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Research Article

Present and Future of Artificial Intelligence: A Case Study on Prospective Teachers

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Abstract: This study investigates prospective teachers' perspectives on the present status of artificial intelligence (AI) and their predictions regarding its future development. The study utilized a case study approach to select a group of 64 prospective teachers from the faculty of education at a state university in Türkiye. The study participants comprised 34 female and 30 male prospective teachers. The researchers employed a purposive sampling technique, specifically the criterion sampling approach, to select the prospective teachers included in the study. The researchers collected data for the study using the "AI Perception Interview Form" and the "AI Future Foresight Determination Form," and then analyzed the data using descriptive and content analysis techniques. The results showed that prospective teachers obtained information about AI primarily from social media, internet/news websites, and applications. Analyzing the definitions and explanations provided by the prospective teachers revealed that they particularly emphasized the uploading of human intelligence to computer systems, the acquisition of human-like abilities by machines, and the ability of AI to learn independently. Additionally, prospective teachers identified health, education, accounting, and finance as domains with significant potential for the advancement of AI. In education, the initial applications prospective teachers thought AI could be used for included determining students' mental states, assessing student levels, and providing personalized content. The data obtained from the study indicate that prospective teachers produced both utopian and dystopian content regarding the future of AI. This production of varied content reveals that prospective teachers have diverse perspectives on the future of AI.

Keywords: Prospective Teachers, Artificial Intelligence, AI Perceptions, Education, AI Future Predictions

1. Introduction

Artificial Intelligence (AI) is a computer technology that mimics human cognition and can work faster and more effectively than human intelligence in some areas. Gondal (2018) states that AI can perceive, interpret, learn, and infer the essential characteristics of human intelligence. Human intelligence continues to surpass AI at present. However, it is seen that AI works faster and more effectively than the human brain in solving complex tasks and under rapidly changing conditions (Teng, 2019). According to the definition provided by Obschonka and Audretsch (2020), AI can be summarized as the ability to solve complex problems and adapt to changing conditions using human intelligence's reasoning and prediction abilities. Although AI is a term coined by McCarthy in 1956 (Ertel, 2011), there has been a rapid increase in the number of studies in this field. Singh et al. (2013) stated that AI has various skills, such as performing in specialized areas, problem-solving, natural language communication, and object recognition. In this context, AI functions as a computer brain and is considered a branch of science representing studies in this field. Since 1956, AI has been developing rapidly, and this development process will continue rapidly in the coming years in line with technological advances. According to Boucher (2019), the three prominent concepts of AI are artificial general intelligence that is not limited to specific fields, artificial superintelligence that exceeds human intelligence, and AI that becomes autonomous. These concepts allow for predicting the future development of cognitive abilities where AI can surpass human intelligence. AI is used in many areas, including communication, digitalization of business and transactions, rapid access to information, health, and security (Komalavalli et al., 2020).

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AI influences our lives through its functionalities, including perception, self-learning, and decision-making. In the near future, it is anticipated that AI will further enhance human existence and assume a more prominent role in daily affairs. However, these developments also bring along some concerns. In particular, concerns about the privacy and use of data collected as AI occurs in all areas of life are increasing (Oliveira et al., 2020). There are also concerns about the uncontrolled use of AI, increased unemployment, and increased war casualties (Fast & Horvitz, 2017). In particular, the potential of AI to replace humans in the labor market is one of the most debated issues today.

Although it is not possible to make a definite prediction about of the future AI, it is possible to make predictions by looking at the realization of predictions made in the past. For example, in 1957, Simon predicted that computers would become chess champions within ten years. Similarly, in 1973, Oscar Firschein and SRI engineers made predictions about the release dates of certain products in consultation with AI experts. They offered the possibility of changing these predictions with the Delphi method (Firschein et al., 1973). One of the most essential points where advanced technology differs from traditional technologies is that a more efficient production process becomes possible by using fewer production inputs such as labor, natural resources, and energy. A significant portion of the investments made, especially in developed countries, are realized as investments involving advanced technology, and this trend is expected to continue in the future (Taşkın & Adalı, 2004, p. 140). This shows that highly critical technology such as AI will become more widespread and record a significant development.

AI studies have made significant progress in the last two decades. With the applications of AI, situations and events considered very difficult in the history of humanity can be faced today without difficulty (Acar, 2020). Looking at the applications of AI in human sciences, there is a general belief that AI only enables the control of machines or robots. However, unlike this belief, with the increase in social media platforms such as Instagram, Facebook, and Twitter, which turn people's behavior and the movements of society into data, changes occur in the methods and processes of individuals communicating and interacting, acquiring and disseminating information. Consequently, there is a discernible rise in the efficacy of AI observed in studies conducted within fields categorized as human sciences and social sciences. It is possible to predict who will reshare a post shared on Twitter based on author, text and content-based features (Xu & Yang, 2012, p. 48). It is possible to diversify applications similar to this example. It seems possible to encounter the information provided to individuals by tracking the traces on websites in every field. An AI application that takes people to a desired address from the most convenient route, such as offering various individual suggestions with the information obtained from previous purchases in the virtual environment, makes people's lives more accessible in terms of spending less time and effort (Sarıel, 2017, p. 22). Access to information becomes easier through AI, and sharing and accessing existing materials, especially in educational applications, with this system becomes much more accessible. However, this is only possible for individuals who can access systems using AI.

Human-AI interaction is a solution or collaboration that can help people worldwide. Therefore, current technologies can inspire people to use AI for education and training. It can motivate students and teachers to be more involved in learning and teaching. The Encyclopedia of Science, Technology, and Ethics (Kelley & Knowles, 2016) refers to AI as "the hybridization of man and machine". In addition, AI refers to semi-robotic human beings who aim to make the human body more qualified and biologically superior (van Hooijdonk, 2017). Complex computing systems using machine learning algorithms and AI can help individuals with different abilities. They are also involved in some human-like processes and can perform complex tasks in teaching and learning. This interaction between humans and machines is a breakthrough in helping humans acquire knowledge and memorize.

Studies in AI play a significant role in developing intelligent systems that produce solutions to a specific problem by modeling the most intelligent beings (Coppin, 2004). AI is a field of study based on human intelligence, and one can imitate it through computers and generate products in different areas of daily life. With AI, it is possible to develop computer systems that artificially produce intelligent thoughts and behaviors of beings in nature (Aydın, 2017; Balaban & Kartal, 2015). In addition, AI technologies have

come to the forefront in many areas of life with the ability of artificial neural networks, which are included in the concept of AI, to produce solutions to events that have never been encountered before by learning from the available data (Atasoy, 2012, p. 39; Yılmaz, 2012, p. 34). These technologies, which are included in our daily lives in almost every field, such as health, security, software, and communication, are also used in the field of educational technology, as stated in the 2018 higher education version of the NMC (New Media Consortium) Horizon Report (Becker et al., 2018). In this direction, many countries, such as Russia and China, have gradually started integrating AI technologies into education (Nabiyev & Erümit, 2020). In Türkiye, under the coordination of the Digital Transformation Office, which serves under the Presidency of the Republic of Türkiye, various projects are being prepared regarding AI in institutions/organizations serving in the field of education, such as the Ministry of National Education, YÖK, and universities. Efforts are being made to put these projects into practice. These projects cover digital classrooms, lifelong learning approaches, talent hunting for qualified human resources, and new education models (Tamer & Övgün, 2020). As one of the first applications in this context, MoNE launched the EBA Assistant application to instantly meet the needs of students and their parents enrolled in distance education courses. This situation again shows the need for AI-based online education applications in special situations such as the COVID-19 pandemic. In contemporary times, unique circumstances such as the pandemic have necessitated the implementation of distance education for educational and training processes, leading to a widespread transition to digital learning environments within this domain. The technical revolution in this field (Nabiyev & Erümit, 2020), consisting of internet networks with high connection speed, AI, big data, and cloud services, is essential in transitioning to the digital environment.

Many countries are actively pursuing the integration of AI technologies into education. The objective of these endeavors is not to supplant teachers in the educational sphere but rather to liberate them from mundane tasks, enhance the professionalism, engagement, and enjoyment of lessons, curate the most suitable teaching materials for particular student demographics, and foster lasting learning experiences by simplifying the learning process (Nabiyev & Erümit, 2020). In addition, studies on integrating AI technologies into the educational process and creating online learning environments with these technologies can be used to identify student dynamics based on student's learning experiences and to support students' learning processes within the framework of these variables. In this direction, AI technologies are suggested as an assistant for the teacher in the learning process. For the teacher to benefit from AI technologies while organizing the teaching process, he/she should have knowledge and awareness about these technologies. In recent literature, there has been an emergence of studies investigating the utilization of AI within higher education (Khare et al., 2018; Popenici & Kerr, 2017; Taşçı & Çelebi, 2020). For instance, Taşçı and Çelebi (2020) specifically examined the implementation of AI technologies in higher education settings. They discussed how these institutions can prepare for the future with AI technologies. In another study, Khare et al. (2018) researched the adoption of AI technologies in education, considering technological, social, political, economic, cultural, and ethical variables. Popenici and Kerr (2017) investigated the impact of AI technologies in higher education, focusing on their effects on students' learning styles, teaching processes within educational institutions, and the evolution of these processes.

The rapid development of technology is intensifying the influence of AI and automation across nearly every facet of work and daily life. Consequently, the field of education is undergoing an inevitable transformation amid this period of change. The development of AI plays a role in supporting and shaping educational processes. However, in this process, it is critical that prospective teachers, who will raise the future generations, have knowledge about AI and can use this technology effectively in education. Considering that teachers are individuals who directly impact the future of society, the adaptation of prospective teachers to current technology as the cornerstones of the education system and their ability to use technology effectively play a critical role in shaping students' future. AI, popular among current technologies, enables learning-teaching environments to become more effective, better understand student needs, and create personalized learning experiences. AI systems can analyze student data to personalize learning experiences based on each student's strengths and weaknesses, making learning

more efficient and tailored. Additionally, AI automates the assessment of exams and assignments through natural language processing (NLP), reducing the workload of teachers and providing quicker, more consistent evaluations. AI-powered virtual assistants offer 24/7 support to students, answering questions and aiding in their learning processes, thus fostering independent learning skills. Furthermore, AI utilizes big data analytics to monitor and analyze learning behaviors, helping educators and administrators track student progress and optimize educational strategies.

In classroom management and lesson planning, AI assists teachers by analyzing student participation and performance, offering insights and recommendations to enhance teaching methods and classroom dynamics. In STEM education, AI provides innovative tools and applications, such as simulations and modeling, allowing students to grasp complex scientific concepts more effectively. Moreover, AI can assess and enhance students' emotional intelligence and social skills by analyzing their emotional states and social interactions, providing feedback to improve their social engagement. These advancements underline the importance of prospective teachers being well-versed in AI technologies to effectively integrate them into their teaching practices and better prepare students for the future.

Examining prospective teachers' interpretations, knowledge sources, and areas of growth concerning AI is crucial for the future of the education system and for preparing them to navigate this transformation. Such investigations can aid prospective teachers in enhancing their proficiency in technology-related domains and formulate strategies for efficiently integrating AI in education. Additionally, it can bolster the competitiveness of prospective teachers in the job market by ensuring they are better prepared for their post-graduation careers. This, in turn, contributes to economic and social advancement at both individual and societal levels. Empowering prospective teachers with knowledge and competencies related to AI will fortify the prospects of students by equipping them to leverage technology effectively in their educational journeys. This endeavor is pivotal in fostering a more sustainable future for society. Therefore, the exploration of AI education holds paramount significance, and endeavors in this realm should be endorsed and incentivized.

It is widely believed that prospective teachers, who will play a crucial role in shaping the future of education and training, should possess a comprehensive understanding of the concept of AI and be cognizant of its potential applications. It is essential to reveal prospective teachers’ awareness of AI and to determine their predictions about how it will be used in education. By determining the current situation of AI in terms of prospective teachers and investigating the predictions for the future of AI, it can be ensured to determine the awareness of AI as well as to reveal the predictions about the development process of AI. Understanding prospective teachers' awareness of AI (AI) and their predictions regarding its future applications in education is paramount. As educators-to-be, their perceptions of AI will significantly influence how they integrate technological advancements into their teaching practices and shape the learning experiences of future generations. By examining the current landscape of AI awareness among prospective teachers and delving into their forecasts for its educational utilization, we aim not only to gauge their comprehension of AI but also to uncover insights into the trajectory of AI development within educational contexts. In essence, this investigation seeks to bridge the gap between theoretical understanding and practical application, shedding light on the evolving role of AI in education and empowering prospective teachers to harness its potential effectively.

This study investigated the perspectives of prospective teachers regarding the concept of AI and their forecasts regarding its future implications. Within the framework of this purpose, the sub-objectives of the study are as follows:

1. What are prospective teachers' sources of information about AI?

2. What are prospective teachers’ definitions/explanations regarding AI?

3. What are prospective teachers' thoughts about the development of AI in the future?

4. What are prospective teachers' thoughts about the use of AI in education?

5. What are prospective teachers' predictions of AI?

2. Method

2.1. Research model

In the study conducted to determine prospective teachers' awareness of the current situation of AI and their predictions of AI, the case study method was used. The case study is a research method that describes a current phenomenon or existing situation within its conditions (Cohen et al., 2007; Yin, 2009). In addition, a case study is a methodological approach that involves an in-depth examination of a limited system using multiple data collection to collect systematic information about how that system functions and works (Chmiliar, 2010). Merriam (2013) defines a case study as an exhaustive depiction and analysis of a constrained system. Conversely, according to Creswell (2007), a case study constitutes a qualitative research methodology wherein the researcher scrutinizes one or more time-bound situations extensively, utilizing various data collection instruments (such as observations, interviews, audiovisual materials, documents, and reports) involving multiple sources. Through this process, the researcher elucidates situations and themes pertinent to the context under investigation. In light of the aim of this study to systematically gather data elucidating prospective teachers' perspectives on the current landscape of AI and their prognostications regarding its future trajectory, the case study method is deemed appropriate for the nature of the inquiry.

2.2. Participants

The study group, which was conducted using the case study method, consisted of 64 prospective teachers studying at the faculty of education of a university in the Marmara Region of Türkiye in the 2023-2024 academic year. Of the prospective teachers in the study, 34 were female, and 30 were male. The participants included in the scope of the study are indicated with codes (P-1, P-2...) according to the order. The "criterion sampling" approach, one of the purposeful sampling methods, was preferred in determining the prospective teachers who took part in the research study. The basic understanding of the criterion sampling method is to study all situations that meet a set of criteria determined by the researcher or prepared in advance (Yıldırım & Şimşek, 2011). In studies where criterion sampling is preferred, observation units can be formed of people, events, or situations with certain qualities. In this case, the units corresponding to the criteria determined for the sample are included in the sample (Büyüköztürk et al., 2014). In the selection of prospective teachers to be included in this research, their qualifications were taken into consideration and the basic criteria were that the candidates had taken courses on AI or participated in a training program on AI.

2.3. Data collection tools

As a data collection tool in the study, the researcher developed the "AI Perception Interview Form" and the "AI Future Foresight Determination Form" in order to determine what the prospective teachers' sources of information about AI are, how they define AI, what their views on the development of AI are, what their thoughts about its use in education are, and what their predictions about of AI are. In the preparation phase of the forms, a literature review was conducted, and then the "AI Perception Interview Form" was created by utilizing the Çam et al. (2021) study. This form includes four questions regarding prospective teachers' definitions of AI, sources of information on AI, and their views on the development of AI and its use in education. The second data collection tool of the study, the "AI Future Foresight Assessment Form" was created based on the study conducted by Uymaz (2023) and was used to determine prospective teachers' predictions of AI. Within this form, prospective teachers are also requested to express their predictions about the future of AI either through drawing a picture or writing a story. The forms prepared by the researcher underwent scrutiny by two field experts: one specializing in measurement and evaluation and the other in linguistics. Following this review, the forms were refined and finalized based on the feedback provided by the experts.

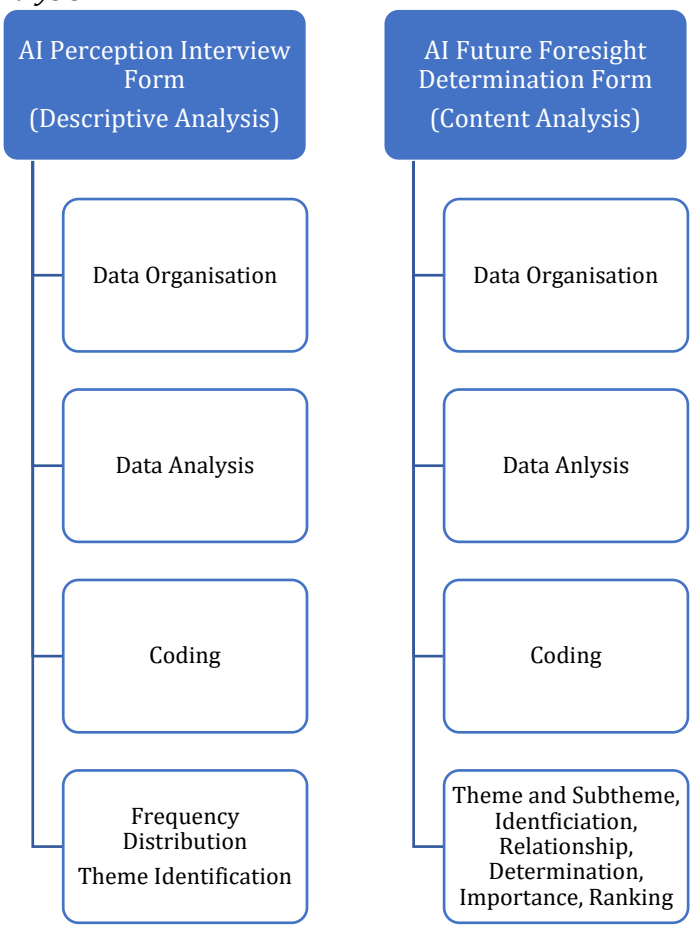
2.4. Data analysis

The data for this study were collected using the document analysis method. Document analysis is a qualitative research method that involves the systematic examination and interpretation of existing documents (Bowen, 2009). The data collected through the "AI Perception Interview Form" and the "AI Foresight Assessment Form" which were used to determine prospective teachers' views on AI, were analyzed using the descriptive analysis and content analysis methods (Figure 1).

The data obtained with the "AI Perception Interview Form" was analyzed with the descriptive analysis method. Descriptive analysis, a qualitative data analysis type, involves summarizing and interpreting the data obtained through various data collection techniques according to predetermined themes. The data collected with "AI Foresight Assessment Form" was analyzed using the content analysis method. Content analysis is a research technique for making replicable and valid inferences from data to their context. It involves systematic coding and categorizing of data to identify patterns, themes, and meanings. The primary purpose of this type of analysis is to present the findings to the reader in a summarized and interpreted form (Yıldırım & Şimşek, 2011). In descriptive analysis, a data analysis framework is established either based on the research problems or the conceptual framework of the study. This framework outlines how the data will be structured and presented. Subsequently, the acquired data are organized, and the findings are delineated. In the final stage, the findings are elucidated, linked, and given significance (Büyüköztürk et al., 2014). In this study, the data collected from prospective teachers were analyzed in alignment with the study's objectives and research questions. In order to increase the comprehensibility of the data obtained with the descriptive analysis method, examples from student responses were included in the findings section. The findings obtained within the framework of these examples are presented by establishing and interpreting relationships with studies on similar topics.

Figure 1

Process of Data Analysis



2.5. Validity and reliability

To ensure the validity of the study, various methods were employed, including researcher diversification, maintaining a prolonged study duration, and soliciting input from three experts both during the development of data collection tools and the analysis phase. Additionally, detailed descriptions and purposive sampling were implemented to enhance the external validity (transferability) of the study findings. Accordingly, documents were analyzed without alteration during the data collection phase, and academic literature pertaining to the study topic was thoroughly examined. The data derived from these analyses were comprehensively described to promote external validity and consistency of the study (Yıldırım & Şimşek, 2011).

Expert opinions were sought from two researchers to assess the reliability of the categories and subcategories developed throughout the study. Subsequently, the codes and themes were cross-referenced with the categories independently generated by two researchers through a separate content analysis. The comparative reliability of the coders was calculated using Miles and Huberman's (1994) formula [Consensus / (Consensus + Dissensus) x 100], resulting in a reliability score of 90.3%. It is worth noting that a reliability score exceeding 70% is generally deemed satisfactory for research purposes (Miles & Huberman, 1994).

3. Findings

For the first sub-objective of the study, which focuses on "What are the sources of information that prospective teachers used in order to acquire information regarding AI?" the responses provided by the prospective teachers are presented in Table 1. In this analysis, the suitability of features was promptly observed by prospective teachers due to the diversity of sources noted in the total number of responses.

Table 1

Distribution of Information Sources Used by Prospective Teachers on AI

Information Resources	**f**
Social Media	23
Web/News Web Sites	20
AI Applications	15
Research Article	8
Books	6
Friends	6
Training Programs on AI	5
YouTube	5
Movies/Series	4
Magazines	3
Chatbots	2
Secondary Schools	1
Television	1
Total	**93**

When the data in Table 1 regarding the sources of information used by prospective teachers regarding AI are examined, it is seen that 23 prospective teachers mentioned social media, 20 prospective teachers mentioned internet/news sites, and 15 prospective teachers mentioned AI applications. In addition, prospective teachers' sources of information about AI include books, friends, and training programs on AI.

Within the scope of the second sub-objective of the study, "What are the prospective teachers' definitions/explanations regarding AI?" Regarding the study question, prospective teachers define AI as having computer systems perform the activities that human intelligence can perform, enabling machines to perform features such as acquiring information, thinking and perceiving with high performance, computers performing problem-solving tasks, simulation of programmed human intelligence, systems that imitate human intelligence, and the ability to perform tasks such as obtaining information, thinking and perceiving with high performance. A set of systems that try to give the appropriate answer, programs that enable the work, tasks and activities of the information loaded into the machines to be carried out quickly, the development of coded systems with machine learning, programmed algorithm technology to display human-like thinking abilities, stimulating learning and creativity abilities in the computer environment, people. It has been determined that digital intelligence is defined as the computer's ability to perform tasks such as learning, problem-solving, language understanding, image recognition, and decision-making. Regarding their definition of AI, P-25 stated that *"AI is a field of technology and science that conducts research to transfer the activities that human intelligence can perform to computer systems."* P-24 defined it as *"the ability of machines to perform features of natural intelligence such as acquiring information, thinking and perceiving with a high performance."* P-6 *"A computer or robot learns like a human and performs tasks such as problem-solving",* P-8 *"AI is the simulation of human intelligence programmed to think, respond and learn like humans.",* P-63 *"AI is the simplest way to perform certain tasks." "AI is a set of systems that give the most appropriate response to the inputs given and try to update themselves with the information they collect and give better results",* P-46 *"They are systems that imitate human intelligence to fulfill their needs and improve themselves by repeating the information they collect." Programs that enable the information loaded into machines to perform various jobs, tasks, and activities more quickly and practically,* P-60 *"AI coded systems gradually develop with machine learning and become AI",* P-53 *"AI performs certain tasks." "A technology that includes programmed algorithms to bring intelligence or display human-like thinking abilities",* P-62 *"AI is the imitation of natural intelligence as computers or devices with similar processing power and reviving the learning and creativity abilities of humans in a computer environment"*, P-10 They defined it as *"AI is digital intelligence designed by humans",* and P-45 is *"AI simulates human-like intelligence features such as learning, problem solving, perception, understanding, language comprehension, and decision making."*

Regarding the third sub-objective of the study, "What are the thoughts of prospective teachers about the development of AI in the future?" The answers prospective teachers gave to the study question are shown in Table 2.

Table 2

Distribution of Prospective Teachers' Responses Regarding the Areas Where AI Can Develop

Development Area of AI	**f**	**Development Area of AI**	**f**	**Development Area of AI**	**f**
Healthy system	25	Library Services	2	R&D Studies	1
Education	24	Technology	2	Energy	1
Accounting and Finance	7	Software	2	Automation	1
Visual Arts	6	Mathematics	2	Cyber Safety	1
Automotive	5	Law	2	Informatics	1
Language Learning and Translation	5	Robotics	2	Engineering	1
Defense Industry	5	Psychology	2	Communication	1
Agriculture	4	Games	1	Business Administration	1
Production	4	Trading	1	Risk Assessment and Prevention	1
Transportation and Logistics	4	Service	1		
Security	3	Counseling	1		
Total					**119**

According to Table 2, prospective teachers who participated in the study, listed health comes first when it comes to areas where AI can develop. Followed by education, accounting and finance, visual arts, and automotive.

Regarding the fourth sub-objective of the study, "What are prospective teachers' thoughts about the use of AI in education?" The answers given by the prospective teachers to the study question are shown in Table 3.

Table 3

Distribution of AI-Supported Applications That Can Be Used in Education According to Prospective Teachers

Education Application	f	Education Application	f	Education Application	f
Determining students' mental states	5	Learning with fun	1	Recording information provided by the teacher	1
Identifying the student's level and providing personalized content	4	Learning with VR glasses	1	Robot assistant	1
Reinforcing the information learned	4	Developing activities based on curricula	1	Interactive book	1
Identifying missing learning	2	Determining readiness and preliminary information	1	Applications for special children	1
Evaluation of learning	2	Application integrated into the curriculum	1	Moral and ethical values	1
Survey-oriented application	2	Preparing activities according to students' learning styles	1	Create animation	1
Language development	2	Preparing a personal plan	1	Trial exam performance evaluation	1
Designing games that suit the student's interests	2	University voice assistant	1	Smart Assistant	1
Personalized progress tracking	2	An application for using Turkish correctly	1	AI coach	1
Hologram application	2	Repository application	1	Games for teaching mathematics	1
Application for visually impaired people	1	Creating visual and audio material	1	Getting to know the student	1
Homework app	1	AI applications that students can develop	1	Consistency between exams	1
AI assistant (introducing human organs)	1	An application that recognizes the student	1	Resolving meaning difficulties	1
Determining the teaching method according to the subject	1	Recycling Applications	1	Emotion Teaching	1
Visualization of novels and stories	1	Tablet notebook	1	Virtual school	1
Language learning application	1	Turkish teaching	1		
Total					**64**

According to Table 3, prospective teachers identified several primary applications for AI in education. These include determining students' mental states, assessing students' proficiency levels, and delivering personalized content. Additionally, teachers highlighted the importance of AI in reinforcing learned information and identifying gaps in learning.

Within the scope of the study, prospective teachers were asked to reflect on their predictions about what AI might be like in the future by writing a fictional story or drawing. The data evaluated separately as stories and pictures are given in Table 4.

Table 4

Predictions and Distributions of Prospective Teachers Regarding the Future of AI

Story/Picture	Utopian	Dystopian	Total
Story	34	18	52
Picture	9	3	12
Story and Picture	5	1	6
Total	**48**	**22**	**70**

According to the data obtained from Table 4, the participation level of prospective teachers regarding the future of AI is as follows: 52 participants wrote stories, 12 participants drew pictures, and 6 participants did both. The participants who wrote stories, submitted 34 utopian and 18 dystopian fiction, while among those who drew pictures, 9 focused on utopian and 3 dystopian objects. The ones who both write stories and draw pictures, submitted 5 utopian and 1 dystopian works. According to the data obtained within the scope of the study, a total of 70 data, 48 utopian and 22 dystopian, were determined. The analysis revealed that the prospective teachers who participated in the study tended to articulate more utopian narratives concerning the future of AI than dystopian ones.

P-3, one of the prospective teachers said the following about the future of AI *"Canan opened her eyes, took the chip plugged into the charger and placed it on her shoulder. He had been sick for the last two days, he checked the ideal menu from the phone application connected to the chip on his shoulder to find out what he should eat for dinner. He created the menu he wanted and headed to the kitchen. When he looked at the timer on the counter and saw how many minutes were left until the robot prepared the meal, he headed to the bedroom to put on his clothes. "The phone application that reviewed the weather forecasts listed clothing combinations suitable for the weather."* P-7 wrote the following short story: *"I am lacking energy today. So, he took energy pills. These pills help balance your hormones,give you energy and boost your mood I am too lazy to make decisions, so I asked Robotgpt, which records everything, ''What should I do today?'' Robotgpt gave me a few tasks. I wore my virtual suit and I simulated these tasks. Then I wanted to try the playroom I just bought to play games. "It is a room that Helps you experience everything in the game,including the smell of the virtual reality environment."* He wrote a story about the future use of AI in daily life. P-14 *"I woke up today with Hüsnü yelling at me. He was quite angry that it took me time to wake up. She tidied up the house and prepared my breakfast according to the amount of food I needed for the day and my body's needs. For no reason, I named the technology that controls all electrical appliances in our home as Hüsnü. I told him to wake up earlier than usual today because we were going to take a short tour in Spain with my friend. Since Hüsnü took care of the travel procedures, all I had to do was teleport to Spain. Since it is enjoyable to do this on Earth, I look forward to the days when I can teleport to nearby planets."* He wrote the followind story. P-23 *"I woke up early in the morning. Today was my first day on Venus. Actually, I have lived on many planets before, such as Saturn and Uranus, but I liked this place more. This place is a little farther from the planet Betelgeuse, where I worked. Helps you experience everything in the game, including the smell of the virtual reality environment. My job at a large company is to ensure that AI and societies can be logically placed on planets."* They wrote utopian stories about the future of AI.

P-37, one of the participants who wrote a dystopian story about the future of AI, said: *"2124 gives the impression of a year in which drones are not just observation tools, but the smallest thing we touch can turn into any weapon. The last efforts of humanity to protect the most natural elements of the world are related to both protecting nature and each other." "Humanity is probably facing its greatest struggles when working with robots."* He wrote the following story: P-38 *"Life flashed before my eyes: 'Critical adrenaline level, please contact the nearest health center.' While I was experiencing of all these, I heard a familiar*

voice. Ambulance siren. After a while, a small vehicle approached me. I did not have time to react and found myself lying down again. It got dark outside; I was being carried on a stretcher. My vision was going and coming and I could not understand the situation. Then, I heard a loud voice: "Subject RT-2124, test-8 failed as a result of future simulation." P-45 *"The people on the streets had different devices inserted in their heads and everyone was acting like they were connected to a machine and receiving commands from a command centre. Meteors were now passing through the sky and not occupying the ground. It was as if humans and robots had changed places, while the humans were emotionless and soulless, the robots were laughing, having fun, getting tired and sleeping."* They wrote dystopian stories about the future of AI.

The prospective teachers who participated in the study tried to predict the future of AI with both utopian and dystopian pictures. These pictures and stories have been analyzed and categorized by researchers and domain experts. The pictures drawn by the participants are included in the appendix of the study (Appendix-1). The picture drawn by P-54, one of the prospective teachers tried to reflect that there will be an artificial eye monitoring the living environment, the concept of peace will gain importance The air will be dirty. The picture drawn by P-55, Shows AI-powered robots causing trouble. As a utopian picture, P-56 tried to reflect the new generation's education system with AI. In the picture, he predicted that hologram conservation would achieve teacher-student interaction. P-58 also drawn a picture that corresponds to the fact that many of his daily needs can be met with the help of AI in the future. P-60 tried to reflect his predictions of AI by using objects such as holograms, drone cargo distributors, people living in the virtual world, flying high-speed trains, robot police, and personal flight devices.

4. Discussion, Conclusion, and Recommendations

According to results of the study conducted to examine prospective teachers' opinions and predictions about AI, it was determined that social media was their primary source of information from which prospective teachers obtained their information about AI. In addition to social media, internet/news sites, AI applications, and articles are among the sources used by prospective teachers to obtain information about AI. These results suggest that AI has become an indispensable part of life today and that societies are open to change and transformation. AI applications, which have developed rapidly in the last century, manifest themselves in every aspect of people's daily lives. For example, the spread of AI applications in areas such as phones, online shopping systems, navigation, and online banking transactions enables daily life to be transferred to virtual media. This indicates that AI likely changes individuals' lifestyles, ways of thinking, and perceiving (Özgeldi, 2019). In this context, it seems that social media platforms, especially channels such as Instagram, Twitter, and Facebook, are based on AI and play a decisive role in transferring daily life to virtual media. Therefore, the impact of AI is not only limited to technological infrastructure but also profoundly affects people's social interactions and daily lives. Data suggest that AI's importance and impact will gradually increase and will be used more in daily life (Altun, 2019).

As a result of the analysis regarding the second sub-objective of the study, it was found that prospective teachers were interested in AI, outsourcing the activities that human intelligence can perform to computer systems, enabling machines to perform features such as acquiring information, thinking, and perceiving with high performance, computers performing problem-solving tasks, simulation of programmed human intelligence, systems that imitate human intelligence, a whole of systems that try to give the most appropriate response to given inputs, and machines. Programs that enable the uploaded information to carry out work, tasks, and activities quickly, development of coded systems with machine learning, algorithm technology programmed to display human-like thinking abilities, revitalization of learning and creativity abilities in the computer environment, digital intelligence designed by humans, and computer learning. It was determined that they define/explain the ability to perform tasks such as problem-solving, language understanding, image recognition, and decision making. Prospective teachers mainly focused on uploading human intelligence to computer systems, machines gaining human-like abilities, and the self-learning feature of AI.

In this context, a relationship is observed between the "learnable" aspect of AI emphasized by Luckin (2017) and the conceptual approaches of prospective teachers. In addition, Aydin's (2017) definition of AI as a field of study that imitates human intelligence and develops products in various fields supports the perspective of prospective teachers. Similarly, the ability of AI technologies to imitate the intelligent behavior of creatures in nature and the ability of artificial neural networks to produce innovative solutions by learning from existing data reflect the evolutionary and advanced technological dimensions of prospective teachers' perceptions of AI. In this context, the study results shed essential light on prospective teachers' knowledge and perceptions about AI. It is also stated that AI can imitate intelligent behaviors in nature, and artificial neural networks can produce new solutions by learning from existing data (Aydın, 2017; Balaban & Kartal, 2015; Atasoy, 2012; Yılmaz, 2012). The study results show that prospective teachers' conceptual frameworks regarding AI have developed in line with the technology's current potential and the literature's definitions.

When prospective teachers' opinions about AI are examined in line with the third sub-objective of the study, it seems that AI is expected to affect the developments in the field of health primarily and also be effective in fields such as education, accounting, finance, and visual arts. When these opinions are evaluated according to the literature findings, various AI technologies are presented in different sectors, as stated by Cibaroğlu and Yalçınkaya (2019). However, it is noted that AI technologies in higher education are not extensively adopted, particularly in the realms of education and health services (Bughin et al., 2017). At this point, prospective teachers advocate for further use of AI, especially in education, because of their accurate analysis of the needs in their profession and their understanding of the importance of these technologies to increase the quality of education. As emphasized by Tekgüç and Adalıer (2019), teachers should use AI technologies to structure appropriate learning processes by analyzing the individual needs of students. In this context, prospective teachers' perceptions of AI highlight its potential for use in education and offer an essential perspective on changes in future education processes.

When prospective teachers' opinions about AI are examined within the scope of the fourth sub-objective of the study, it is stated that AI has a vast potential for use in education. It is suggested that AI technologies could be used primarily to determine the student's level, provide personalized content, determine mental states, and detect missing knowledge. In addition, prospective teachers emphasize that AI can be used effectively in teaching lessons, carrying out in-class applications, evaluating students individually, and eliminating their deficiencies. These views are also supported in the literature. For example, Sheikh (2020) suggests that AI can be applied in teaching to improve flexible and individualized learning. Similarly, Nabiyev and Erümit (2020) emphasized that AI technologies can be used in education as teacher assistants, ensure the evaluation of information, and offer personalized learning systems. In this context, it is suggested that learning platforms supported by AI technologies can be an effective tool for students to have individual learning experiences and personalize the learning process. In this regard, Elazab's (2023) view that individual information can be provided for each student with the help of AI systems and that a personalized learning style can be determined so that each student can learn according to his/her ability supports this study result.

Analyses made within the scope of the fifth sub-objective of the study revealed that prospective teachers produced utopia and dystopia content about the future of AI. However, the opinions in the literature stating that the concept of utopia should be understood correctly emphasize that utopia is not only the imagination of a perfect society but also a design that reflects the ideals and ideology of the individual (Ağkaya, 2016). It is suggested that the essence of the utopian idea is shaped by longing for the past and hopes for the future and intersects with the inevitability of progress. In this context, it is stated that the utopias that emerged in the 20th century are reflections of technological and social developments such as digitalization and AI. However, it is suggested that this progress brings with it some fears and dystopias emerge (Özsoy, 2018). It is suggested that the concept of dystopia, as the opposite of utopia, forms a basis of thought in which the interaction of social structure with technology and intellectual designs is discussed with scientific theories. In this context, it can be said that the contents produced by

prospective teachers about the future of AI draw attention to the hopes brought by technological progress, as well as the potential risks and threats it may bring.

The data obtained from the study show that prospective teachers produce both utopian and dystopian content about the future of AI. In the study, most participants preferred to write stories, and these stories primarily focused on utopian content. In particular, some participants describe the potential use of AI in daily life in a utopian way. However, a significant amount of dystopian content is also present. In addition to the story format, participants also drew pictures about the future of AI. The majority of the participants who chose drawing focused on utopian elements regarding the future of AI. In particular, some participants reflect on the positive effects of AI on education and daily life. On the other hand, the drawings also depict the possible dangers of AI. These results suggest that prospective teachers believe that AI will likely affect human life both positively and negatively in the future but the positive effects might be more significant.

The content diversity produced by the prospective teachers participating in the study about the future of AI is remarkable. The higher amount of utopian contents shows that participants generally view AI in a positive light. Nevertheless, there was also a significant amount of dystopian narratives, indicating that prospective teachers are cognizant of the potential risks associated with AI. This diversity of perspectives aligns with the findings of Ağkaya (2016), which emphasize the importance of considering various viewpoints in discussions concerning the future of AI.

This study was conducted to determine prospective teachers' views on the present and future role of AI (Al-Matari, 2023; Elazab, 2023; Göksel & Bozkurt, 2019; Özkaynak, 2020) and emphasizes the increasing importance of AI in education. The most direct result of the application of AI in education is the emergence of an intelligent teaching system. This system forms the basis of computer-assisted teaching and reveals an open human-computer interaction system. In addition, since it is student-centered and computer-based, it supports thinking processes with computer simulations. The field of AI applications in education, now called intelligence teaching systems, is gradually expanding. In this context, prospective teachers' perceptions of AI and its future role are essential in transforming education systems. For this reason, understanding the relationship between AI and education is considered an important issue that should be considered in the preparation process of prospective teachers and the design of educational programs.

The study reveals that prospective teachers mainly learn about AI from digital platforms such as social media. This shows that the role of AI in every aspect of daily life is increasing and that societies are open to change and transformation. When examining the opinions of prospective teachers regarding AI, their attention is primarily directed towards the potential and impacts of AI.

Based on the results of the research, the following recommendations can be made: Studies examining the practical applications of AI technologies in education are of great importance. In particular, more research should be conducted on AI-supported teaching methods, personalized learning experiences, and student assessment systems. Such studies can reveal how to optimize teaching processes by enhancing the effectiveness and efficiency of educational technologies. Additionally, long-term studies should be conducted to understand the effects of AI on education. Such studies can help evaluate the long-term impacts of AI on student achievement, the role of teachers, and educational processes. Finally, studies examining the ethical and social impacts of using AI in education should be increased. This can help us better understand the effects of AI on issues of fairness, equality, and privacy in education and provide guidance for the ethical use of AI technologies.

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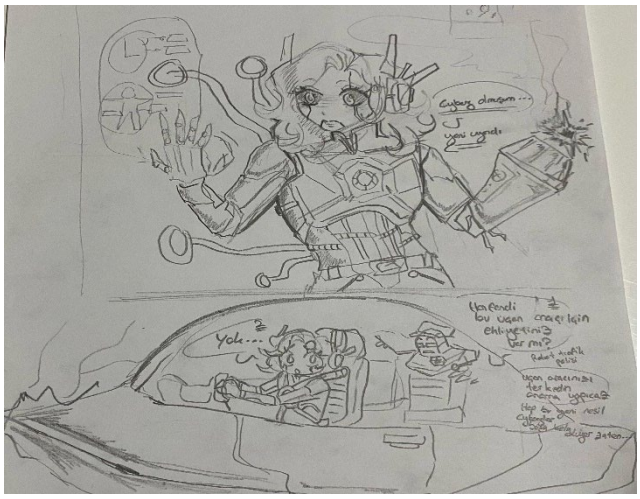
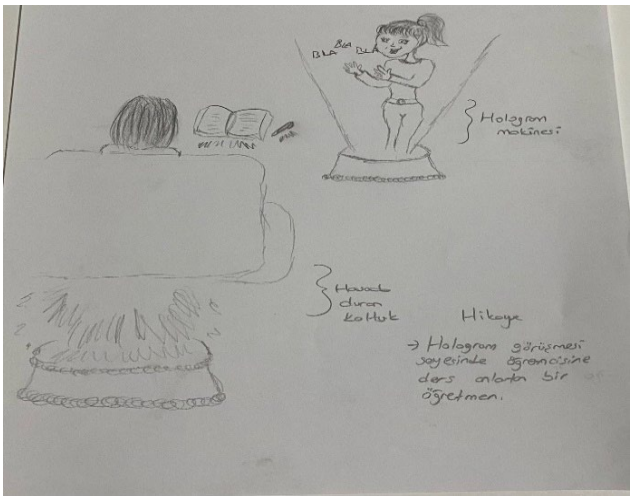
Appendix-1

Pictures drawn by the participants

P-54

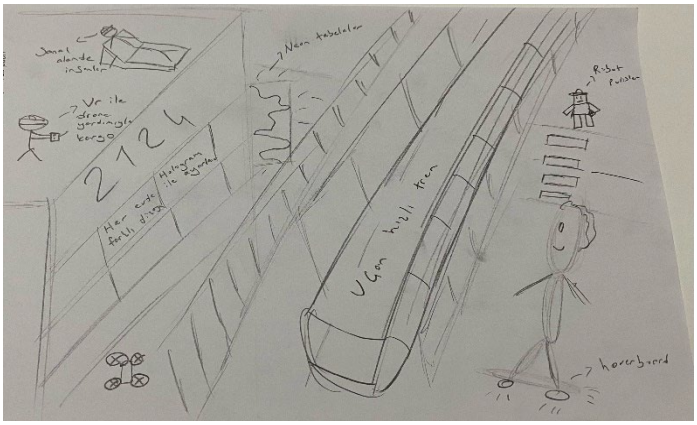


P-55



P-56

P-58



P-60

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