An Investigation of Pre-Service Science Teachers' Views on Artificial Intelligence Supported Instruction: A Qualitative Study

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Abstract: Today, with the advancement of technology, the use of artificial intelligence in education has increased. The aim of this study is to explore the views of pre-service science teachers towards artificial intelligence-supported teaching. The research was conducted using a phenomenological design, one of the qualitative research methods. The study group of this research consists of four pre-service science teachers from the fourth grade of science teaching at a university in Turkey in the spring semester of the 2024-2025 academic year. The data will be collected with a semi-structured interview form and analyzed by thematic analysis method. The data to be obtained contributed to understanding the pre-service teachers' use of artificial intelligence, their awareness of artificial intelligence- supported teaching, the advantages of using artificial intelligence applications in the course, pre-service teachers' views on their concerns about artificial intelligence and their level of competence to use the applications. This study aims to provide a pre-service teacher-centered perspective on artificial intelligence applications in science courses.

Keywords: Science education, Artificial intelligence, Pre-Service science teachers

Introduction

Scientific and technological innovations are advancing rapidly in today's world. These advances have prompted new approaches in the field of education and necessitated the integration of new software and applications. The increase in technologies used in education has enhanced the understanding and implementation of modern educational practices. The use of current technology is very important for the consolidation of these foundations. One such example artificial intelligence as an example to these technologies. Artificial intelligence is a technology based on computer science that imitates human intelligence (Williamson & Eynon, 2020). The concept of artificial intelligence was first presented by Jhon McCarthy, Marvin at the Dortmund conference in 1956 (Dergunova et al., 2022).

Artificial intelligence is designed to simulate human mind and intelligence to computer and machine systems (Yılmaz, 2024). In other words, artificial intelligence is the uploading of some features of humans to computers and machines. Artificial intelligence is a system in which human intelligence is developed to perform challenging tasks such as inference and perception. Rapid changes in technology and the dynamic nature of artificial intelligence make it difficult to clearly define the concept of artificial intelligence (Jiang et al., 2022). This situation has caused scientists to consider artificial intelligence from different perspectives and put forward different definitions (Temur, 2025). Artificial intelligence can be defined as artificial systems that can imitate human intelligence and fulfill various tasks assigned to it (Sheikh et al., 2023).

Artificial intelligence applications have caused significant changes in our daily lives. Artificial intelligence has intervened in every aspect of our lives. From agriculture to cleaning, from the kitchen to banking, from health to

security, etc. artificial intelligence has started to be used in every field. As AI has become increasingly important for professions, AI literacy has become just as important as other of types literacies (Casal-Otero et al., 2023). The integration of AI into educational settings has recently attracted interest as it can lead to changes in students' engagement and assessment practices (Mnguni, 2023). The nature of AI requires teachers to develop themselves to adapt to the competencies required for successful integration (Mnguni, 2025). Studies on teacher adoption of technology suggest that integration remains limited unless educators embrace these innovations and are confident in their ability to use them effectively (Ertmer, 2005).

Since 2000s, there has been an effort to popularize technology in schools. Computer classes were opened in schools and smart boards were brought to classrooms. In the studies conducted, artificial intelligence is widely used in general education applications that include all areas of education, and it is primarily utilized in computer education (Tekin, 2023). Diversities such as interdisciplinary applications with computer science, engineering disciplines, computer sciences, etc. are seen to be integrated with multiple disciplines and information from different branches for educational research (Duran & Aydın, 2024).

Generative AI has been seen to permeate the field of education (Lei Tao et al., 2025). Artificial intelligence, humanoid robots and chat bots, which have entered our lives with computer-related technologies in education, begun to take over some of the roles traditionally and performed by teachers (Chen et al., 2021). There are ongoing debates about whether digital education can ever replace face-to-face education (Alpaydın & Demirli, 2022). As a result of the research, a positive correlation was found between teachers' perceptions of usefulness and their intention to use technology (Öz, 2022). In developed countries, the relationship between technology and education relations have been effectively managed in order to create qualified manpower (Yılmaz, 2023). Recognizing and incorporating teachers' perspectives on education can help bridge the gap between the capabilities of AI systems and the actual expectations and needs of teachers (Shi et al., 2024). For teachers, generative AI technologies not only enrich the learning experience but also improve teaching efficiency (Kshetri, 2023). Erol (2023) emphasized that artificial intelligence technologies can be used in education to create learning content tailored to students' learning styles, abilities, and needs. In education systems using artificial intelligence, students' knowledge levels can be determined and content can be presented for them. This situation allows each student to learn individually according to the principle of student relativity. Artificial intelligence makes education fun, attracts attention more easily and makes learning more enjoyable (Solak et al., 2025). Alaybeyoğlu and colleagues (2024) noted in their studies that artificial intelligence technologies support making lessons more understandable while also reducing education costs. The study emphasized the idea that artificial intelligence systems and technologies will form the basis of the education system of the future.

The biggest competition between countries worldwide is seen as the development and progress in the fields of science and technology (Balçin, 2024). Science explores the universe and reveals its secrets in order to define and explain our world, and systematically examines all observable and unobservable events. We rely on science in nearly every aspect of our daily lives. In order to keep up with the changes in science and technology, we need to master science. For this adaptation, countries need to implement science education correctly. A nation strong in science, can advance in area such as health, defense and industry (Kayrakçı & Çelik, 2019; Restivo, 2005). A good science education should start in childhood. Children are very curious about the environment during this period. A constant sense of curiosity and the desire to explore cause them to gain new knowledge and skills. These discoveries, knowledge and accumulations increase their interest in science throughout their lives. Science education is important for children to understand and explore nature and to help them find the skills they have. Science education starts in the family and continues at school within the framework of a plan and program. Science teaches learning; on the other hand, it provides individuals with scientific and critical thinking skills to raise science literate individuals who question and research (García-Carmona, 2025).

With the rapid development of artificial intelligence, teachers need to keep themselves up to date about using artificial intelligence in the classroom. Students should be told about the possible pitfalls and advantages of AI (Uwosomah & Dooly, 2025). Training programs should comply with the principle of student relativity. Courses should provide content that meets the individual needs of students. Artificial intelligence offers resources to help meet all these needs. Artificial intelligence, which is very important in science education, provides many opportunities for teaching the course (Dede, 2009). As with the use of educational technologies, science teachers have a significant role to play when it comes to integrating artificial intelligence technologies into educational environments. By its very nature, the discipline of science is a field that cannot be considered independently of technology. In this context, every development and change related to technology also affects science education. In this context, this study aims to determine the views of science teacher candidates, who are the teachers of the future, on AI-supported teaching.

Method

Research Model

In this study, which uses qualitative research methods, phenomenology was chosen as the research design. Phenomenological model focuses on how a person perceives a past experience, how it is structured and interpreted in their mind, and how they attribute meaning to it. This approach is based on the subjective experience of specific phenomena from the individual's life and past. Phenomenological experiences can only be perceived by the person who has had that experience (Moustakas, 1994).

Participants

The study group for the research consists of four pre-service science teachers. When forming the study's participant group, care was taken to select teacher candidates who had experienced AI-supported teaching. The pre-service science teachers forming the study group are continuing their undergraduate education at the fourth-year level. Convenience sampling was preferred when determining the study group for the research. This method refers to obtaining research data from a sample that is easily accessible in terms of certain factors (Rahi, 2017). Two of the participants are women and the other two are men. The participants' ages range from 21 to 24.

Data Collection Tool

Data for the study was collected through interviews. An interview is a method of communication involving mutual interaction, consisting of asking and answering questions in accordance with a predetermined purpose. Data collection through interviews is one of the most common data collection techniques in the social sciences (Briggs, 1986; Stewart & Cash, 1985). The data collection tool for the study was a semi-structured interview form prepared by the researchers. This form consists of two sections. The first section of the form contains demographic information, while the second section contains three open-ended questions designed to determine science teacher candidates' views on AI-supported teaching. The open-ended questions in a semi-structured format were prepared by researchers. Expert opinions were obtained from two field expert working in the fields of artificial intelligence and science education for the prepared questions.

Data Analysis

In the study, thematic analysis was used to analyze the research data. Thematic analysis is an analytical method that systematically identifies and organizes patterns of meaning, or themes, within research data and provides insight into these themes (Braun & Clarke, 2012). Thematic analysis enables the creation of meaningful themes from the data obtained and a more in-depth interpretation of the participants' experiences with these themes (Creswell, 2013).

A series of procedures were followed to ensure the validity and reliability of the research data. First, lengthy and detailed interviews were conducted with teacher candidates without any time constraints. Teacher candidates were encouraged to share their responses in a sincere and genuine manner. To ensure the validity of the data in the study, direct quotations from the statements of science teacher candidates were included. Yıldırım and Şimşek (2018) stated that this method, also known as thick description in the literature, is a method frequently used to ensure validity in qualitative research. The inter-coder reliability method was used for data reliability. In this study, research data were coded by another researcher for reliability. The inter-coder reliability coefficient was calculated as 0.93. This value, calculated as 0.80 and above, indicates that the qualitative data are reliable (Yardley, 2008). In the findings section of the study, the statements of science teacher candidates are presented, with teacher candidates identified by the codes STC1, STC2, STC3, and STC4.

Results and Discussion

When analyzing science teacher candidates' views on AI-supported teaching, five themes were identified. The themes, categories, and codes were determined through analysis of the research data. The identified themes, categories, and codes are presented in Table 1. These themes are presented in Figure 1.

Table 1. Themes, categories and codes

Theme	Category	Code
Artificial intelligence awareness	Artificial intelligence knowledge	Human intelligence
		A system lacking emotional intelligence
		Problem solving
		A thinking system
		A learning system
Proficiency in using artificial intelligence	Teacher	Sufficient
		Insufficient
	Student	Sufficient
Artificial intelligence and teaching environments	Adequacy	Internet
		Smart Board
		Computer Laboratories
	Limitations	Infrastructure deficiencies
		Unstable internet connections
		The condition of schools in rural areas
		Equipment deficiencies
		Overcrowded classrooms
		Schools ' socioeconomic status
The impact of artificial intelligence applications on education	Positive	Permanent learning
		Meaningful learning
		Concretization of abstract concepts
		Attractive content
		Increased motivation
		Increased interest in the lesson
		Active participation
		Speed and ease of access to information
		Variety of teaching materials
		Individualized teaching
		Out-of-school learning
	Negative	Sharing personal information
		Unreliable information sources
		Non-scientific information and conceptual misconceptions
		Ethical issues
		Restricting creativity skills
		Encouraging laziness
		Restricting research skills
		Screen addiction
		Eye strain
		Decreased trust in teachers
The future of artificial intelligence	Teacher Profession	The changing role of the teacher
		Supporting the teacher and teaching
		AI can never be a real teacher.

The themes, categories, and codes identified through the analysis of the research data are presented in Table 1. Table 1 shows that the responses obtained from pre-service science teachers were evaluated under five main themes: artificial intelligence awareness, proficiency in using artificial intelligence, artificial intelligence and teaching environments, the impact of artificial intelligence applications on education, and the future of artificial intelligence. The theme of artificial intelligence awareness has been evaluated as a category of artificial intelligence knowledge. The theme of proficiency in the use of artificial intelligence was evaluated in the teacher and student categories. The theme of artificial intelligence and teaching environments was evaluated in terms of the adequacy and limitations of teaching environments. The theme of the impact of artificial intelligence applications on education was evaluated in terms of positive and negative effects. Finally, the theme of the future of artificial intelligence was evaluated in terms of the teacher profession.
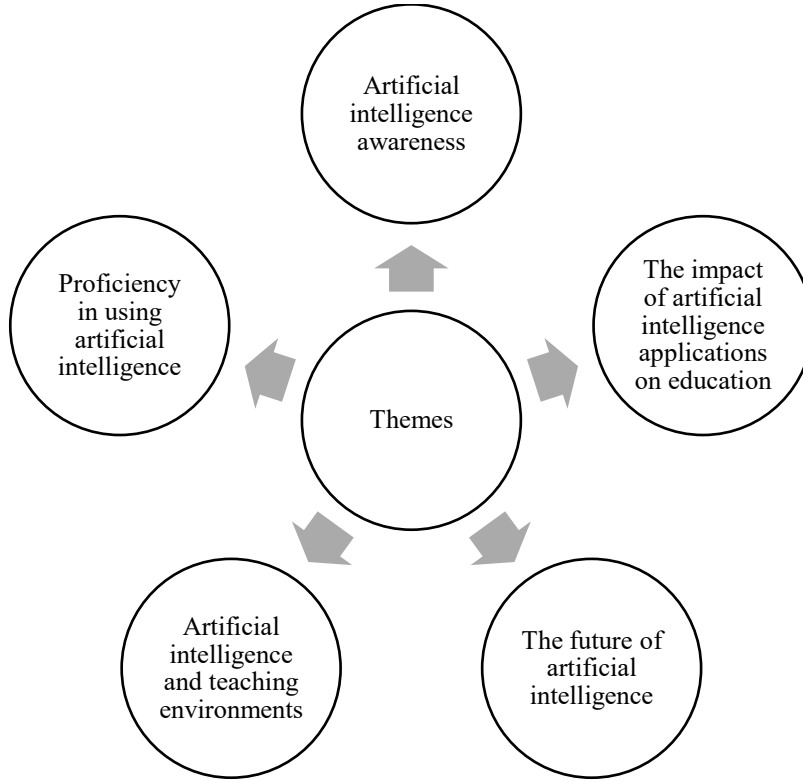
Figure 1. Themes

Theme 1: Artificial Intelligence Awareness

Under this theme, pre-service science teachers' definitions of the concept of artificial intelligence were evaluated. The analyses conducted indicate that pre-service science teachers perceive the concept of artificial intelligence as a system that mimics human intelligence, lacks emotional intelligence, can think, learn, and possesses problem-solving skills. Examples of pre-service teacher statements in this category are provided below.

STC4. "I think artificial intelligence is a system that can solve problems when needed."

STC3. "I know that artificial intelligence systems are thinking systems, but they are technologies lacking emotional intelligence."

STC1. "An artificial intelligence system is a computer system that can mimic human intelligence."

When examining the responses given by pre-service science teachers, it is observed that they emphasize certain characteristics of artificial intelligence systems, such as problem-solving, learning, and the ability to mimic human intelligence. This indicates that pre-service science teachers do not view artificial intelligence systems merely as advanced computer systems. The knowledge that artificial intelligence systems are systems that can produce solutions when faced with a problem and can mimic human intelligence can be interpreted as an indication that science teacher candidates are aware of the definition and content of artificial intelligence. When their responses are analyzed, it is seen that science teacher candidates think that artificial intelligence systems are systems with human-like cognitive abilities. In his study, Arslan (2020) interpreted the phrase "human-like intelligent machines" used by McCarthy (2004) to define artificial intelligence as machines that can use reasoning, solve problems, inferring, and make generalizations.

Theme 2: Proficiency in Using Artificial Intelligence

In this theme, pre-service science teachers' opinions regarding the proficiency of teachers and students in using artificial intelligence were evaluated. While there was consensus among the pre-service science teachers participating in the study regarding students' proficiency, there was no consensus regarding teachers' proficiency. Some of the pre-service science teachers participating in the study found the teachers they observed to be

proficient in using artificial intelligence, while others found them to be insufficient for certain reasons. Sample statements are provided below.

STC4. "Among the teachers I observed at the school I visited as part of my teaching practice course, the older ones in particular were quite insufficient in their use of artificial intelligence applications."

STC1. "I believe teachers are sufficiently proficient in using artificial intelligence. From what I've observed in my immediate surroundings, all teachers are now able to skillfully integrate artificial intelligence applications into their lessons."

All pre-service science teachers participating in the study believe that students are proficient in using artificial intelligence. Sample statements are provided below.

STC2. "All the students I've seen are adept at using AI applications. I would even say they are more proficient than us in this area."

STC3. "Both the students I've seen in my teaching practice and the students in my family are very good at using AI applications. I see them benefiting from these applications in many different areas."

For educational environments to remain progressive, up-to-date, and modern, teachers must first have the ability to keep pace with developments and changes in science and technology. In this context, it is crucial to train teachers who can use current technologies. Artificial intelligence systems are one such technology. Therefore, the higher the teachers' skills in using artificial intelligence technologies, the higher the potential for benefiting from these applications. A teacher who can use artificial intelligence technologies appropriately can design more diverse teaching materials and more effective teaching activities. They can provide their students with quality feedback using more creative ideas. Thus, they can develop their students' higher-order thinking skills. (Holmes et al., 2022; Popenici & Kerr, 2017: Wang et al., 2021). In the technological age we live in, artificial intelligence applications are present in every moment of our lives. We now receive services using these technologies on almost all platforms (Isler & Kılıc, 2021). Therefore, students are more familiar with these technologies according to a certain age group because they have been exposed to them at an earlier age and have had more exposure. Students' proficiency in using artificial intelligence applications is therefore no coincidence.

Theme 3: Artificial Intelligence and Teaching Environments

This theme presents the views of pre-service science teachers on the integration of artificial intelligence technologies into teaching environments. The views of pre-service science teachers on teaching environments and artificial intelligence technologies are presented in two categories: adequacy and limitations in terms of equipment. While some pre-service teachers find teaching environments adequate for artificial intelligence technologies, others express the limitations of teaching environments. The first category of the theme concerns the adequacy of teaching environments in terms of equipment. Some science teacher candidates find teaching environments adequate in terms of equipment such as the internet, smart boards, and computer labs. Sample statements are presented below.

STC3. "All the schools I've seen are quite adequate for the use of artificial intelligence technologies. The smart boards are quite new and well-maintained."

STC1. "All schools now have uninterrupted internet access. Smart boards and computer labs are quite adequate for artificial intelligence applications; in fact, students can improve their skills outside of class in the computer labs."

Science teacher candidates who mentioned the limitations of teaching environments cited factors such as infrastructure deficiencies, unstable internet connections, the condition of schools in rural areas, equipment deficiencies, overcrowded classrooms, and the socioeconomic status of schools.

STC2. "I don't think all teaching environments are adequate. First of all, we need to consider not only schools in big cities but also schools in rural districts with low socioeconomic levels. While it is difficult to obtain the equipment needed to teach lessons using traditional methods, it is quite difficult to talk about internet infrastructure or technological equipment. Even in big cities, there are hundreds of schools that do not have adequate internet infrastructure."

STC4. "During my teaching practice internship, I observed that classes are very crowded and not every student gets an equal opportunity to participate. In addition, the computers and smart boards in schools are quite old and in need of repair."

When examining the responses given by pre-service science teachers, it is seen that some find the teaching environments adequate, while others do not. The pre-service teachers who did not find them adequate cited examples such as infrastructure deficiencies in some schools, unstable internet connections, equipment shortages, classroom sizes, the situation of schools in rural areas, and schools in areas with low socioeconomic levels. Although improvements are made every day in this technological age we live in, there are still many schools today that do not have an internet connection. Furthermore, not all classrooms in many of our schools have smart boards. Not all of our schools have computer labs. Even in schools with computer labs, not all computers are new or well-maintained and up-to-date. In this context, it is difficult to say that all educational institutions are ready for AI-supported teaching. In a statement made by the Ministry of National Education of the Republic of Turkey in 2024, it was stated that high-security broadband fiber internet access was provided in 12,500 schools and that efforts were ongoing to reach 18,000 schools. The same statement also noted that 620,000 interactive boards were installed in classrooms as part of the FATİH Project in Education and made available to teachers and students. (URL-1). Again, in another statement made by the Ministry of National Education of the Republic of Turkey in 2024, it was stated that as of 2024, there were 75,467 schools and 742,829 classrooms in formal education (URL-2). The figures in the explanations also summarize the current situation. Jang et al. (2022) and Kong et al. (2021) listed factors such as inequality in the technological infrastructure of educational institutions and lack of access to internet services as obstacles to the integration of artificial intelligence technologies into teaching environments.

Theme 4: The Impact of Artificial Intelligence Applications on Education

This theme examines science teacher candidates' views on the impact of artificial intelligence technologies on education. Two categories, positive and negative, were defined for the theme. When the science teacher candidates' interview responses were examined, it was seen that they believed artificial intelligence technologies had a positive impact on education. These positive effects are interpreted as advantages or benefits. Science teacher candidates mentioned concepts such as permanent learning, meaningful learning, concretization of abstract concepts, attractive content, increased motivation, increased interest in the lesson, active participation, speed and ease of access to information, variety of teaching materials, individualized teaching, out-of-school learning as positive effects. Sample statements are provided below.

STC1. "Science in particular has many abstract concepts, and there are quite successful applications in making these concrete."

STC2. "I believe that learning becomes more meaningful and permanent when artificial intelligence applications are used. In my opinion, artificial intelligence technologies offer more visual and attractive content, which increases students' interest in the lesson. When interest increases, they actively participate in the lesson and their motivation increases."

STC4. "From what I've seen in my teacher practice, there are many students in classrooms with different characteristics and needs. You cannot respond to all these students' needs with the same type of materials or activities. In this context, it is necessary to develop more individualized and varied teaching methods and techniques. This is precisely where we utilize artificial intelligence technologies."

When the interview data are examined, it is seen that science teacher candidates also mention the negative effects that will arise from the use of artificial intelligence technologies in education. These can be interpreted as disadvantages or harm. Science teacher candidates mention the following as negative effects sharing personal information, unreliable information sources, non-scientific information and conceptual misconceptions, ethical issues, restricting creativity skills, encouraging laziness, restricting research skills, screen addiction, eye strain, distrust to the teachers as negative effects. Sample statements are provided below.

STC1. "It needs to be used in a controlled and balanced manner. These technologies record a lot of personal information. Sharing this information is a major problem. This situation can cause ethical issues when used unconsciously. Let's also consider the health aspect: when used excessively, it can cause problems such as eye strain in students. Screen addiction is another problem. Screen addiction is already very common today, so I think it should be used in doses that do not encourage screen addiction."

STC2. "I support the use of artificial intelligence in educational settings, and I have mentioned its benefits, but I believe it should be used sparingly. First of all, students do not question the correctness of the information obtained from artificial intelligence technologies and accept it as true. In fact, if it contradicts the teacher, they defend the information obtained from artificial intelligence as correct. This is quite wrong. I would like to mention an observation I have made. I have students whom I tutor privately. Recently, when I assign homework to these students, I notice that all the assignments they submit are identical. The students have become accustomed to taking shortcuts and being lazy. They do not research, think, or create anything original; they simply copy and paste from ChatGPT.

STC3. "Students can easily and quickly access information regardless of time and location thanks to artificial intelligence technologies. This is true, and I certainly support this situation. However, as a teacher candidate, I am not sure how much we can trust the information provided by artificial intelligence applications and the sources of this information. I also use these applications, and I have seen that they sometimes provide non-scientific information. This causes misconceptions in students."

The impact of using artificial intelligence applications on education was the most emphasized theme in this study. Pre-service science teachers emphasized the impact on education when expressing their views on AI-supported education. An examination of the codes for this theme reveals that the advantages and disadvantages are almost equal. While science teacher candidates stated that artificial intelligence technologies have a very beneficial, positive effect on education, they also believe that uncontrolled or unconscious use could replace these positive effects with negative ones. Özer et al. (2023) discuss the benefits of using artificial intelligence in educational settings, such as developing different types of intelligence and providing speed and practicality, while emphasizing the need for safe and conscious use of these systems. Singil and Duman (2025) stated in their studies that teacher candidates believe artificial intelligence technologies have negative effects such as making people lazy, reducing originality and creativity, and making it difficult to distinguish false information. Mishra et al. (2023) and Ning et al. (2024) have stated in their studies that artificial intelligence systems offer significant pedagogical opportunities in teaching environments and support a more student-centered education process. Cui et al. (2018) emphasized in their study that artificial intelligence technologies improve the learning experience. Williamson (2018) discussed the potential of artificial intelligence systems to increase learning quality in their study. Huang et al. (2019) raised concerns about security and personal information sharing during the use of artificial intelligence applications in their study, presenting the potential reduction in interaction between students and teachers as a disadvantage. As seen, there are many studies in the literature that evaluate the integration of artificial intelligence applications into education systems in terms of advantages and disadvantages. To get maximum benefit from the use of these technologies, safe and limited use should be preferred. Considering artificial intelligence technologies as supportive systems rather than central to teaching may be effective in reducing these disadvantages. When artificial intelligence technologies become the main element of teaching rather than supportive systems, they may have negative effects on students' skills such as problem solving and research rather than benefits (Mhlanga, 2023; Sok & Heng, 2023). In this context, if the potential negative effects of artificial intelligence applications can be prevented or minimized, the positive effects of artificial intelligence applications on education can be utilized with high efficiency.

Theme 5; The Future of Artificial Intelligence

Within this theme, pre-service science teachers' thoughts on the future of artificial intelligence were examined in the context of the teacher profession. When examining the responses of pre-service science teachers, it is seen that they believe that with the development of artificial intelligence technologies, the role of teachers will change, it is a system that supports teachers, and it cannot replace teachers. Sample statements are provided below.

STC2. "I believe that the role of teachers will change with the development of artificial intelligence technologies. While teachers currently occupy a more central position in teaching environments, with the development of artificial intelligence technologies, they will transition to a more guiding role, helping students access information. But this does not mean that we will no longer need teachers."

STC4. "Everyone thinks the teacher profession will disappear, but I disagree. I think teachers' jobs will become easier. This technology will support teachers in areas such as creating materials and preparing activities, enabling more efficient teaching."

When examining the statements of pre-service teachers, it is seen that they believe artificial intelligence technologies do not pose an obstacle or risk to the future of the teacher profession, but rather are a technology that

supports the profession. Science teacher candidates believe that artificial intelligence technologies cannot replace a real teacher. Felix (2020) states in his study that artificial intelligence systems cannot teach cultural values, traditions, customs, and norms, and that features used by teachers such as gestures, facial expressions, changes in tone of voice, and eye contact cannot be provided by any artificial intelligence technology. Schiff (2021) emphasized in his study that education requires interaction between the learner and the teacher, stating that education is shaped according to the individual's general characteristics by recognizing these characteristics through this interaction. The researcher believes that this interaction cannot be achieved with artificial intelligence technologies. In their study, Zhao and Liu (2019) stated that artificial intelligence cannot replace a physical teacher but can assist the teacher.

Conclusion

Today, science and technology are undergoing rapid development and change. New inventions, discoveries, and technologies are emerging every moment. Artificial intelligence technology is one such innovation. Artificial intelligence technologies are used in every area of our lives (Pannu, 2015). One such area is education. Artificial intelligence technologies are integrated into every aspect of education with the aim of conducting teaching with a more technological system. With the integration of artificial intelligence technologies into education systems, it is aimed to optimize the teaching process and classroom management with artificial intelligence technologies, develop certain skills of students, and in short, create more efficient learning environments (Chassignol et al., 2018; Roll & Wylie, 2016; Wang, 2020). This study investigated pre-service science teachers' views on AI-supported instruction. Research data were collected through interviews. The study was designed using the phenomenology pattern from qualitative research methods. Thematic analysis was used to analyze the research data. Five themes were identified by examining pre-service science teachers' views on AI-supported instruction. During the interviews, science teacher candidates defined artificial intelligence systems. The definitions provided information about pre-service science teachers' awareness of artificial intelligence systems. Pre-service science teachers evaluated the proficiency in the use of artificial intelligence technology from the perspective of both teachers and students. Pre-service teachers who found students proficient did not think that all teachers were proficient. During the interviews, science teacher candidates assessed the suitability of teaching environments for artificial intelligence technologies. The analysis results showed that teacher candidates did not think teaching environments were completely suitable for artificial intelligence systems and mentioned some shortcomings and limitations. Another finding of the study concerns the impact of artificial intelligence technologies on education. The point most emphasized by science teacher candidates in the interviews was the positive and negative effects of artificial intelligence technologies on education. While highlighting the many advantages to be gained from the use of artificial intelligence in education, the teacher candidates also emphasized points to be considered and situations that caused them concern. Another finding of the study concerns the future impact of artificial intelligence on the teacher profession. According to science teacher candidates, artificial intelligence systems will never replace physical teachers; rather, they will serve as a supportive element for teachers and teaching.

Recommendations

By conducting research using a mixed-method approach that also includes an experimental section, the positive and negative effects of artificial intelligence applications on education can be presented in a quantitative manner.

Scientific Ethics Declaration

Conflict of Interest

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