woman applying to the hospital because of anxiety that she may have cancer due to a cyst on her breast can lead to an early diagnosis of the disease and save the person's life. Anxiety is normal if it is balanced and regular, but an anxiety disorder begins when the feeling of anxiety becomes excessive and persistent and begins to negatively affect the person and render the person dysfunctional.

Anxiety can be confused with fear, such as feeling afraid of a situation. Fear is the fear of a sudden situation and the person's body reacting with fight or flight. However, anxiety is future-oriented, and it means that the person shows some physical reactions and avoidance behavior towards the situation that the person is anxious about (Craske, et al., 2011: 370).

People with anxiety disorders, which have negative effects on most activities, performance, and relationships in daily life, can regain their normal and healthy state with different treatment methods in the literature. There are different types of anxiety disorders in the literature, such as social anxiety disorder, generalized anxiety disorder, separation anxiety disorder, panic disorder, agoraphobia, specific phobia, and selective mutism (Penninx et al., 2021: 915).

2.3.1. Social Anxiety Disorder

People with social anxiety disorder (SAD) often experience phobia towards others or a group. People with SAD feel emotions and fears, such as being criticized by others, judged, rejected, and humiliated, making them unable to engage in public activities. One of the biggest characteristics of people with SAD is their fear of being constantly watched in society. They avoid being in communities and social spaces. Moreover, they avoid speaking in front of groups, eating and drinking in public, interacting with new people, and situations where people might be the center of attention. People with this disorder often avoid situations that cause anxiety because it affects many of their daily living activities. People who are in these situations that may cause anxiety may experience some physical symptoms such as sweating and heart palpitations (APA, 2013: 194).

2.3.2. Generalized Anxiety Disorder

Excessive worry about routine everyday activities is a symptom of generalized anxiety disorder (GAD). It generally refers to people's excessive and constant thinking and worrying about their basic situations, such as their family, economic situation, work situation, health or basic daily responsibilities, in a way they cannot control. In addition to these anxious states experienced by people with GAD, people may also show some physical symptoms such as muscle contraction, early fatigue, inability to concentrate, and sleep difficulties. The biggest difference that distinguishes people with GAD from people with normal anxiety levels is that people with normal levels of anxiety can

develop plans and actions against anxiety-provoking situations and carry out activities, whereas, in people with GAD, the state of anxiety overwhelms people and prevents them from performing activities (APA, 2013: 206).

In addition to the physical symptoms they experience, people with GAD are also at high risk for suicide and death. Although most patients are diagnosed correctly by physicians, in some cases, misdiagnoses occur because people also have other anxiety disorders, such as SAD. Among the most effective treatments are types of psychotherapy (DeMartini, Patel, and Fancher: 2019: 49).

2.3.3. Separation Anxiety Disorder

People with separation anxiety disorder feel intense anxiety and fear about separation from the people they are attached to or love. They generally fear being isolated and distant from people and communities to whom they are emotionally attached, especially their families. People with this type of anxiety are constantly worried about the deaths of their loved ones and the possibility of losing them. It can usually start with a fear that children who have just started school may develop in childhood when they are separated from their families for the first time. While it is normal for children who are separated from their families for a short time to experience a certain level of anxiety, if it is constant and uncontrollable, this situation turns into a disorder. Additionally, some physical symptoms, such as abdominal pain and nausea, may be observed in people. Although these symptoms usually begin in childhood, they can also be observed in later years. Children with this disorder generally do not want to sleep alone. They want to sleep with people they fear losing (APA, 2013: 206).

Separation anxiety disorder is stated in DSM 4 to begin before adolescence and especially in childhood. It is classified in the broad anxiety disorders class in DSM 5. Because while it was previously thought that separation anxiety disorder mostly started in childhood, later studies have shown that the rate of development of this disorder is very high after adolescence (Baldwin et al., 2016: 289).

2.3.4. Panic Disorder

To understand panic disorder, it is necessary to first understand the panic attacks experienced by people. Panic attacks are situations caused by fear and anxiety that occur so intensely that people lose physical and emotional control. Panic attacks occur frequently and repeatedly in people's daily lives and occur in situations that affect their

behavior and activities, which indicates that the person has panic disorder. People with disorders are full of fear and anxiety about the attacks they may experience at any time, as well as the difficulties caused by the attacks they experience. People who experience panic attacks may show some symptoms such as palpitations, sweating, feeling cold or hot, shortness of breath, feeling of suffocation, chest pain, fear of losing control, dizziness, feeling faint, nausea and abdominal pain, feeling of suffocation, shivering, numbness and tingling, rapid heartbeat, and fear of dying (APA, 2013: 214). Symptoms can appear quite severely, and people may think that they may lose their lives or even think that they have another disease. Since it is not known exactly what causes a panic attack, people may have attacks at unexpected times and places for no reason. Panic disorder has also been associated with other anxiety disorders and depression (Taylor, 2006: 952).

2.3.5. Agoraphobia

While people with agoraphobia anxiety feel safe in certain areas, they feel unsafe, especially in social areas. People tend to avoid places where it is not easy to escape and hide the symptoms, especially in situations where they will experience panic symptoms. They are especially disturbed by areas such as shopping malls and public transportation, where large gatherings are located. People are uncomfortable being alone in open spaces and queuing in places with queues. They do not want to be alone, especially outside areas where they feel safe, such as home, and avoid such situations. However, when they are faced with such situations, they want to have people with whom they feel safe, or if they are alone, they deal with intense anxiety and fear. People with advanced agoraphobia have begun to lose their functionality in daily life and may even be unable to leave the house. A person is usually diagnosed with agoraphobia when he or she becomes unable to perform daily activities and loses functionality (APA, 2013: 217).

2.3.6. Specific Phobia

A specific phobia is a form of anxiety that expresses the extreme fear people feel towards some special objects, living things, and situations. Phobias that people feel anxious about are often met with surprise by other people. While the things people feel anxious about are generally harmless, patients know that their phobias and fears are not actually that scary, but they cannot overcome them. Some phobias can develop

against animals and insects that are common in society. The most common ones are the fear of spiders and snakes. In such fears, people are afraid of encountering these creatures and may even be worried about their names being mentioned. Some other examples are clown phobia, fear of getting into elevators, and fear of getting on planes. Even though people do not usually show any specific physical symptoms, they show avoidance behavior against such phobias. These phobias are situations that people may encounter in their daily activities and can reduce their functionality (APA, 2013: 197). It usually begins in childhood and lasts 6 months or longer, and may last throughout life. Specific phobia is more common in younger people and women. At the same time, those with phobia reported more chronic illnesses and traumatic experiences than those without (Coelho, Gonçalves-Bradley, and Zsido: 2020: 67).

2.3.7. Selective Mutism

Selective mutism is a type of anxiety disorder that is usually seen in children and in which children selectively choose not to talk. While children with this anxiety disorder can speak in their normal social environments and within the family, they cannot speak in school and other social environments where they are expected to speak. In these social environments where the child does not speak, the child usually exhibits shy attitudes based on nonverbal movements. Children who do not have a problem with speech under normal circumstances do not speak at school due to selective mutism, and this can negatively affect their school and academic lives. These problems can lead to situations such as social isolation, intense shyness, public shame, and social anxiety in children. Children with this disorder sometimes tend not to talk to close family members and peers when they first meet (APA, 2013: 195). This disorder, which does not cause any physical symptoms, mostly begins in children before the age of 5. To make a diagnosis, it must be observed that the child has lived with this condition for more than one month (Penninx, et al., 2021: 915). According to research, factors such as bilingualism, living in a country of immigration, and communication delays are some of the factors of selective mutism. Moreover, studies have shown that psychosocial interventions positively impact patients' development. In this practice, children with the disorder are gradually exposed to some situations that require verbal communication, and the aim is to overcome the disorder gradually (Alexandra and Nili, 2016: 114).

2.4. Unemployment Anxiety

After detailed definitions of anxiety and unemployment, unemployment anxiety is a form of anxiety that includes people's concerns and fears about not being able to find a job or remaining unemployed in the future. University students are the social group most likely to experience unemployment anxiety, especially since university students are intensely concerned about whether they will be able to find jobs related to their departments and that suit their wishes after graduation.

Especially in developing countries such as Turkey, the number of students studying at university is increasing, and therefore, the number of graduates from departments is increasing, but since the employment areas do not increase at the same rate, it is observed that the graduating students remain unemployed at certain rates (Tektaş, 2014: 245). Universities cannot fully meet students' expectations in terms of finding a job. In some cases, such as the failure of universities to provide students with the necessary equipment for jobs, unemployment rates are affected. University students who aim to gain the necessary competencies and then find a job according to their abilities develop concerns that they will be unable to find jobs that match their abilities due to the mentioned situations (Tayfun and Korkmaz, 2016: 535). At the same time, students who encounter the experiences of people who graduated from their departments before them and cannot find a job are worried about their future.

Students may experience anxiety due to concerns such as the fact that the policies implemented by countries for unemployment are insufficient, thinking that they cannot receive the necessary education at universities, and thinking that they will not be able to find jobs with the qualifications they want in the market. These students, who worry that they will not be able to find the job they want after graduation, may experience mental wear and tear and develop unemployment anxiety (Tayfun and Korkmaz, 2016: 553). There are studies in the literature that investigate the unemployment anxiety experienced by students in different contexts.

In a study conducted on 410 university students, men, and women between the ages of 18 and 36, the relationship between career adaptation and unemployment anxiety was investigated in the context of the mediator effect of career stress. The researchers analyzed the students' results using a detailed analysis of the data collected through the career adaptation scale, unemployment anxiety scale, and career stress scale. They

found a relationship between unemployment anxiety and having insufficient information about their careers, pressures from those around them to find a job, and uncertainty about their career situations in the future (Demirtaş and Kara, 2022: 19).

In another research was conducted on students who graduated from Necmettin Erbakan University between 2017 and 2020. The research on 328 students from the finance and banking department measured the relationship between their job search competence levels, their self-efficacy, and their unemployment anxiety. After examining the data collected from university students on the necessary scales, it was revealed that people with previous work experience had lower unemployment anxiety and higher job search skills. Considering these results, students' self-efficacy levels were observed when unemployment anxiety increased. It has been shown that low self-efficacy negatively affects people's ability to find and search for a job (Yazgan, Şendoğdu, and Ak: 2022: 1938)

The research conducted at Adıyaman University in 2020 and 21 on 196 female and male students studying in the Department of Sports Sciences aimed to measure the relationship between life satisfaction and unemployment anxiety of students studying in sports sciences. To carry out the research, students' data were collected using the unemployment anxiety scale to determine their unemployment anxiety and the life satisfaction scale to determine their life satisfaction levels. As a result of various statistical analyses performed on the collected data showed that although the students' life satisfaction was relatively high and their unemployment anxiety was relatively low, there was a negative correlation between unemployment anxiety and life satisfaction. As a result, it was determined that students' unemployment anxiety negatively affected their life satisfaction (İnan and Koç, 2023: 33).

Another study, conducted on data collected from 456 randomly selected students from various universities and different departments, aimed to measure the relationships and effects between university students' meaning of life, unemployment anxiety, and career goals. According to the results obtained from the collected data, some direct relationships have been discovered. It has been revealed that having career goals has positive effects on students' personal development and giving meaning to life. Moreover, it was concluded that unemployment anxiety has a positive effect on giving meaning to life. As a result, it has been revealed that there is a positive and significant relationship between university student's career goals, their personal development

levels, unemployment anxiety levels, and their ability to give meaning to their lives (Akyüz and Durmuş, 2022: 23).

Another study that sought to measure university students' unemployment anxiety in the context of behavioral economics was conducted with information collected from 835 students at Samsun, Iğdır and On Dokuz Mayıs Universities. In the research conducted with mixed methods, students were asked whether they experienced unemployment anxiety or not, and then the necessary questions were asked to find out the reasons why students experienced unemployment anxiety. In the light of the collected data, some classifications, such as lack of employment, inexperience, discrimination, and personal competence that cause unemployment anxiety, have been made. As a result of the statistical analysis conducted after these classifications, it was seen that students experienced unemployment anxiety, which is mostly associated with the conditions of the current conjuncture. Gender differences were observed in the sub-dimensions of personal competence, lack of employment, and discrimination. When looking at their recommendations, students made suggestions such as reducing foreign dependency, providing language and other necessary training, and providing education according to their abilities and wishes (Duran and Künü, 2022: 1719).

Research conducted based on the assumption that people experiencing unemployment experience depression, anxiety, and stress is aimed to examine how people cope with these psychological effects they experience due to unemployment. The research used data from 208 unemployed people between 20 and 65, randomly selected through a survey. In the survey used to collect people's data, DASS-21R was used to collect data about their mental state, and the COPE scale was used to collect data on how they coped. After the necessary statistical analyses were performed on the collected data, it was observed that the mental problems experienced by people were related to their coping methods. Moreover, it was concluded that people who tried to cope in a problem-focused way experienced mental problems at the lowest levels (Bordea, Manea, and Pellegrini: 2017: 6).

Another study, which aimed to examine the anxiety levels of students graduating from Marmara University and the things that cause anxiety, was conducted on students graduating from Marmara University in 2012-2013. Students who graduated from the Mechanical and Metal Department of the university in the relevant year were selected as the sample, and data on the student's personal information and mental states were

collected with the State and Trait Anxiety scale through an online survey. As a result of the statistical analysis conducted with the collected data, a positive relationship was found between students' trait anxiety and state anxiety. There was no significant relationship between students' anxiety levels and the time it took to find a job, their satisfaction with their job, and their unemployment status (Tektaş, 2014: 243).

Another study, prepared as a cross-sectional study, focused on the unemployment that increasing nurse graduates may experience in the market. The research aimed to measure the relationship between Turkish university students who will graduate from the nursing department and their attitudes towards migrating to countries they see as having better conditions after graduation, job satisfaction, and unemployment anxiety. The cross-sectional research conducted on 738 female and 362 male students collected students' information with Job Satisfaction and BDAS scales. After the necessary statistical research, it was seen that more than half of the students who will become new nurses have unemployment anxiety. Moreover, it has been observed that people's salary expectations and concerns about the future economic order due to some conditions brought about by Turkey's current economic conjuncture increase students' unemployment anxiety and their tendency to migrate to countries where they believe better conditions are available (Öncü, et al., 2023: 1).

The research conducted at Süleyman Demirel University, it was aimed to discover whether senior university students have unemployment anxiety and, if so, what the underlying reasons are for their anxiety. Moreover, it was wanted to reveal the level of anxiety of the students and the relationship between their anxiety and other mental problems. The research conducted on senior students studying at the Faculties of Science, Health, Engineering, and Administrative Sciences also aimed to discover whether the relationships between the variables were related to the departments the students studied. Analyzes were made on the data collected through a survey using the state and trait anxiety scale and Beck depression scale on 441 senior students. As a result of the analyses made in the light of the collected data, it was revealed that senior university students have unemployment anxiety, and the sub-dimensions of the unemployment anxiety they experience were qualitatively determined as reasons such as lack of knowledge and skills, environmental and social pressure, lack of self-confidence. Moreover, another finding of the study was that a positive relationship was discovered between students experiencing unemployment anxiety and developing

depression, stress symptoms and trait anxiety. The research also observed that students studying in different departments differ in their symptoms. While unemployment anxiety was detected in students of the Faculty of Business and Administrative Sciences, Faculty of Arts and Sciences, and Faculty of Engineering, unemployment anxiety was not detected in the Faculty of Health Sciences (Tayfun and Korkmaz, 2016: 534).

In another study conducted on senior students studying in the field of sports sciences at Aksaray, Düzce, Bursa Uludağ, Ömer Halis Demir and Selçuk Universities, it was aimed to determine the level of hopelessness and unemployment anxiety of senior students studying at the faculty of sports. Analyses were carried out on 209 male and 523 female students, and data was collected via surveys using the Beck Depression and Unemployment anxiety scales. As a result of the necessary statistical research and analysis, men are more likely to experience unemployment anxiety due to environmental pressures than women. On the other hand, women have a higher level of hopelessness than men in the hopelessness dimension. Moreover, no statistically significant relationship was discovered between the hopelessness and unemployment anxiety experienced by the participants and their age and economic status. Another important result is that no significant relationship was detected between the departments and faculties in which the students studied and their unemployment anxiety (Yalçın, 2022: 131).

Another study conducted at Prince Sattam Bin Abdulaziz University was conducted to examine the level of unemployment anxiety levels of university students and the effects of the COVID-19 process on this situation. Another primary goal of the research is to discover whether there is a significant difference between the unemployment anxiety levels of working and non-working students during the COVID-19 period. For the stated purposes, the researchers selected one hundred and twenty students and, in accordance with the conditions of the pandemic period, sent Zung's anxiety questions to the students via an online survey. 107 of the students answered the survey as requested, and because of the necessary statistical analysis, it was seen that nearly half of the students were unemployed, and the other half worked during the pandemic period. In the research findings, it was seen that the anxiety scores of the non-working part of the students were statistically significantly higher than those who were working (Ibrahim, Zaitoun, and Ajanil: 2022: 1).

Another study was conducted at Kastamonu University to examine the unemployment anxiety of senior university students and its effects on other mental disorders caused by this anxiety. The research was carried out in the light of the data collected with the Unemployment Anxiety Scale on two hundred and twenty-six students from the Physical Education and Sports School. As a result of the statistical analysis performed on the collected data, it was observed that there were no statistically significant differences between the male and female students, but the anxiety scores of the males were higher than the females, and in this case, for the reason behind it was concluded that the social pressures on males regarding work were greater. Moreover, it has been observed that sports students have higher anxiety than average. In comparisons between departments, it was determined that sports department students experienced more unemployment anxiety than other departments (Yasar and Turgut, 2020: 56).

The research, which aimed to investigate the concerns of senior students about whether they could find a job after graduation, was conducted at Nevşehir Hacı Bektaş Veli University. The research aims to examine the relationship and effects of students' demographic characteristics on their unemployment anxiety. The research was conducted on senior university students with the assumption that they may experience anxiety due to job uncertainty in the market and the thought that they will not be able to find a job. The research was conducted in line with the determined objectives, with data collected by survey method from one hundred and thirty-nine senior students of the Faculty of Arts and Sciences of the specified University. After performing the necessary statistical analyses on the collected data, it was determined that there were differences in students' unemployment anxiety according to their departments, settlements, grade point averages, and demographic characteristics. As a result of the statistical analysis conducted to see the differences between departments, it was concluded that the unemployment anxiety of students studying in the field of social sciences was higher than that of students studying in the field of Natural science. It has been determined that the unemployment anxiety of students studying in the departments of History, Turkish Language and Literature, Sociology, and Archeology is higher than that of students studying Mathematics, Molecular Biology and Genetics. As a result of the statistical analysis conducted in terms of gender, it was determined that male students experienced more unemployment anxiety than female students. When students' unemployment anxiety was examined according to their GPA, it was

seen that students with lower GPA (1.01 - 2.00 CGPA) experienced lower unemployment anxiety than students with higher GPA (2.00 - 4.00 CGPA) (Surat and Ceran, 2020: 145).

Since there is little research in the literature on whether there is a relationship between young adults losing their jobs or experiencing long-term unemployment and experiencing anxiety and depression in later years, the research was conducted to fill this gap. They also aimed to examine the possible effects of people's childhood years and their interactions with the environment they live in on these mental problems they are likely to experience. The researchers carried out the study, which was planned as a long-term longitudinal study, in the light of data collected continuously since 1985. The research was conducted with data collected from 677 people between eighteen and thirty-nine. The people who make up the research sample are people with different ethnic origins and childhood experiences. As a result of the necessary statistical analyses performed on the collected data, it was determined that the unemployment and unemployment periods experienced by people, regardless of gender, increased the mental problems experienced by people in middle age. Moreover, growing up in a positive environment in people's childhood has positive effects, regardless of their anxiety about unemployment. As a result of the analyses made in terms of gender, it was seen that gender had no effect on the symptoms experienced by people (Lee, et al., 2019: 30).

Another study conducted on students studying in the field of aviation aimed to determine the unemployment anxiety experienced by the students before graduation. Moreover, it aims to reveal the sub-reasons that cause unemployment anxiety. For this purpose, data was collected from two thousand seven hundred and sixty-seven students via an online survey. In the first part of the survey, a demographic characteristics survey was sent to the students to determine their demographic characteristics, and in the second part, an unemployment anxiety survey was sent to the students to determine their unemployment anxiety. As a result of the necessary statistical research on the collected data, it was determined that university students were worried about whether they could find a job after graduation. That is, unemployment anxiety was high (Ateş, 2019: 165).

Another study examines unemployment anxiety and factors affecting the life satisfaction of health management students. The study, which aims to discover whether

students have concerns about whether they will be able to find a job after graduation and what factors affect their life satisfaction, was conducted on students in the Health Management department at a state university in Ankara. In the study, which included senior and 3rd-year students, a survey containing the Unemployment Anxiety Scale and Life Satisfaction Scale was distributed, and the students' data were collected. As a result of the statistical analysis performed on the data collected as requested from one hundred and thirty-six of the students, it was revealed that the average life satisfaction of the students was higher than the average unemployment anxiety and that there was a statistically significant but weak and negative relationship between unemployment anxiety and life satisfaction. As a result, it has been observed that as students' unemployment anxiety increases, their life satisfaction is negatively affected (Turaç and Donar, 2017: 119).

The research was conducted because Pharmacy department students experience unemployment anxiety due to opening new departments across the country, which will enable more students to graduate from their departments. Researchers aimed to discover whether Pharmacy students at the Ege University have concerns about whether they will be able to find a job after graduation and, if so, to what level their anxiety is. Data was collected from four hundred and two students as requested in the research conducted as a survey using the job anxiety scale distributed to six hundred and ninety-one students studying in the department. As a result of the necessary statistical research conducted on the collected data, it was determined that there was a statistically significant and positive relationship between the poor economic situation of the student's families and the students' unemployment anxiety. Moreover, a positive and significant relationship exists between students approaching their final year and their unemployment anxiety. As a result, it has been revealed that pharmacy students have unemployment anxiety and one of the reasons for this is the increasing number of graduates (Kıran, Karaca, and Bali, 2022: 1016).

2.5. Artificial Intelligence and Unemployment

Throughout history, the development of different technologies has changed the need for jobs and workers in the sector. Today, the world is going through a period in which Artificial Intelligence technology, one of the most advanced examples of technology, is being developed more and more every day. In its current state and as it develops further, Artificial Intelligence, which takes on and aims to take on humanoid

characteristics, has become capable of performing cognitive tasks. It is thought that some jobs may be replaced due to this situation (Frank, Ahn, and Moro, 2023: 2).

The fact that these innovations brought by artificial intelligence change some old technologies and business structures in the sector is not a newly discussed topic in the literature. Discussions have arisen because some technologies have developed rapidly and changed existing ways of doing business. To understand these changes in the industry, the Creative Destruction concept, which was put forward in the 1940s, can shed light on today. Creative Destruction refers to change in a process rather than a situation that develops instantly. In the ever-advancing field of trade and technology, while technological advances create new ways of doing business, old ways and tools disappear because they lose their functionality. Economic systems that are in the process of self-renewal are redesigning the systems they produce, and in this way, industries are being redesigned by creating new technologies, new business areas and new markets (Aghion and Howitt, 1992: 324).

Due to the new ways of doing business brought about by this change, companies' ability to keep up with this change depends on some characteristics of institutions, and if institutions do not have these characteristics, they may not be able to keep up with this change and may go bankrupt. In addition, although the ways of doing business and the required competencies in some sectors may change due to these changes, some studies argue that this change will not cause huge unemployment since new job fields will emerge. On the other hand, they argue that AI technology differs from previous technological changes and occurs faster than others. Moreover, AI displays more human-like features than previous technologies and can be used in jobs requiring cognitive abilities (Tolan et al., 2021: 217). For this reason, some researchers argue that it may cause unemployment in some jobs (Frey and Osborne, 2017: 268).

In this context, some studies in the literature emphasize that AI technology will cause unemployment, while others emphasize that it will not cause unemployment. Some examples of this research are listed below.

A study conducted in the USA aimed to measure the effects of employees' exposure to artificial intelligence on skill changes and unemployment situations. For this purpose, the research was conducted on data collected from unemployment insurance institutions in different states of the USA between 2010 and 2020. As a result of the

necessary statistical analyses carried out in the light of the collected data, researchers have revealed that individuals direct their exposure to artificial intelligence in a way that causes changes in people's abilities within their professions. Moreover, they emphasized that people's exposure to artificial intelligence is associated with job separation and risks of unemployment (Frank, Ahn, and Moro, 2023: 1).

Another study, which aims to investigate the effects of the development of artificial intelligence on unemployment in developed countries that have high technology and even pioneers in the production of high technology, was conducted because it was seen that there was a deficiency in this field in the literature. The research was conducted on the data collected in twenty-four technologically advanced developed countries. The research was conducted on data between 2005 and 2021 obtained from the Google trend index in the context of artificial intelligence and unemployment. In the necessary statistical analyses performed on the collected data, variables such as inflation, economic growth, and government expenditures of countries with major effects on unemployment were used as control variables. As a result of these statistical analyses, it was emphasized that artificial intelligence does not increase unemployment in developed countries, on the contrary, it reduces it. They based these results on reasons such as artificial intelligence increasing productivity and creating new job areas and new roles in addition to the jobs it destroys. Moreover, suggestions have been made that developed and developing countries can reduce unemployment and increase productivity by adapting AI technologies to industries (Guliyev, 2023: 1).

Another research study with the same objective, which aims to investigate the effects of the development of artificial intelligence on unemployment in developed countries with high technology, has similar results but also revealed some different results. The research was conducted on data collected from twenty-three technologically advanced countries. In this context, the research was conducted empirically and on data between 1998 and 2016. In the necessary statistical analyses performed on the collected data, inflation, which greatly impacts unemployment, was used as a control variable. As a result of the analysis, it was concluded that there is no significant and linear relationship between artificial intelligence and employment, independent of inflation. However, under low inflation conditions, an inverse and significant relationship was found between AI development and use and unemployment. These results emphasize

that AI will not cause unemployment in developed countries with low inflation, but the same conditions do not apply to countries with high inflation (Mutascu, 2021: 653).

Another research that aims to measure the relationship between artificial intelligence and unemployment in developed and developing countries was carried out with data collected from 40 different countries, including both developed and developing countries, in line with the determined objectives. To analyze the development of artificial intelligence in countries, data on patents related to artificial intelligence between 2000 and 2019 were taken from the Google Cloud Public Datasets data center, which is open to public use. As a result of the necessary statistical analyses performed on the collected data, researchers have revealed that there is no linear relationship between unemployment and AI under the condition of inflation. However, another finding is that artificial intelligence can increase unemployment to a certain level, and after a certain level, it can reduce unemployment after inflation reaches the desired level. As a result, the research emphasizes that artificial intelligence will increase unemployment depending on inflation up to a certain level, and then its effect will decrease. Moreover, it has been seen that this effect also depends on the inflation levels of the countries (Nguyen and Vo, 2022: 40).

Another research aims to measure the relationship between artificial intelligence, big data technologies, and unemployment in G7 countries. The research was carried out with data collected from seven different technologically and economically developed countries in line with the determined objectives. Data on countries' artificial intelligence, machine learning, big data, and unemployment between 2005 and 2020 were taken from the Google Trend Index data center. As a result of the necessary statistical analysis performed on the collected data, researchers discovered an inverse relationship between unemployment and artificial intelligence. As a result, research has suggested that artificial intelligence does not increase unemployment or even reduce it in countries with the most advanced technology and economic systems. This is based on the idea that these new developing technologies will increase productivity in developed countries and that machines and new job areas will perform some existing routine jobs will be created thanks to AI technologies (Guliyev, Huseynov, and Nuriyev: 2023: 3).

Another research study investigating the effects of artificial intelligence and tools on businesses and industries examined eleven studies selected from dozens of studies that

investigated the relationship between AI, machine learning, and jobs. As a result of the research in which the necessary research and analysis was carried out, it was concluded that artificial intelligence and technologies will greatly impact current human work and will change how work is done. Moreover, it has been stated that artificial intelligence will offer industries and businesses the opportunity to open new areas and grow. However, on the other hand, an important finding is that it will lead existing job holders to unemployment, create unemployment, and cause economic inequality (Poba-Nzaou, et al., 2021: 60).

Another researcher wanted to examine the effects of artificial intelligence, the biggest technology of Industry 5.0, on unemployment to shed light on unemployment, which is one of the most important topics of discussion in countries, especially the unemployment of young people and long-term unemployment in economies. Based on this context, because of the research in which a detailed literature review was conducted, it was observed that the unemployment data in economically and technologically developed and developing countries were more negative compared to previous years. Stating that artificial intelligence technologies and automation systems effectively increase these unemployment data, the research emphasized that technological developments and unemployment are among the most important issues that decision-makers will consider. It has been emphasized that due to the widespread use of these systems, which display humanoid features and have cognitive decision-making mechanisms, they may lead to unemployment by replacing the jobs of workers in the middle and lower-skill classes (Iscan, 2021: 77).

The research examines the relationship between unemployment in OECD countries and the development of artificial intelligence and robots. For this purpose, data on unemployment rates, patents containing artificial intelligence technologies, and robot technologies patents between 2005 and 2017 were collected from thirty-three OECD countries. As a result of the necessary statistical analyses performed on these collected data, some striking relationships were discovered between the variables and other features affecting the variables. In analyzing the relationship between the increased rate of robot patents and unemployment, a ten percent increase in robot stocks was associated with a 0.42 percent increase in the unemployment rate. It has been concluded that there is a positive relationship between the increase in artificial intelligence technologies and the increase in unemployment rates, although it is not as

strong as the relationship between robots and unemployment rate. Moreover, when the demographic data of employees are included in the analysis, the effect of patent increases in robotic technologies is two and a half times higher in unemployment rates for people aged twenty-five to thirty-four with secondary education than for people aged fifty-five to sixty-four with tertiary education degrees. Moreover, the group where the increase in robot and artificial intelligence technology patents affects unemployment rates the most are employees with intermediate-level education. In line with these results, the study concluded that the development of artificial intelligence technologies and robotic technologies has negative effects on unemployment rates (Bordot, 2022: 117).

To shed light on the concern that robotics and artificial intelligence technologies may cause a large amount of unemployment due to automation in the coming years, this research comparatively evaluates the perspectives of people who are experts in the field of artificial intelligence technologies and robotics and the perspectives of those who are not experts. For this purpose, it aimed to collect data from three different groups. The first group includes two hundred experts who are authors at leading conferences in artificial intelligence. The second group includes one hundred and one fellows of the IEEE and authors at leading conferences in robotics and automation. The third group is five hundred and forty-eight people who have read an article determined on the website "The Conversation". People in the third group are people who do not have expertise in artificial intelligence and robotics, have different characteristics and are from different countries. As a result of the necessary statistical analyzes made in the light of the data collected from these three groups by the survey method, the researchers concluded that the experts look at the issue more cautiously, as well as emphasizing that professions are under threat from automation systems in the next few years. As a result, experts reported that automation systems could lead to unemployment and suggested that society adapt to these technologies (Walsh, 2018: 637).

With the prediction that artificial intelligence systems, robotic systems, and automation systems will take over routine tasks in different areas of the business world, people doing current jobs may face the danger of unemployment. The research aims to investigate this prediction and reveal the relationships between variables. The research is based on studies in the literature examining the relationship between the

development of technology and artificial intelligence and unemployment. As a result of the necessary literature review, the researcher emphasized that artificial intelligence may cause unemployment in the short and medium term by transferring many of the routine jobs from humans to machines with artificial intelligence and automation systems and concluded that these developments will create new areas of expertise and business areas and open employment opportunities in different fields (Sheikhi, 2022: 102).

Considering that there is not enough research in the literature on the effects of artificial intelligence and the advancement of technology on people's anxiety and unemployment anxiety, the researcher aimed to examine the effects of people's unemployment fears, financial insecurity, and technological fears in the face of the rapid development of artificial intelligence, robots, and automation systems. For this purpose, data collected by the Chapman Survey of American Fears, which was administered annually to individuals from the US in 2015, was used. The survey measures people's concerns in different areas, such as natural disasters, government policies, and technological breakthroughs. The research was carried out on the data of one thousand five hundred and forty-one people, whose data were collected through this survey. As a result of the necessary statistical analysis, it has been determined that there are "technophobes" among people who are afraid of technological developments and those who are afraid of robots. Moreover, it has been determined that those who are afraid of technology develop more anxiety and have fears about unemployment and financial insecurity than those who are not afraid. As a result, it has been seen that people in the US are concerned about technological unemployment due to technological developments, robotic developments, and automation systems (McClure, 2018: 139).

2.6. University Students' Attitudes Towards Artificial Intelligence

Artificial intelligence is increasingly being used in different fields and jobs every day. Based on the results of the research in the literature review section where artificial intelligence and unemployment are examined, it can be reached conclusions such as artificial intelligence technologies will transform existing human jobs, human-machine interaction will increase, and artificial intelligence will create new job areas.

Considering this information, students' relationships with artificial intelligence in the current education system are important for their adaptation to future jobs (Almaraz-López, Almaraz-Menéndez, and López-Esteban: 2023: 1). Students' relationships with artificial intelligence and their attitudes towards it may vary depending on their gender and personality traits (Kaya, et al., 2022: 507). Also, it may vary depending on the departments in which they study. Although some students have a positive attitude towards artificial intelligence, others may have a negative attitude. Students' attitudes can affect their adaptation to artificial intelligence in different ways (Keleş and Aydın, 2021: 218).

In this context, some studies examining university students' attitudes towards artificial intelligence are as follows:

The research is based on the acceptance that the use of artificial intelligence increases daily and changes how it operates in professional fields. The research stated that the education students receive in higher education should be adapted to artificial intelligence technologies and that departments should transform in the context of this technology. For this purpose, it is aimed to examine in what direction and how the departments and curriculum should be shaped through students' attitudes toward artificial intelligence. In this context, a survey was conducted on students in the education department and business and management department of the University of Salamanca. In the light of the data collected from the surveys completed as requested by 270 students, eighty-five percent of the students studying in the education department and eighty-two percent of the students studying economics, business, and management sciences are aware that artificial intelligence will have a great impact on the future jobs of the students. Students in economics and business are largely concerned about the risk of job displacement. Students who are aware of the effects and transformation of artificial intelligence on their future jobs think that the departments' training in artificial intelligence is lacking. In line with these results, researchers emphasized that education should be transformed with artificial intelligence content for students to better capture this change and be better prepared for their future professional fields (Almaraz-López, Almaraz-Menéndez, and López-Esteban: 2023: 1).

Another study examined students' attitudes toward using artificial intelligence in education. To analyze this relationship, students' behaviors and attitudes were

examined in the context of perceived risk, performance, and effort expectancy, as well as some facilitating conditions, awareness, and attitude. For these purposes, Taif University's business and management sciences department students were selected as a sample. Among the data collected by the survey method, the data of three hundred and four students were used for statistical analysis. As a result of the necessary statistical analyses performed on the collected data, the risks perceived by the students negatively affect their attitudes toward the use of artificial intelligence. Moreover, it was observed that students' attitudes were also affected in the context of performance expectancy and facilitating conditions (Alzahrani, 2023: 65).

In a study that aims to reveal the preparedness and perspectives of students studying in the health field against the changes that artificial intelligence technologies will bring, researchers conducted the research in the context of students' attitudes, practices, and knowledge toward artificial intelligence. For these purposes, data was collected through a survey distributed online to four hundred and eighty-three health students from different universities in Jordan. Necessary statistical analyses were carried out to reveal the relationships between variables through regression modeling on the collected data. As a result of the statistical analysis, it was discovered that the students were at an intermediate level in terms of their knowledge of artificial intelligence. In terms of their attitudes, it was observed that students had concerns about artificial intelligence becoming the new teacher. Moreover, it was emphasized that students may encounter obstacles in terms of time, information, and accessibility in preparing for their specialties by receiving education integrated with artificial intelligence. Considering this information, researchers emphasized that students should integrate artificial intelligence with their current education and be more equipped in their specialties in the future (Al-Qerem et al., 2023: 1).

Another study aimed to measure nursing students' attitudes toward artificial intelligence based on the assumption that the use of artificial intelligence and its applications in nursing is increasing and that this increase is associated with nurses' positive attitudes toward these AI-supported applications. For this purpose, the research was conducted on first-year nursing students from 4 different schools in Croatia. To collect information from the sample, valid answers were collected from three hundred and thirty-six students through an online survey. The survey includes a form containing students' demographic data and a form using GAAIS as a five-point

Likert-type scale to examine students' attitudes toward artificial intelligence. The statistical analysis performed on the collected data showed that the students had higher scores than the neutral score, and no significant difference was observed between the scores of students studying at different universities. Moreover, there is no difference between students' attitudes towards artificial intelligence depending on their age. On the other hand, students' attitudes differ according to their gender, and male students have higher scores. As a result, it was observed that nursing students' attitudes towards artificial intelligence were positive, and it was emphasized that training should be focused on the applications of artificial intelligence in the field of nursing for the new generation of nurses to be more adapted to the field and benefit from the advantages of these applications (Lukić, et al., 2023: 1).

Based on the acceptance that the use of artificial intelligence in all fields of medicine is increasing day by day, the research aims to discover the attitudes and perceptions of students studying in the field of health towards developments such as these increasing artificial intelligence applications and the state of their knowledge and whether they are prepared for these changes. For these purposes, medical students in their clinical years at Sultan Qaboos University were selected as a sample. It was aimed to collect data by sending an online survey of forty-nine questions with a 5-point Likert scale to the selected sample. The research results were reached through statistical analysis on the data of two hundred and twenty-one students collected validly and as requested. The results showed that most students in their departments were not exposed to AI enough to acquire the necessary knowledge about AI. On the other hand, most students have positive attitudes towards artificial intelligence and its applications, but it has also been observed that they have concerns about unemployment and ethical problems that AI may pose. Moreover, it has been observed that students are willing to include AI-related training in their curriculum to be prepared for the future applications of AI (Hadithy et al., 2023: 1).

Researchers have discovered in other studies that students studying health are interested in AI and its applications, and they aimed to research medical students in Australia to investigate whether this situation exhibits similar characteristics. In this regard, it aimed to investigate the attitudes of medical students in Australia towards AI and their attitudes towards introducing AI into the curriculum in their current education. The research was conducted with valid and properly filled data collected

from one hundred and thirty-four students through an online survey. As a result of the statistical analysis performed on the collected data, it was concluded that most students have not yet received training on artificial intelligence but are interested in AI. Although most students have positive attitudes towards artificial intelligence and its applications, students think that these technologies should be adapted in their education and that these applications will affect them in performing their profession better. At the same time, students have different opinions that it will affect their job security depending on their field. While students in departments such as radiology and pathology think they will be more affected, those in psychiatry and obstetrics departments think they will be less affected (Stewart et al., 2023: 1).

Another research aims to see whether people's attitudes towards this situation change according to their characteristics in response to artificial intelligence's increasing development and usage areas. For these purposes, the research was conducted using valid and usable data from four hundred and ninety people with a survey. The survey includes the 5-point Likert-type ATTARI-12 scale to measure people's attitudes toward artificial intelligence, a scale to measure their attitudes towards robots, and the Big Five Inventory and Dark Triad scale to measure people's personality traits. As a result of the necessary statistical analyses performed on the collected data, it was concluded that younger people have more positive attitudes toward artificial intelligence and its tools. Moreover, when people's personality traits are examined, it has been observed that people with dominant agreeableness traits have more positive attitudes towards artificial intelligence (Stein et al., 2024: 1).

The research aimed to measure the perceptions and attitudes of medical students in different Arab countries towards the use of artificial intelligence in medicine, especially in the field of radiology, and their knowledge about artificial intelligence technologies. In this context, all medical students in 9 countries in the Middle East and North Africa region were determined as the population of the study. Taking at least three hundred and eighty-five students from each country as a sample, the data of 5171 students were collected by online survey method. The survey includes a demographic information form to collect students' demographic data, ten questions to measure their knowledge about AI, 18 questions to measure their attitudes towards AI, 4 questions to measure their perceptions, and an additional 4 questions about whether students have received training on AI. As a result of the statistical analysis performed on the

collected data, it was seen that almost all the students had not yet received education on AI, and it was emphasized that many students had limited knowledge about AI and its components. Most students believe that AI technology will have a devastating impact on their departments and will be used extensively in the detection of diseases. At the same time, nearly half of the students believe that AI will replace doctors in some special departments, such as radiology, and that the need for doctors will decrease and may create unemployment. For these reasons, those with high knowledge about artificial intelligence do not consider these departments as a career goal, compared to low rates (Allam and Eltewacy, 2023: 1).

The research, which aims to investigate the perceptions of university students towards AI, was conducted on students studying in different faculties from different universities in the Anatolian region. In addition to students from different faculties such as the Faculty of Education, Faculty of Business and Management Sciences, and Faculty of Art constituting the research population, a total of one hundred and thirty students from these faculties constituted the research sample. Statistical analyses were carried out on the data after collecting the necessary data from these students using the survey method. As a result of these analyses, it was revealed that students' perceptions of AI differ for students from different faculties. It was concluded that students in the Faculty of Education have richer perceptions about AI than students in the Faculty of Business and Economics and the Faculty of Arts. Moreover, it has been observed that most students have a more negative perception towards AI than a positive one. Based on these results, it was understood that the students did not have sufficient knowledge, skill, and training in the field of AI, and the researcher emphasized that training on AI and applications related to their fields should be included in the current curriculum of the students (Keleş and Aydın, 2021: 212).

Another study aimed to examine the attitudes of individuals in Turkey toward artificial intelligence in the context of different demographic characteristics, different personality traits, and anxiety state they developed toward AI. In this context, data was collected by survey method on a total of three hundred and fifty people selected by convenience sampling. The survey consists of questions about people's demographic data, the GAAIS scale for their attitudes toward AI, the Ten-Item Personality Inventory scale, and the AI Anxiety scale for personality traits. As a result of the statistical analysis performed on the collected data, it was observed that people with high

computer usage rates had a more positive attitude toward AI. There is a significant negative relationship between people's positive attitudes towards AI and their development of anxiety towards AI and job replacement anxiety. On the other hand, for people's personality traits and demographic characteristics and their attitudes towards AI, it has been observed that there is a positive significant relationship between people with high openness to change in the personality traits dimension and their positive attitudes towards AI, but no significant relationship found with age and gender (Kaya et al., 2022: 497).

The study, whose sample consisted of two hundred and forty university students, aimed to analyze university students' attitudes toward artificial intelligence and the factors affecting these attitudes. For these purposes, the research was conducted using a survey method prepared online and sent to students. The survey consists of questions containing demographic information of people and The AI Attitude scale questions. As a result of the necessary statistical analyses performed on the collected data, the relationship between students' gender and their attitudes was tested, and no significant relationship was discovered between the students' gender and their attitudes towards AI. On the other hand, differences were observed in the relationships between students' attitudes towards AI and their departments. It was concluded that students in the Science department had more positive attitudes towards AI than those in the commerce and art departments. Considering these results, researchers have recommended introducing AI into students' curricula to educators, curriculum makers, and policymakers (Hajam and Gahir, 2024: 1).

As a result of the detailed literature review, it has been seen that there are many studies on unemployment anxiety, artificial intelligence, and unemployment and students' attitudes toward artificial intelligence, but it has been determined that there is no research in the literature that measures the relationship between university students' attitudes towards artificial intelligence and technology-related unemployment anxiety. For these reasons, the current research sets out to fill this gap in the literature and provide resources to lawmakers, universities, and curricula makers.

CHAPTER III

METHODOLOGY

The Methodology section includes the research design, population and sample, data collection tools, and data analysis information.

3.1. The Research Design

This study utilizes quantitative research to investigate the relationships between various variables. The online survey method is chosen to ensure a broader reach and expand our sample pool as it aligns well with the quantitative research pattern approach.

3.2. Population and Sample

The research population consists of university students studying in Istanbul in the 2023-2024 academic year. The convenience sampling method was chosen to select the research sample due to time and cost constraints (Golzar, Tajik, and Noor, 2022: 75). The survey was distributed to 1000 students from different universities and different departments. Demographic data of the students who participated in the distributed survey and were participants in the research are shown in Table 3.1.

Table 3.1: Participants Demographic Information

Variables	Groups	f	Percent
Gender	Male	107	32.3
	Female	225	67.7
Age	18-48	332	100
Universities	27	332	100
Departments	39	332	100
Grade Level	1.Year	67	20.2
	2.Year	32	9.6
	3.Year	81	24.4
	4.Year	152	45.8

Grade Point Average	3.5 - 4.0	45	13.6
	3.0 – 3.49	112	33.7
	2.5 – 2.99	124	37.3
	1.5 – 2.49	49	14.8
	<1.49	2	0.6
Total		332	%100

As a result of the survey distributed to 1000 students, data was collected from 332 university students that constituted the sample of the research. When Table 3.1 is examined, 107 participants are men and 225 are women. The age density of the participants is between 18 and 22 years old, and they are between 18 and 48 years old. Students from 27 different universities participated in the research. The leading universities are Istanbul University, Istanbul Technical University, Marmara University, Yıldız Technical University, Istanbul Sabahattin Zaim University, Ibn Haldun University, Istanbul Bilgi University, Medipol University. Moreover, students from 39 departments participated in the research, including Business Administration, International Trade and Finance, Psychology, Nutrition and Dietetics, Islamic Economics and Finance, Industrial Engineering, Law, Economics, Computer Engineering, and Architecture. Considering the grade levels of the students, 67 students are in the first grade, 32 are in the second grade, 82 are in the third grade, and 152 are in the senior year. The distribution of students according to their GPA is as follows: 45 students have a GPA of 3.5 - 4.0, 112 students have a GPA of 3.0 - 3.49, 124 students have a GPA of 2.5 - 2.99, 49 students have a GPA of 1.5 - 2.49, and 2 students have a GPA of less than 1.49.

3.3. Data Collection Tools

The survey method, one of the quantitative research patterns, was chosen as the research data collection tool. To reach more students, the survey was prepared online via Google Forms and delivered to the students. The survey consists of three different forms. A demographic information form, GAAIS scale for attitudes towards artificial intelligence, and Technological Unemployment Anxiety Scale for unemployment anxiety were used to collect participants' information.

At the beginning of the survey form, participants were given clear information about the research objectives, and contact addresses were provided so that their possible questions or concerns could be addressed immediately. Participants were also informed that their confidentiality and anonymity would be strictly protected throughout and after the research.

3.3.1. Demographic Information Form

In the demographic information form, the participating university students' gender, age, university, grade level, department, grade point average, etc. questions were asked about their personal information.

3.3.2. The General Attitudes towards Artificial Intelligence Scale (GAAIS)

The scale used in the research to collect data about students' attitudes towards artificial intelligence is the "GAAIS" scale. The scale consists of 20 items. Twelve items on the scale are positive GAAIS, and 8 are negative GAAIS items. In the scale, a 5-point Likert scale was used for negative and positive GAAIS, but the scores were reversed for negative GAAIS. Scoring for positive GAAIS is 1=Strongly disagree, 2=Somewhat disagree, 3=Neutral, 4=Somewhat agree, 5=Strongly agree. For negative GAAIS, the scores are reversed and are 1=Strongly agree, 2=Somewhat agree, 3=Neutral, 4=Somewhat disagree, 5=Strongly disagree. In this way, the higher scores on the results of the two scales indicate a more positive attitude. In the research conducted to validate the scale, the validation of the scale was proven using different methods. In the chi-square test, the X^2 / df ratio of the scale was found to be 1.32. According to this result, the model has a good fit since the value is less than 2. In the Root Mean Square Error of Approximation (RMSEA) model, another fit evaluation model, the scale was measured as RMSEA = 0.032. In this case, it was observed that the model had a good fit because the value was less than 0.05. In addition to these evaluations, the scale has proven its validity in line with the results it received in other evaluations; CFI= 0.987, TLI= 0.986, SMRS= 0.065. Moreover, the two-factor model, compared with the developed alternative models with the Expected cross-validation index (ECVI), gave an ECVI value of 1.007, while the other alternative model gave a value of 2.308. According to these results, the two-factor model gave a more valid result because the one with a lower ECVI value had a better fit (Schepman and Rodway, 2022: 1).

3.3.3. Technological Unemployment Anxiety Scale

The scale used in the research to collect data on students' unemployment anxiety in the face of the development of technology is the "Technological Unemployment Anxiety Scale." The scale consists of 12 items in total. Four items were designed to measure participants' unemployment concerns under the subheadings of Lack of Technical Skill, 4 under the subheadings of Incremental Technical Improvement, and 4 under the subheadings of Technological Disruption. A 5-point Likert scale was used when applying the scale to the participants. Scoring for the scale is 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly Agree. In this way, higher scores from the scale items indicate higher unemployment anxiety. In the validity and reliability studies conducted for the scale, confirmatory factor analyses were carried out for validity, and these satisfactory fit index values were evaluated; one of the values, X^2 / df ratio, was found to be 1.83, and since this value is less than 2, the model has a good fit. The scale gave the RMSEA value of 0.08, and since the result was between 0.05 and 0.08, it was concluded that the model had a sufficient fit to the observed data. In addition to these evaluations, the scale has proven its validity in line with the results it received in other evaluations; CFI= 0.95, IFI= 0.95. At the same time, confirmatory factor analysis was performed on all items of the scale in the study, and according to the results, the standardized factor loads of all items were above 0.05 and were significant. Considering these results, the validity and power of the scale were demonstrated. The AVE (Average Variance Extracted) value, which is another validity indicator, gave values of 0.598, 0.685, and 0.623 for scale subheadings, respectively. As can be seen, it has been observed that the scale gives a value greater than the threshold value of 0.5 for each subheading. At the same time, it showed that there was discriminant validity because the AVE values compared with the correlation coefficient results for the scale were higher. In the Cronbach α and composite reliability tests conducted for the scale's reliability, Cronbach α = 0.829, 0.898, 0.857 values and composite reliability= 0.854, 0.896, 0.868 values were given for the scale subheadings, respectively. It has proven its reliability in line with these results, giving values above the scale threshold level of 0.7 (Civelek and Pehlivanoğlu, 2020: 64).

3.4. An Overview of the Data Analysis

SPSS.25 and AMOS.25 statistical programs were used to analyze the data.

To measure the reliability values of The General Attitudes Toward Artificial Intelligence Scale and Technological Unemployment Anxiety Scale, the expressions of the scales were subjected to Cronbach's Alpha test. At the same time, Skewness and Kurtosis values were evaluated to test whether the data collected from the participants were normally distributed. The means, standard deviations, kurtosis and skewness values and Cronbach's Alpha reliability coefficients of The General Attitudes towards Artificial Intelligence Scale and Technological Unemployment Anxiety Scale are shown in Table 3.2.

Table 3.2: Scales' Means, Standard Deviations, Kurtosis, Skewness and Cronbach's Alpha Coefficients

	N	X	SD	Skewness	Kurtosis	Cronbach's Alpha
General Attitudes Toward AI	332	3.374	.601	.067	.115	.876
Technological Unemployment Anxiety	332	2.516	.721	-.123	-.480	.869

The coefficients of the scales are shown in Table 3.2. When these values are examined, the averages of the scales are (X= 3.37) for General Attitudes toward AI and (X=2.51) for Technological Unemployment Anxiety, and the standard deviations of the scales are (.60) and (.72), respectively.

Skewness and Kurtosis values were obtained to see if the data are normally distributed: Skewness (.067) and Kurtosis (.115) for General Attitudes toward AI. For Technological Unemployment Anxiety, Skewness (-.123), Kurtosis (-.480). When the Skewness and Kurtosis values of the scales were examined, the data met normal distribution conditions as the values remained between -1 and +1 (Hair et al., 2013). Since the data met the normality assumption, parametric tests such as Linear Regression, One-way ANOVA, and Independent Samples t-test were applied to the data during hypothesis testing.

Moreover, when Cronbach's Alpha coefficient values, which were performed to measure reliability and internal consistency on all expressions in the two scales, were examined, the coefficient for the General Attitudes toward AI scale was: (.876); The coefficient for Technological Unemployment Anxiety is: (.869). When the Cronbach Alpha values of the scales are between .80 and .90, the scale is said to have a very good fit (Skidmore and Skidmore, 1975: 135). When the values of the two scales are examined, it can be said that they meet the reliability conditions because they meet these conditions.

3.4.1. Scales' Model Fit

Before testing the research hypotheses, CFA (Confirmatory Factor Analysis) was applied to the scales to test the sampling fit of the model. To evaluate the fit indices, the most used RMSEA (Root Mean Square Error of Approximation), GFI (Goodness of Fit), CFI (Comparative Fit Index), and AGFI (Adjusted Goodness-of-fit) model fit indices were used. The results are evaluated according to cutoff criteria in the literature that is stated in Table 3.3 (Meydan and Şeşen, 2011).

Table 3.3: Cutoff Points of Fit Indices

Fit Indices	Perfect Fit	Good Fit	Acceptable Fit
$\chi 2/df$	$0 \leq \chi 2/df \leq 2$	$2 < \chi 2/df \leq 3$	$3 < \chi 2/df \leq 5$
RMSEA	0<RMSEA<0.05	0,05 ≤ RMSEA < 0,08	0,08 ≤ RMSEA < 0,10
CFI	0,97 ≤ CFI ≤1	0,95≤ CFI <0,97	0,90≤ CFI < 0,95
GFI	0,95 ≤ GFI ≤1	0,90≤ GFI < 0,95	0,85≤ GFI < 0,90
AGFI	0,90 ≤ AGFI ≤1	0,85≤ AGFI < 0,90	0,80≤ AGFI < 0,85

3.4.1.1. The General Attitudes towards Artificial Intelligence Scales CFA

The scale consists of 20 items and 2 sub-factors, as it was in the original research in which it was taken. Sub-factors are Positive GAAIS and Negative GAAIS. The factor model of the scale drawn from these 2 factors is shown in Figure 3.1.

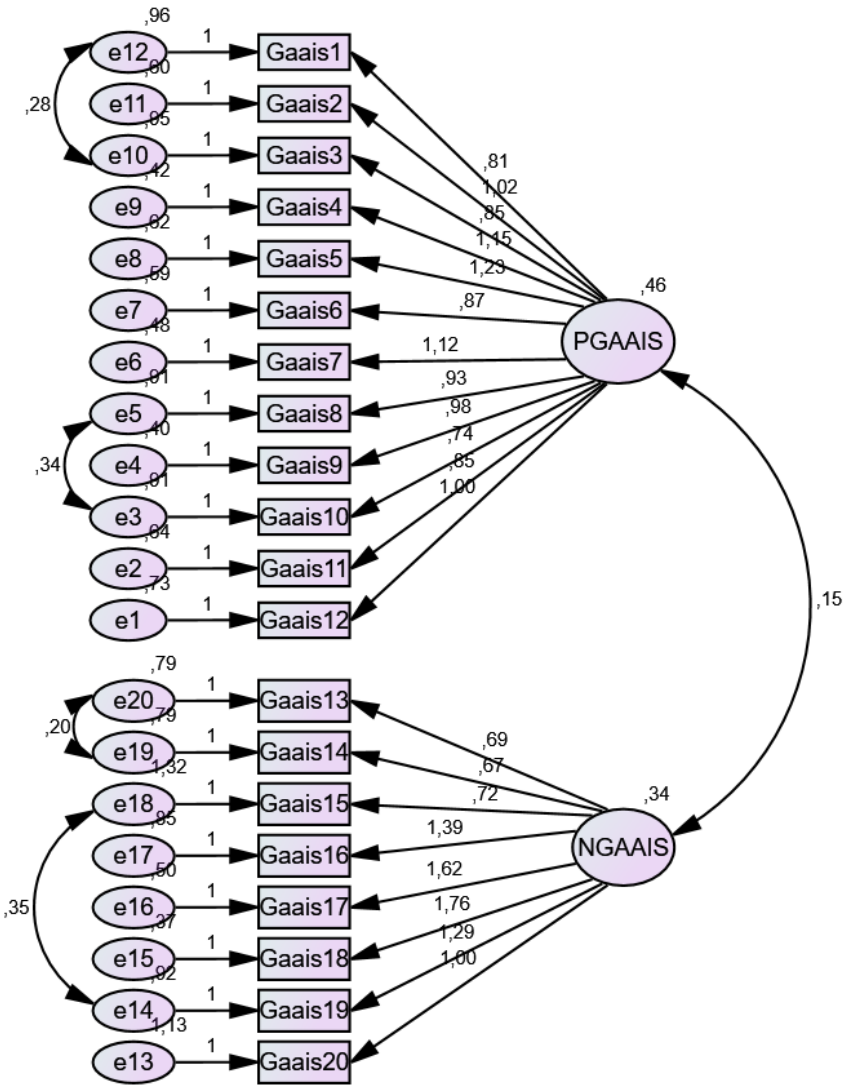

Figure 3.1: The General Attitudes towards Artificial Intelligence Scales CF Model

As a result of CFA performed with AMOS.25, the fit indices results were $\chi 2/df$: 2.271 (good fit); RMSEA; 0.062 (good fit); CFI: 0.914 (acceptable fit); GFI: 0.900 (good fit) and AGFI: 0.873 (good fit). Considering these results, it can be said that the model has a good fit. The Cronbach Alpha analysis results for the sub-dimensions are 0.886 for Positive GAAIS and 0.814 for Negative GAAIS, and the total Cronbach Alpha value

of the scale was found to be 0.876 and it can be said scale met the validity and reliability conditions.

Additionally, the regression weights of the scale are given in Table 3.4. below. All p values for coefficients are below 0.01.

Table 3.4: The General Attitudes towards AI Scales Regression Weights

		Factors	Estimate	S.E.	C.R.	P
Gaais12	<---	PGAAIS	1,000			
Gaais11	<---	PGAAIS	.848	.093	9.122	***
Gaais10	<---	PGAAIS	.736	.098	7.480	***
Gaais9	<---	PGAAIS	.984	.091	10.823	***
Gaais8	<---	PGAAIS	.933	.107	8.732	***
Gaais7	<---	PGAAIS	1.122	.102	10.968	***
Gaais6	<---	PGAAIS	.874	.092	9.477	***
Gaais5	<---	PGAAIS	1.228	.113	10.832	***
Gaais4	<---	PGAAIS	1.152	.102	11.264	***
Gaais3	<---	PGAAIS	.847	.105	8.100	***
Gaais2	<---	PGAAIS	1.017	.100	10.128	***
Gaais1	<---	PGAAIS	.805	.103	7.825	***
Gaais20	<---	NGAAIS	1.000			
Gaais19	<---	NGAAIS	1.286	.169	7.618	***
Gaais18	<---	NGAAIS	1.757	.201	8.747	***
Gaais17	<---	NGAAIS	1.620	.189	8.572	***
Gaais16	<---	NGAAIS	1.394	.177	7.900	***
Gaais15	<---	NGAAIS	.721	.140	5.166	***
Gaais14	<---	NGAAIS	.675	.115	5.858	***
Gaais13	<---	NGAAIS	.691	.116	5.951	***

3.4.1.2. Technological Unemployment Anxiety Scales CFA

The scale consists of a total of 12 items and 3 sub-factors, as it was in the original research in which it was developed. The sub-factors were designed to measure the technological unemployment anxiety of the participants under the factors of Lack of Technical Skill (LTS), Incremental Technical Improvement (ITI), and Technological Disruption (TD). The factor model of the scale drawn with these three factors is shown in Figure 3.2.

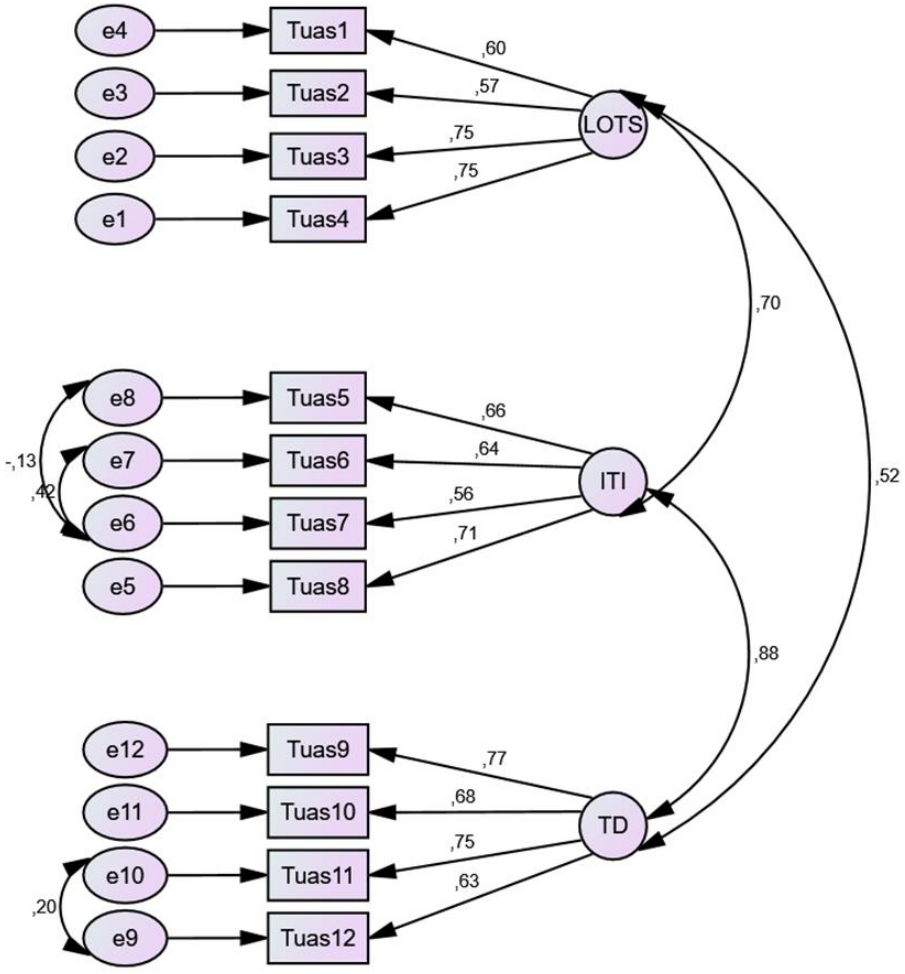

Figure 3.2: Technological Unemployment Anxiety Scales CF Model

As a result of CFA performed with AMOS.25, the fit indices results were $\chi 2/df$: 3.501 (acceptable fit); RMSEA; 0.087 (acceptable fit); CFI: 0.921 (acceptable fit); GFI: 0.915 (good fit) and AGFI: 0.861 (good fit). These results show that the model is a good fit. The Cronbach Alpha analysis results for the sub-dimensions are respectively

0.755 for Lack of Technical Skill and 0.769 for Incremental Technical Improvement. For Technological Disruption, it was found to be 0.816, and the total Cronbach Alpha value of the scale was found to be 0.869. It can be said that the scale met the validity and reliability conditions.

Additionally, the regression weights of the scale are given in Table 3.5. below. All p values for coefficients are below 0.01.

Table 3.5: Technological Unemployment Anxiety Scales Regression Weights

		Factors	Estimate	S.E.	C.R.	P
Tuas4	<---	LTS	1,000			
Tuas3	<---	LTS	1,141	.100	11.370	***
Tuas2	<---	LTS	.802	.088	9.133	***
Tuas1	<---	LTS	.893	.094	9.521	***
Tuas8	<---	ITI	1.000			
Tuas7	<---	ITI	.809	.091	8.941	***
Tuas6	<---	ITI	.945	.091	10.385	***
Tuas5	<---	ITI	.863	.081	10.618	***
Tuas12	<---	TD	1.000			
Tuas11	<---	TD	1.172	.099	11.824	***
Tuas10	<---	TD	1.093	.113	9.707	***
Tuas9	<---	TD	1.199	.115	10.448	***

CHAPTER IV

RESULTS

This research aims to measure the relationship between university students' attitudes toward artificial intelligence and their unemployment anxiety, and in this context, it seeks answers to the following questions: Do university students' general attitudes towards artificial intelligence significantly affect their levels of technological unemployment anxiety? Do university students' general attitudes towards AI significantly differ according to their gender? Do university students' technological unemployment anxiety significantly differ according to their gender? Do university students' technological unemployment anxiety significantly differ according to their GPA? Do university students' technological unemployment anxiety significantly differ according to their year of the study? In the result section, these questions and the hypotheses related to these questions were tested.

4.1. Research Question 1

Linear regression analysis was used to test the first question of the research, "Do university students' general attitudes towards artificial intelligence significantly affect their levels of technological unemployment anxiety ?" and the first hypothesis of the research, students' positive general attitudes toward AI among significantly predict lower levels of technological unemployment anxiety. However, the prerequisites required for the analysis were examined before using the analysis. Some analysis of the prerequisites is shown in Table 4.1.

Table 4.1: Results of Prerequisite Analyses Required for Linear Regression Analysis

	Std. Residual	Cook's Distance	Durbin-Watson
Minimum	-2.560	.000	1.824
Maximum	2.933	.113	

First, the first necessary condition is that both variables must be continuously variable. Our data also meets the second condition, which is that the data be normally distributed. A graph was produced to examine the third condition, a linear relationship

between the variables. It was seen that the data was distributed linearly, and the linearity condition was also met. Residual statistics were applied to the data for the fourth condition: no extreme values should exist. According to the results, the data gave the values (Minimum = -2.56, Maximum = 2.93) as the Std. Residual value. According to these results, there are no extreme values since the values are between -3.29 and +3.29. In Cook's Distance analysis, another extreme value analysis, the data also gave the value (Minimum = .000, Maximum = .113). According to this analysis, since the value does not exceed 1, it is said that there is no extreme value in our data and the condition for extreme values is met. A histogram chart was created for the fifth prerequisite, which is that errors should be normally distributed, and it was seen that the errors were normally distributed. A scatterplot chart was created for the sixth prerequisite: the variables must have homoscedasticity. It was observed that the data spread across the chart in a rectangular shape, and the condition was met. Durbin-Watson analysis was carried out for the seventh condition, which is that the errors must be independent, and the value was realized as (1.82). Since the value was between 1 and 3 and close to the value of 2, it was concluded that the errors were independent of each other, and the prerequisites were met.

After the necessary prerequisites were met, Liner Regression analysis was performed to test the hypothesis "Positive general attitudes towards AI among students significantly predict lower levels of technological unemployment anxiety." The results of the regression analysis are shown in Table 4.2.

Table 4.2: Linear Regression Analysis Results Regarding the Hypothesis "Positive general attitudes towards AI among students significantly predict lower levels of technological unemployment anxiety."

IV	DV	B	Std. Err.	(β)	t	p	R	R^2	F	*p*
GA AIS	**TU AS**	3.387	.221		15.327	.000	.215	.043	16.018	.000
		-.258	.064	-.215	-4.002	.000				

When Table 4.2 is examined, it is seen that students' general attitudes towards AI significantly predicts their technological unemployment anxiety levels (r^2=.043;

p<.05). In other words, 4.3% of university students' technological unemployment anxiety levels are explained by their attitudes towards artificial intelligence. When we look at the direction and strength of the relationship between the variables ((β) = -.215), we see that there is a weak and significant negative correlation between the variables. In other words, as students' general attitudes towards artificial intelligence levels increase, their technological unemployment anxiety levels decrease significantly.

Considering these results, the first hypothesis of the research "Positive general attitudes towards AI among students significantly predict lower levels of technological unemployment anxiety." is accepted and the null hypothesis is rejected.

4.2. Research Question 2

For the second question of the research, "Do university students' general attitudes towards AI significantly differ according to their gender?" and for the second hypothesis of the research, "University students' general attitudes towards artificial intelligence differ significantly according to their gender.", The Independent Samples t Test was used to test. The results of the Independent Samples t-test analyses are shown in Table 4.3.

Table 4.3: Independent Samples t-test Results of University Students' General Attitudes Towards AI by Gender

Variables	Groups	N	X	SD	t-test		
					t	df	p
General Attitudes Toward AI	Male	107	3.54	.684	3.234	330	.001
	Female	225	3.29	.542			

When Table 4.3 is examined, university students' general attitudes towards artificial intelligence show a significant difference according to their gender *(t[330]=3.234; p<.05)*. Male students' general attitudes towards artificial intelligence (X = 3.54) are more positive than female students' general attitudes towards artificial intelligence (X = 3.29).

Considering these results, the second hypothesis of the research, "University students' general attitudes towards artificial intelligence differ significantly according to their gender." is accepted, and the null hypothesis is rejected.

4.3. Research Question 3

For the third question of the research, "Do university students' technological unemployment anxiety levels significantly differ according to their gender?", and for the third hypothesis of the research, "University students' technological unemployment anxiety levels differ significantly according to their gender.", The Independent Samples t-test was used to test. The results of the Independent Samples t-test analysis are shown in Table 4.4.

Table 4.4: Independent Samples T-test Results of University Students' Technological Unemployment Anxiety Levels by Gender

Variables	Groups	N	X	SD	t test		
					t	df	p
Technological Unemployment Anxiety	**Male**	107	2.41	.705	-1.846	330	.066
	Female	225	2.56	.724			

When Table 4.4 is examined, University students' technological unemployment anxiety levels do not differ significantly according to their gender *(t[330]=-1.846; p>.05).*

Considering these results, the third hypothesis of the research "University students' technological unemployment anxiety levels differ significantly according to their gender." is rejected and the null hypothesis is accepted.

4.4. Research Question 4

For the fourth question of the research, "Do university students' technological unemployment anxiety levels significantly differ according to their GPA?" and for the fourth hypothesis of the research, "University students' technological unemployment anxiety levels differ significantly according to their GPA," the One-way ANOVA test was used to test. The results of the One-way ANOVA test analysis are shown in Table 4.5.

Table 4.5: One-way ANOVA test Results of University Students' Technological Unemployment Anxiety Levels by GPA

Grade Point Average	N	X	SD	SV	Sum of Sq.	df	Mean of Sq.	F	p	Sig.
<1.49 (1)	2	2.91	1.41	B. Group	1.296	4	.324	.619	.649	-
1.5 – 2.49 (2)	49	2.54	.823	W. Group	171.0	327	.523			
2.5 – 2.99 (3)	124	2.56	.712	Total	172.3	331				
3.0 – 3.49 (4)	112	2.47	.654							
3.5 – 4.0 (5)	45	2.42	.777							
Total	332	2.51	.721							

When Table 4.5 is examined, University students' technological unemployment anxiety levels do not differ significantly according to their GPA *(F=.619; p>.05).*

These results show that the fourth hypothesis of the research, "University students' technological unemployment anxiety levels differ significantly according to their GPA," is rejected, and the null hypothesis is accepted.

4.5. Research Question 5

For the fifth question of the research, " Do university students' technological unemployment anxiety levels significantly differ according to their year of the study?", and for the fifth hypothesis of the research, "University students' technological unemployment anxiety levels differ significantly according to their year of the study.", The One-way ANOVA test was used to test. The results of the One-way ANOVA test analysis are shown in Table 4.6.

Table 4.6: One-way ANOVA test Results of University Students' Technological Unemployment Anxiety Levels by Year of the Study

Year of Study	N	X	SD	Source of Variance	Sum of Sq.	df	Mean of Sq.	F	p	Sig.
1.Year (1)	67	2.55	.730	B. Groups	1.004	3	.335	.641	.589	
2.Year (2)	32	2.36	.686	W. Groups	171.29	328	.522			
3.Year (3)	81	2.49	.683	Total	172.30	331				
4.Year (4)	152	2.54	.746							
Total	332	2.51	.721							

When Table 4.6 is examined, University students' technological unemployment anxiety levels do not differ significantly according to their year of the study *(F=.641; p>.05)*.

These results show that the fifth hypothesis of the research, "University students' technological unemployment anxiety levels differ significantly according to their year of the study," is rejected and the null hypothesis is accepted.

CHAPTER V

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

In this section, the study's findings are discussed and compared with other studies in the literature. Moreover, suggestions were made based on the findings obtained from the research and other studies in the literature.

5.1. Conclusion and Discussion

5.1.1. Conclusion and Discussion for Research Question 1

According to the findings obtained as a result of the analysis of the first and main question of the research, "Do university students' general attitudes towards artificial intelligence significantly affect their levels of technological unemployment anxiety?," it was seen that students' general attitudes towards AI significantly predicted their technological unemployment anxiety and among its variables a significant inverse relationship was discovered, that is, as university students' positive attitudes towards artificial intelligence increased, their technological unemployment anxiety decreased. There are some studies in the literature that support this finding. In their study, Kaya et al. (2022: 497) concluded that "there is a significant negative relationship between people's positive attitudes towards AI and their development of anxiety towards AI and job replacement anxiety." In other words, it has been observed that as people's positive attitudes toward AI increase, their job replacement anxiety decreases. Another study supporting the findings of the research was conducted in the USA. According to the findings of the research, it has been determined that those who are afraid of technology develop more anxiety and have fears about unemployment and financial insecurity than those who are not afraid. As a result, it has been seen that people in the US are concerned about technological unemployment due to technological developments, robotic developments, and automation systems (McClure, 2018: 139). In another study, it was concluded that most students have positive attitudes toward artificial intelligence and its applications, but it has also been observed that they have concerns about unemployment and ethical problems (Hadithy et al., 2023: 1). Although some other studies did not directly examine students' attitudes towards AI and unemployment anxiety, they reached some conclusions about the students'

perspectives on the unemployment problems that AI may cause. In a study conducted by Almaraz-López, Almaraz-Menéndez, and López-Esteban (2023: 1), it was concluded that the students studying economics, business, and management sciences are aware that artificial intelligence will have a great impact on the future jobs of the students and students in economics and business are largely concerned about the risk of job displacement. In another study, it is concluded that most students believe that AI technology will devastate their departments. At the same time, nearly half of the students believed that AI would replace doctors in some special departments (Allam and Eltewacy, 2023: 1). Looking at the results of the current research and other studies in the literature, it is seen that students' positive attitudes towards artificial intelligence reduce their unemployment anxiety. Moreover, it has been observed that most students are concerned that AI technologies may cause unemployment problems in their fields. The main reason for these concerns is that AI technologies have not yet been sufficiently added to students' current education. As suggested in other studies, AI technologies must be adapted to existing education curricula (Stewart, et al., 2023: 1).

5.1.2. Conclusion and Discussion for Research Question 2

According to the findings obtained as a result of the analysis of the second question of the research "Do university students' general attitudes towards AI significantly differ according to their gender?" it was seen that university students' general attitudes towards artificial intelligence show a significant difference according to their gender and male students' general attitudes towards artificial intelligence are more positive than female students' general attitudes towards artificial intelligence. Some studies in the literature support this conclusion, but there are also studies that discover no relationship between variables. In the research conducted by Lukić et al (2023: 1) to measure students' attitudes towards AI, they found that attitudes towards artificial intelligence differ depending on gender. It was observed that male students had higher scores than female students. These results support the current research. On the other hand, in another study, it was concluded that the relationship between students' gender and their attitudes was tested, and no significant relationship was discovered between the students' gender and their attitudes towards AI (Hajam and Gahir, 2024: 1). According to the findings from the current research and some studies in the literature, it has been observed that male students' attitudes towards AI are more positive than

female students. It can be argued that the main reason for this is that men, especially in countries such as Turkey, are more involved with business-oriented technologies.

5.1.3. Conclusion and Discussion for Research Question 3

According to the findings obtained from the analysis of the third research question, "Do university students' technological unemployment anxiety levels significantly differ according to their gender?" it was seen that university students' technological unemployment anxiety levels do not differ significantly according to their gender. Some studies in the literature comply with this conclusion, but there are also studies that discover relationships between variables. A study that supports current research results in the literature was conducted on university students in Turkey. According to the results of the research, it was concluded that the unemployment anxiety of the students did not differ significantly according to their gender, but male students had higher anxiety levels of unemployment anxiety than female students (Yasar and Turgut, 2020: 56). A study that had different results than the current research in the literature was conducted on university students in Turkey. According to the results of the research, it was concluded that the unemployment anxiety of the students differed significantly according to their gender, and it was concluded that male students had higher unemployment anxiety than female students (Surat and Ceran, 2020: 145). Studies in the literature have suggested that men's higher unemployment anxiety may be due to their exposure to more social pressure regarding work.

5.1.4. Conclusion and Discussion for Research Question 4

According to the findings obtained from the analysis of the fourth research question, "Do university students' technological unemployment anxiety levels significantly differ according to their GPA?" it was seen that university students' technological unemployment anxiety levels do not differ significantly according to their GPA. There is insufficient research on whether students' unemployment anxiety differs according to their grade point averages. Unlike the results of the current study, a study has been found to conclude that university students' unemployment anxiety differs significantly according to their GPAs. In their research on 139 students from different departments, researchers concluded that students' unemployment anxiety differed significantly according to their GPA. It was seen that students with lower GPAs (1.01 - 2.00) experienced lower unemployment anxiety than students with higher GPAs (2.00 - 4.00)

(Surat and Ceran, 2020: 145). Under normal circumstances, based on the assumptions that students with high GPAs are more likely to find a job and see themselves as more successful, it can be expected that students with high GPAs will have lower unemployment anxiety, but according to the results of the research in the literature, there has been seen an opposite relationship. Moreover, the current study could not discover a significant relationship between the variables.

5.1.5. Conclusion and Discussion for Research Question 5

According to the findings obtained from the analysis of the fourth question of the research, "Do university students' technological unemployment anxiety levels significantly differ according to their year of the study?" it was seen that university students' technological unemployment anxiety levels do not differ significantly according to their year of the study. There are few studies examining this relationship in the literature. The research conducted on 402 students at Ege University concluded that there is a positive and significant relationship between students' approaching their final year and their unemployment anxiety (Kıran, Karaca, and Bali: 2022: 1016). Unlike the current research, the results of this research show that students may experience more unemployment anxiety as they approach their final year. It seems significant that as students approach business life and are aware that they will work after graduation, their anxiety levels increase compared to their previous years.

5.2. Recommendations

After evaluating the results of the current study and comparing them with the studies in the literature, it was seen that the studies in the literature supported some of the results of the current study, while some of the results were different from the results in the literature. Considering the results of the current study and other studies in the literature, the following suggestions have been made for curriculum makers, universities, and other researchers:

1. Conferences and congresses can be organized at universities to make university students' attitudes toward artificial intelligence more positive.
2. Existing student curricula and courses can be arranged to include artificial intelligence tools in line with the rapidly changing technologies in the business world, especially artificial intelligence-supported technologies.

3. To reduce students' technological unemployment anxiety, universities can enter into orientation-oriented collaborations with various institutions, organizations, and companies, allowing students to gain insight into their jobs' transformation.
4. The government can issue student-focused project support and incentives to improve students' attitudes towards artificial intelligence.
5. State and foundation universities can offer students new departments shaped according to developing technologies and especially artificial intelligence transformation.
6. Other researchers may conduct qualitative research to examine students' attitudes toward artificial intelligence in different dimensions.
7. Other researchers may research whether students' attitudes towards artificial intelligence and unemployment anxiety differ according to the departments they study and the universities they study at.

5.3. Summary of Conclusion and Discussion

When the findings of the research were examined, it was seen that students' general attitudes towards AI significantly predicted students' technological unemployment anxiety and among its variables a significant inverse relationship was discovered, that is, as university students' positive attitudes towards artificial intelligence increased, their technological unemployment anxiety decrease. This result of the research was compared with the research in the literature and it was concluded that many other studies in the literature support the result of the current research. and in line with this result, some recommendations are given in the recommendations section, based on other research, in order to make students' attitudes towards artificial intelligence more positive. The research also examined whether students' attitudes towards artificial intelligence differed in terms of their gender, and it was observed that male students had a more positive attitude. This result of the research was compared with the studies in the literature. Although some studies in the literature support the result of the research, there are also studies that reach different results. In other questions of the research, it was examined whether the technological unemployment anxiety levels of university students differ according to gender, grade point average and the year they study, but it was revealed that the students' technological unemployment anxiety did

not show a significant difference based on these three variables. These results were compared with the studies in the literature and it was seen that although some studies supported the results of the research, there were also studies that reached different results. The results of the research and the results in the literature were evaluated and some suggestions were made in line with these results.

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APPENDIX

The Questionnaire

Exploring University Students' Attitudes Toward Artificial Intelligence: The Relationship Between Perceptions of AI and Technology-Induced Unemployment Anxiety

Dear Participant,

You have been invited to this research conducted by Burak SAKALOĞLU under the consultancy of Assoc. Prof. Dr. Haşmet GÖKIRMAK. You are asked to spend approximately 10 minutes on the research. Participating in this study is completely voluntary. All the things expected from you for the study to achieve its purpose, fulfilling all questions sincerely, completely, without anyone's pressure or guidance, and in the most appropriate way for you. By reading and approving this form, it will mean that you agree to participate. However, you also have the right not to participate or to stop working at any time after participating. The information obtained from this study will be used entirely for academic and research purposes and will not be used for other purposes. Your information will be kept confidential. In research since personal data will be collected, Personal Data Protection Law No. 6698 and all necessary measures to protect personal data under the relevant legislation will be taken. If other than this information given about the research, you need more information now or later, you can contact, ask to the researcher at the e-mail address; burak.sakaloglu@std.izu.edu.tr.

Personal Information Form	
1. Age	…….
2. Gender	( ) Male ( ) Female
3. University	……..
4. Department	……..
5. Grade Level	( ) 1. ( ) 2. ( ) 3. ( ) 4.
6. Grade Point Average	( ) 3.5 - 4.0 ( ) 3.0 - 3.49 ( ) 2.5 - 2.99 ( ) 1.5 - 2.49 ( ) <1.49

The General Attitudes towards Artificial Intelligence Scale (GAAIS)							
Answering Guide – 1 After reading the 12 items (1 to 12) below carefully, answer the statements most appropriate to you between 1 to 5. 1= Strongly disagree, 5= Strongly agree.		(1) Strongly disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly agree
1	For routine transactions, I would rather interact with an artificially intelligent system than with a human					
2	Artificial Intelligence can provide new economic opportunities for this country.					
3	Artificially intelligent systems can help people feel happier.					
4	I am impressed by what Artificial Intelligence can do.					
5	I am interested in using artificially intelligent systems in my daily life.					
6	Artificial Intelligence can have positive impacts on people's wellbeing.					
7	Artificial Intelligence is exciting.					
8	An artificially intelligent agent would be better than an employee in many routine jobs.					
9	There are many beneficial applications of Artificial Intelligence.					
10	Artificially intelligent systems can perform better than humans.					
11	Much of society will benefit from a future full of Artificial Intelligence.					
12	I would like to use Artificial Intelligence in my own job.					

The General Attitudes towards Artificial Intelligence Scale (GAAIS)						
Answering Guide – 2 After reading the 8 items (13 to 20) below carefully, answer the statements most appropriate to you between 1 to 5. 1= Strongly agree, 5= Strongly disagree.		(1) Strongly agree	(2) Agree	(3) Neutral	(4) Disagree	(5) Strongly disagree
13	Organisations use Artificial Intelligence unethically.					
14	I think artificially intelligent systems make many errors.					

15	I find Artificial Intelligence sinister.					
16	Artificial Intelligence might take control of people.					
17	I think Artificial Intelligence is dangerous.					
18	I shiver with discomfort when I think about future uses of Artificial Intelligence.					
19	People like me will suffer if Artificial Intelligence is used more and more.					
20	Artificial Intelligence is used to spy on people.					

Technological Unemployment Anxiety Scale						
Answering Guide – 3 After reading the 12 items (1 to 12) below carefully, answer the statements most appropriate to you between 1 to 5. 1= Strongly disagree, 5= Strongly agree.		(1) Strongly disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree
1	I think I will lag behind in terms of performance as technology advances.					
2	I do not feel comfortable using the technologies such as the internet and smartphones.					
3	I do not think I will be able to improve myself aptly so that I can adapt to technological advances.					
4	I find it difficult to adapt to the systems I use while doing my job.					
5	I think that the change in the business processes due to the technological advancements will make me unhappy in the future.					
6	I think that the continuous improvement of the systems used in the workplace will reduce the need for me over time.					
7	I think my business life will become shorter as a result of the technological advancements.					
8	As a result of the continuous advancement of technology, I think my current job description will change in a way that will affect me negatively.					

9	I am worried that I may spend the rest of my life as unemployed due to the new technologies.					
10	I think that the education I have received at school will be invalid due to technological advances.					
11	I think that technological advances may cause the organization I am working for to close down in the future.					
12	I think that technological advancements can completely eliminate the business line I have trained.					

CV

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A. EDUCATION

Postgraduate: Istanbul Sabahattin Zaim University, MBA, Department of Business Administration. - 2024

Undergraduate: : Istanbul Sabahattin Zaim University, Faculty of Humanities and Social Sciences, Psychology. – 2022

Istanbul Sabahattin Zaim University, Faculty of Business and Management Sciences, Business Administration.- 2021

B. EMPLOYMENT

2017-2024 Building Contractor