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Science Teachers' Views on the Use of Artificial Intelligence Applications in Education

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Abstract: We live in the age of technology. Artificial intelligence tools have become part of our daily lives. The integration of artificial intelligence systems into our daily lives has made it necessary to integrate these applications into education systems. With the integration of artificial intelligence applications into education systems, teachers and students have begun to actively use artificial intelligence applications in teaching processes. Science disciplines, in particular, are inherently intertwined with technology. This study was conducted to determine science teachers' views on the use of artificial intelligence applications in education. A phenomenological design, one of the qualitative research methods, was used in the study. The sample of the study consisted of five science teachers working in public schools, determined through convenience sampling, one of the purposive sampling methods. Data were obtained through semi-structured interviews. Thematic analysis was preferred for data analysis. Analysis of the research data reveals that science teachers' views fall under four themes. These themes are: knowledge of artificial intelligence, readiness to use artificial intelligence, the use of artificial intelligence in education, and the impact of artificial intelligence applications on the teaching profession. Within the four themes identified through the analysis, teachers' views are seen to focus heavily on the advantages to be gained from the use of artificial intelligence applications in education. Throughout the interviews, science teachers, who evaluated categories such as the application of artificial intelligence technologies, competence, and the impact on the teaching profession, expressed their opinions on the use of artificial intelligence in education and emphasized codes related to its advantages.

Keywords: Artificial intelligence, Science education, Science teachers

Introduction

When examining the history of artificial intelligence, one of today's most popular concepts, it becomes clear that it is not actually a new concept. The first data related to the concept of artificial intelligence dates back to the 1950s. The concept of artificial intelligence was first mentioned at the Dortmund Conference in 1956. John McCarthy is known as the inventor of this concept (Rajaraman, 2014). Artificial intelligence technology has continued to develop from the 1950s to the present day, parallel to developments and changes in science and technology. By the 1960s, the effects of developments in computers on artificial intelligence technology were becoming apparent. The most prominent examples of this effect are the “General Problem Solver” developed by Newell and Simon (Augusto, 2021) and the ELIZA program developed by Joseph Weizenbaum in MIT laboratories (Floyd, 2023). By the 1980s, computers had reached a stage where they could establish relationships between pieces of information. During these years, the concept of “deep learning” introduced to the literature by John Hopfield and David Rumelhart and the program called “expert systems” developed by Edward Feigenbaum emerged as reflections of artificial intelligence technology (Brock & Grad, 2022; Fitz & Romero, 2021).

The 1990s were years that brought new aspects to artificial intelligence technologies. Artificial neural networks developed during these years are referred to as learning systems. In addition to all these developments, IBM's

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chess-playing program called Deep Blue defeated the grandmaster Gary Kasparov, known as the father of chess, causing a worldwide sensation. This sensation also spread concerns about artificial intelligence becoming a superhuman model (Arslan, 2020; Zhang et al., 2023). By the 2000s, no problem was too difficult for artificial intelligence. The robot named "Kismet," developed in the laboratories of the Massachusetts Institute of Technology (MIT), is one of the finest examples of this development. Kismet is a robot that can socialize like a baby and mimic human facial expressions and movements (Breazeal, 2004). Today, artificial intelligence technologies have become an indispensable part of our lives. With the help of various applications and developed devices, artificial intelligence technologies can be utilized in every field. The most commonly used artificial intelligence applications today are smart home systems and smartphones. It is impossible for these technologies, which we use in every moment and area of our lives, not to be reflected in education systems. Artificial intelligence technology has gradually been integrated into education systems (İşler & Kılıç, 2021). The priority for the applications and approaches that have emerged with the integration of artificial intelligence into education has been set as supporting learning. Examples of these applications include personalized teaching systems, data mining in education, education for children with special needs, and chat bots (conversational robots). In addition to supporting learning, artificial intelligence also provides administrative support to educational institutions. Issues such as cyber security, institutional management, exam and personnel planning are among the direct contributions of artificial intelligence to educational institutions (Holmes et al., 2019).

The use of artificial intelligence technologies in education is evident in every area of education, from the materials used in educational environments to teaching methods and techniques, from assessment and evaluation services to career guidance (Savaş, 2021). When examining studies related to artificial intelligence, although concerns about it replacing teachers in the future are encountered, it is generally found that teachers view the use of artificial intelligence in education as a positive development (Meço & Coştu, 2022). Of course, with the emergence of artificial intelligence, the qualifications and scope of some existing professions will change. In fact, some new professions will emerge in the future. Therefore, equipping individuals with the skills that will be needed in future professions is among the issues that require attention (Yavuz Aksakal & Ülgen, 2021).

The use of artificial intelligence technologies in education systems offers many advantages, but in some cases, it can also have negative effects. The fact that artificial intelligence technologies are systems lacking empathy and emotional intelligence, the impossibility of programming all subjects and skills included in the curriculum, and the uncontrolled use of the system are among these negative effects (Nabiyev & Erümit, 2022). In order to reduce these negative effects, it is crucial that teachers in educational institutions are familiar with artificial intelligence technology and applications and have the necessary equipment. Due to their sub-disciplines and scope, science teachers are the teachers most closely related to trends and developments in technology within the teaching departments. In this context, artificial intelligence technologies, like all educational technologies, are technologies that science teachers will inevitably use. In this respect, the views of science teachers on the use of artificial intelligence technologies in education are quite important and valuable. This study aims to determine the views of science teachers on the use of artificial intelligence technologies in education.

Method

Research Model

This study is qualitative research. Qualitative research refers to a process aimed at revealing data obtained through various data collection tools such as observation and interviews in a holistic and realistic manner. Qualitative studies are studies that emphasize philosophical background (Creswell, 2007; Yıldırım & Şimşek, 2016). The phenomenological design was used in the study. Phenomenology is a research method that allows individuals to express their feelings, understandings, perspectives, or perceptions regarding a specific event, concept, or phenomenon. The phenomenological design also aims to describe how individuals experience phenomena (Creswell et al., 2007; Rose et al., 1995).

Participants

The study group consists of five science teachers. The science teachers participating in the study were selected from teachers working in different schools in different provinces in Turkey. Convenience sampling was used to form the study group. This method refers to the process of collecting data from a research population that is accessible to the researcher. Convenience sampling can be defined as the researcher identifying a sample that is

easily accessible in terms of certain factors and obtaining research data from this sample (Koerber & McMichael, 2008; Rahi, 2017). The teachers who formed the study group participated in the research voluntarily.

Data Collection Tool and Process

The data was collected face-to-face by the researchers themselves. The data for this study was obtained during the 2025-2026 academic year. The data collection process was conducted through semi-structured interviews. During the semi-structured interviews, teachers were asked nine open-ended questions. When preparing the open-ended questions used as the data collection tool, draft questions were sent to two different subject matter experts to obtain their expert opinion.

Data Analysis

Participants in the data analysis process were coded as ST1 (Science Teacher 1), ST2, ST3, ST4, and ST5. The purpose of this coding is to protect the personal information of the study group. Thematic analysis was preferred for the analysis of the data. Thematic analysis is recognized in the literature as one of the most appropriate methods for conducting exploratory research using participant comments (Alholjailan, 2012). The thematic analysis method is essentially defined as the process of identifying themes or patterns in qualitative data (Braun & Clarke, 2006). In this study, the data obtained from science teachers were examined in detail. The science teachers' views on the use of artificial intelligence in education were analyzed using the thematic analysis method, and codes, categories, and themes were determined.

Table 1. Themes, categories and codes

Theme	Category	Code
Knowledge of artificial intelligence	Definition	Advanced computer system
		Software system
		Library
	Application	Canva
		Prezi
		Dualingo
		ChatGPT
		Gemini
		Phet
		Siri
		Wordwall
		Claude
		Eba
		Morpa Kampüs
Readiness for the use of artificial intelligence	Teacher	We are sufficient
		We are not sufficient
	Student	They are sufficient
		They are not sufficient
	Learning Environment	Sufficient
		Not sufficient
The use of artificial intelligence in education	Advantage	Attention-grabbing
		Active participation
		Easy access to information
		Eagerness to learn
		Research skills
		Concretization
		Individual differences
	Disadvantage	Ethical issues
		Restricted skills
		Addiction
		The reliability of the information
The impact of artificial intelligence applications on the teacher profession	The Future of the Teacher Profession	Robot teachers

Various factors were taken into account to ensure the validity and reliability of the research data. The interviews were conducted over extended periods to ensure that participants provided accurate and complete responses through prolonged interaction. In the reliability analysis of the data, coding was performed by an expert other than the researchers, and inter-coder agreement was achieved. Inter-coder agreement was calculated as 89%. Miles and Huberman (1994) consider inter-coder agreement of 80% or higher to be sufficient. The validity of the research data was ensured through thick descriptions. Validity was ensured by including direct quotations in the research.

Results and Discussion

When analyzing science teachers' views on the use of artificial intelligence in education four distinct themes emerged. These themes are listed as knowledge of artificial intelligence, readiness for the use of artificial intelligence, the use of artificial intelligence in education, and the impact of artificial intelligence applications on the teacher profession. The themes, categories, and codes are presented in Table 1.

Under the theme of artificial intelligence knowledge, science teachers' definitions of the concept of artificial intelligence and the applications they refer to as artificial intelligence were evaluated. In the theme of readiness for artificial intelligence use, science teachers' statements were evaluated from the perspectives of teachers, students, and the learning Environment. In the theme of the use of artificial intelligence in education, advantages and disadvantages were evaluated as categories. Finally, under the theme of the impact of artificial intelligence on the teacher profession, the future of the teacher profession was evaluated as a category.

Knowledge of Artificial Intelligence;

Under this theme, science teachers' definitions of artificial intelligence and the AI applications they use were evaluated. Analysis of the responses shows that science teachers define artificial intelligence technologies as advanced software or computer systems. Science teachers view AI systems as easily accessible libraries where information is stored in its entirety. For example;

ST1: "Artificial intelligence is the advanced form of today's computer systems."

ST4: "Defining artificial intelligence is frankly not easy, but if I had to say a few things, I could describe artificial intelligence as an easily accessible library."

When teachers were asked about the artificial intelligence applications they use, they mentioned Canva, Prezi, Duolingo, ChatGPT, Gemini, Phet, Siri, Wordwall, Claude, Eba, and Morpa Kampüs.

ST2: "ChatGPT, Canva, Duolingo"

ST5: "Wordwall, Claude, Eba, Morpa Kampüs"

There are different definitions of the concept of artificial intelligence in the literature. For example, McCarthy (2004) refers to human-like characteristics when discussing the concept of artificial intelligence. This human-like expression is interpreted as meaning that artificial intelligence systems are systems that possess skills such as meaning extraction, generalization, reasoning, and problem solving (Arslan, 2020). Another definition of the concept of artificial intelligence belongs to Slage. Slage defined the concept of artificial intelligence as intuitive programming. Axe, on the other hand, described the concept of artificial intelligence as intelligent programs that can solve complex problems and can react when faced with a new problem or situation that has not been experienced before (Nabiyev, 2012).

When examining science teachers' statements regarding the definition of artificial intelligence, it is observed that they do not mention the cognitive abilities possessed by artificial intelligence systems. This situation can be interpreted as science teachers characterizing artificial intelligence applications as a fast and advanced way to access information. When examining the applications defined by science teachers as artificial intelligence applications, it is seen that some of them are not artificial intelligence applications. This situation may indicate that science teachers have insufficient or incorrect information about the nature and mechanism of artificial intelligence systems. For example, EBA, presented as an artificial intelligence application by science teachers, is a social education platform established by the Ministry of National Education.

Readiness for the Use of Artificial Intelligence

Under this theme, ideas are presented for science teachers to evaluate their readiness to use artificial intelligence from the perspectives of teachers, students, and the learning environment. The analysis reveals that among science teachers, there are those who consider their readiness to use artificial intelligence sufficient and those who do not. For example;

ST1: "From what I've seen in my own community, our teachers are well-equipped in terms of artificial intelligence. They make extensive use of AI applications in their lessons, and I've also seen them conducting research outside of school for their own development."

ST4: "I never think it's sufficient because AI applications are a very new system, not one based on the past, and I think many of us, due to our age or economic difficulties, have only recently become acquainted with these applications."

The assessment of students' readiness for AI use revealed that science teachers did not agree on whether students had sufficient readiness for AI use. For example:

ST3: "In terms of usage, yes, they may be sufficient, but equipment also means using it for its intended purpose, and to be honest, most of my students do not use these applications for their intended purpose, which means they are not sufficient."

ST1: "I think they are much more sufficient than us teachers because they were born with technology, and this makes it necessary for them to be equipped."

The assessment of readiness for AI use in learning environments revealed that science teachers did not reach a consensus on whether their learning environments had sufficient equipment for AI use. While some teachers stated that their learning environments had sufficient equipment for AI applications, others pointed out the shortcomings of their learning environments.

ST4: "I think smart boards are quite sufficient; you can do a lot with them, and the computers in schools also make our work easier."

ST2: "Unfortunately, this varies depending on the economic situation of the school. While the situation is slightly better in private schools, I can say that it is inadequate in public schools. For example, smart boards do not work in some classrooms, which is also a negative situation in terms of education."

Science teachers' ideas regarding their readiness to use artificial intelligence were evaluated from the perspectives of teachers, students, and the learning environment. An analysis of the teachers' statements reveals that there is no consensus in any of the three categories. Teachers who expressed negative views regarding their readiness believe that they are not sufficiently equipped due to factors such as age, given that artificial intelligence systems are highly technological. From the students' perspective, they believe there is a lack of purposeful use. When evaluating learning environments, the economic dimension comes to the fore, revealing that teachers believe not every school has equal opportunities, access, or infrastructure for AI applications. Eren et al. (2025) identified the technological infrastructure and access issues required for artificial intelligence applications as a limitation in their study. The same study mentioned the lack of knowledge and skills regarding the use of artificial intelligence, stating that there is a lack of knowledge and skills for its use. Şahin et al. (2025), in their study that included teachers' views on the use of artificial intelligence, emphasized that artificial intelligence technologies are costly systems and stated that they are systems that not every student can access. In the study, teachers stated that both they and their students needed training on artificial intelligence. A similar study was conducted by Özer et al. (2023). In this study, teachers stated that teachers needed to be made aware through seminars and other activities in areas such as cyber security and safe use, emphasizing that they needed to be knowledgeable about issues such as misuse or security breaches.

The Use of Artificial Intelligence in Education;

The use of artificial intelligence in education has been evaluated under two different categories. These categories are listed as advantages and disadvantages. Science teachers mentioned the benefits of using artificial intelligence in education, such as drawing attention to the lesson, encouraging active participation, facilitating access to

information, creating a desire to learn, developing research skills, making abstract concepts concrete, and planning lessons tailored to individual differences. Teacher statements related to the advantages category:

ST1: "It grabs the students' attention a lot, so it should be used."

ST5: "It creates a desire to learn in students."

Science teachers have pointed out that the use of artificial intelligence in education has disadvantages such as ethical issues, restricted skills, dependency, and the unknown or unreliable source of the information provided. Teacher statements related to the disadvantage category:

ST2: "I think it could create ethical issues as a disadvantage because our students at this age are not very knowledgeable about ethics, and some of our teachers are not either, so we need to be careful."

ST3: "I think AI applications restrict the use of certain skills in our students, especially creativity, because when students encounter problems, they use AI. When we look at the answers, they are always the same type, the same style, because instead of finding a solution themselves, they use these types of applications. It's good that they use them, but not always."

Science teachers' views on the use of artificial intelligence in education have been examined in terms of advantages and disadvantages. When teachers' thoughts on this subject are examined, it emerges that they predominantly consider the use of artificial intelligence technologies in education to be advantageous, but they are concerned about the disadvantages. There are studies in the literature that share similar views. Çolak Yazıcı and Erkoç (2023) noted in their study that teachers consider artificial intelligence applications to be engaging and dynamic systems. The same study also highlighted that artificial intelligence applications facilitate the learning process, in addition to offering benefits such as permanent learning and personalized learning. The use of artificial intelligence applications in education attracts student interest and increases participation rates in class (Burgsteiner et al., 2016; Han et al., 2020). Similarly, Temur (2024) states in his study that the integration of artificial intelligence applications into education systems will enable students to gain personalized learning experiences. Regarding the disadvantages of using artificial intelligence technologies in education, Rane (2024) stated in his study that students benefit greatly from artificial intelligence tools, especially when doing homework, but there are doubts about the originality of the homework created through artificial intelligence tools. Baidoo-Anu and Ansah (2023) emphasized that AI tools can present non-scientific information and drew attention to ethical violations. Yeşilyurt et al. (2025) mentioned disadvantages such as AI applications dulling students' creativity skills and increasing their addiction to technology.

The Impact of Artificial Intelligence Applications on the Teacher Profession

Within the scope of this study, science teachers' opinions on the effects of artificial intelligence applications on the teaching profession were gathered. Teachers' thoughts on this subject consist of predictions about the future of science teaching as a profession. Science teachers believe that as a result of the rapid development of artificial intelligence applications, the teaching profession will lose its physical structure in the future and teacher robots will replace teachers. Teachers' statements regarding the future of the teaching profession:

ST2: "Just as today very delicate surgeries can be performed with artificial intelligence, or planes weighing tons can take off and land with artificial intelligence, in the future it will be possible to see artificial intelligence robots teaching lessons for us."

ST5: "It's very sad to say this, but I think that in the future, the teacher profession will be designed by computers and artificial intelligence, not by us, because even today, education has evolved towards individuality, and artificial intelligence handles many things, so it will be difficult to talk about the concepts of physical schools and teachers in the future."

Science teachers participating in the study believe that artificial intelligence applications could physically eliminate the teaching profession in the future. This belief is based on the fact that artificial intelligence applications have the ability to perform many functions, such as content preparation, subject presentation, and question preparation. There are studies in the literature that express similar thoughts. Demir Dülger and Gümüşeli (2023) stated in their study that some teachers considered artificial intelligence applications to be emotionally deficient robots and a threat to the future of the teacher profession. Some of the teachers who participated in the

study expressed their concerns that artificial intelligence applications would end the teacher profession. Similarly, Osetskyi et al. (2020) suggested in their study that AI applications could replace teachers and viewed this as a disadvantage.

Conclusion

Science education is inherently intertwined with technology. Therefore, every development and change in the field of technology is closely related to science education. Artificial intelligence applications are one such development. This research was conducted to examine science teachers' views on the use of artificial intelligence in education. Five science teachers participated in the study. Thematic analysis was used to analyze the research data. The analysis of the study data revealed four main themes. These themes were named knowledge of artificial intelligence, readiness for the use of artificial intelligence, the use of artificial intelligence in education, and the impact of artificial intelligence applications on the teacher profession, and were analyzed by categorization. The research revealed that science teachers have gaps in their knowledge regarding the nature and mechanisms of artificial intelligence. During the analysis, it was determined that some non-artificial intelligence applications were classified as artificial intelligence by science teachers. Science teachers participating in the study referred to artificial intelligence applications as advanced computer systems, but limited them to being libraries that allow quick and easy access to data. There was no mention of their advanced cognitive abilities. For example, the analyses did not include any statements regarding the problem-solving abilities of artificial intelligence applications. Another finding of the study is that while some science teachers believe their colleagues, students, and teaching environments have the necessary equipment for artificial intelligence, some teachers state that they themselves, their students, and their teaching environments do not have sufficient equipment. When examining the statements of science teachers, it is seen that they generally focus on the theme of using artificial intelligence applications in education. Within this theme, it is seen that they mainly focus on the advantages that can be gained by using artificial intelligence applications in education. Although they believe that artificial intelligence applications have certain disadvantages, science teachers generally find the use of artificial intelligence applications in education beneficial. Another finding of the research is predictions regarding the impact of using artificial intelligence applications in education on the teacher profession. Science teachers believe that if artificial intelligence technologies continue to advance at this pace, artificial intelligence robots will replace human teachers in the future. In conclusion, although science teachers mention shortcomings, ethical issues, and disadvantages regarding the use of artificial intelligence applications, they generally view it as an advantageous situation and an opportunity for efficient teaching.

Recommendations

This study is qualitative research. It can be elaborated by combining quantitative research methods. An experimental study can be conducted on the difficulties encountered in the teaching process or the impact of artificial intelligence applications by directly observing teachers who use artificial intelligence applications in their lessons in their teaching environments.

Scientific Ethics Declaration

* The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

* In this study, we declare that the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with and that we do not take any of the actions based on "Actions Against Scientific Research and Publication Ethics".

Conflict of Interest

* Authors declare that there is no conflict of interest between the authors, which all authors contribute to the study, and that all the responsibility belongs to the article authors in case of all ethical violations.

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