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THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN EDUCATION ACCORDING TO THE VIEWS OF TEACHERS WORKING IN SCIENCE AND ART CENTERS

Abstract. The purpose of this research is to determine the opinions of teachers working in Science and Art Centers (BİLSEM) about artificial intelligence and its use in education. In the research conducted with the case study method, semi-structured interviews were conducted with 42 teachers and content analysis was applied. The results showed that teachers use artificial intelligence technologies in education in different ways and that they are aware of the use of these technologies in areas such as electronics, health, and informatics outside of education. In addition, teachers' opinions about the advantages and disadvantages of artificial intelligence in education are also included.

Key words: teacher, artificial intelligence, education, technology, art.

Introduction. In Turkey, Science and Art Centers (BİLSEM) under the Ministry of National Education provide education for gifted students by developing their abilities according to their interests and skills. Gifted individuals are defined as those who learn faster than their peers and show high performance in creativity, leadership, and academic skills [10]. Thus, educational environments should enable these students to develop their capacities, with well-equipped teachers guiding them.

Teachers play a crucial role in education, adapting to rapidly changing curricula and technologies. They observe students' learning needs and guide them accordingly but must also keep pace with technological advances affecting communication and information access [6]. Educational technologies develop

quickly, requiring teachers, especially those at BİLSEM, to continuously update their skills to implement enriched programs [5].

Artificial intelligence (AI), a recent innovation present in smart devices and applications, imitates human intelligence via computers and supports learning permanence [1;2]. AI technologies are widely used in various fields such as health, security, and education [16]. In education, AI aims to be as effective as human instructors, with AI-supported applications increasingly used in internet-connected classrooms [13]. In this context, the aim of the research is to determine the views of teachers working in Science and Art Centers (BİLSEM) on artificial intelligence and the use of artificial intelligence in education. In line with this purpose, answers to the following questions were sought:

1. What is the knowledge of teachers working in BİLSEM about the concept of artificial intelligence?
2. What are the views of teachers working in BİLSEM on the usage areas of artificial intelligence technologies and their use in education?
3. What are the views of teachers working in BİLSEM on the advantages of using artificial intelligence technologies in education?
4. What are the views of teachers working in BİLSEM on the disadvantages of using artificial intelligence technologies in education?

METHOD

Research design

In this study, which was conducted to determine the views of teachers working in Science and Art Centers on artificial intelligence and the use of artificial intelligence in education, the qualitative research method was employed. Qualitative research shows the perspectives of people and events encountered in their natural environment in detail [18]. In the research, the case study method, one of the qualitative research methods, was used. Case study is used to observe events through the lens of a social structure, group, institution, or organization, to explain the purpose, and to evaluate conditions and events through in-depth analysis [18].

Study group

The study group of our research consists of 42 teachers working in Science and Art Centers. Interviews were conducted with these teachers. In qualitative research, the interview technique is an effective method that allows collecting information by directly interacting with participants. This technique enables

researchers to gain an in-depth understanding of the experiences, thoughts and feelings of the participants [7].

The maximum variation sampling approach, one of the purposeful sampling techniques, was used to determine the study group. According to Yıldırım and Şimşek [18], the main purpose of maximum variation sampling is to increase the variability in the characteristics of individuals who could be study participants. The gender, age, professional seniority, branch, and graduate education levels of the teachers participating in the research were considered as sources of diversity. Thus, a diverse sample group was created for the research [3].

When the profile of the participants presented examined, it is seen that a total of 42 teachers, 25 female and 17 male, participated in the research. The branches of these teachers are distributed as follows: 4 Classroom Teachers, 4 English, 3 Mathematics, 4 Music, 3 Visual Arts, 3 Physics, 1 Philosophy, 2 Geography, 2 History, 2 Turkish, 2 Guidance, 2 Biology, 2 Science, 2 Literature, 3 Information Technologies, 1 Aviation, and 2 Chemistry teachers. It was determined that the teachers participating in the research were in the age range of 27-55. In terms of professional seniority, it was observed that teachers with a minimum of 2 years and a maximum of 35 years of seniority took part in the study. Finally, when their educational status was examined, it was stated that 6 teachers had a bachelor's degree, 29 teachers had a master's degree, and 7 teachers had a doctorate degree.

Data collection tool and data collection

In this research, data were collected with a semi-structured interview format. First, a literature review was conducted. As a result of the literature research, a semi-structured interview form was developed. The form was finalized by taking the opinions of subject area and language expression experts. This prepared interview form contains 4 open-ended semi-structured interview questions.

The prepared semi-structured interview form was administered face-to-face and via Google form, in accordance with the participants' wishes. All teachers participating in the study were informed prior to the interview that they were free to participate in this study or not, that they could give any answer they wanted to all the questions asked in the interview, as well as that they could end the interview at any time.

Various studies have been conducted to ensure the reliability and validity of this research. For transferability/external validity, detailed

information was provided to those who would be interviewed about every stage of the research. To ensure credibility/internal validity, teachers were made sure that their views were confirmed by having them read the textual version of their views. For confirmability/external reliability, a different expert researcher evaluated the themes, categories, and sub-codes. To ensure consistency/internal reliability, the research data were reviewed by another researcher. These studies were conducted with the aim of making the research reliable and applicable to other situations, as stated by Noble & Smith [12].

Data analysis. For the analysis of the data collected for the research, the information of the participant teachers was coded as Ö1, Ö2, and the information collected in the interview was written into text via the Microsoft word program. Content analysis was used for the data collected for the study. During the content analysis process, themes, sub-themes, categories, and codes were created [18]. The Codes and themes formed by the codes were reached in line with the answers of the teachers participating in the research. The relationships between the data were revealed by classifying them within the framework of codes, categories, and themes. In order to express the results clearly, comprehensibly, and precisely, the findings obtained from the data were presented with direct quotations and tables. The analysis was first done by the researcher. Later, the codes and themes created were checked by a different expert researcher. The percentage of agreement between the two researchers was calculated.

The agreement percentage value calculated with Miles and Huberman's [11] agreement percentage formula ($\text{Agreement percentage} = [\text{Agreement} / (\text{disagreement} + \text{Agreement}) * 100]$) was found to be .87. The fact that this value is greater than .70 indicates the reliability of the data analysis.

FINDINGS AND INTERPRETATION

The data obtained in this study, which was conducted to determine the views of teachers working in science and art centers on artificial intelligence and the use of artificial intelligence technologies in education, were analyzed and presented in the order of the interview form.

Evaluation of the Knowledge of Teachers Working in Science and Art Centers About the Concept of Artificial Intelligence

The themes and codes created in line with the participants' answers to the questions «Have you heard of the concept of artificial intelligence before? If

you have heard, from which source did you hear it?» in the semi-structured interview form developed by the researcher are presented in Table 1.

Table 1. Themes and Codes for the Evaluation of the Knowledge of Teachers Working in Science and Art Centers About the Concept of Artificial Intelligence

Themes	Codes	f
Digital Areas	Internet	20
	Television	15
	Social Media	15
	Digital Game	3
Social Areas	My Friends	12
	My Students	6
Personal Development Areas	In-Service Training	9
	Projects	5
	Academic Publications	6

Some teacher views on the evaluation of their knowledge regarding the concept of artificial intelligence are stated below;

«I heard about the concept of artificial intelligence from the internet, television, and social media» (Ö1).

«I heard about the concept of artificial intelligence. Mostly in communication tools (such as internet, television)» (Ö12).

«I had read about it in academic publications and also heard about it on the internet» (Ö23).

«I first heard about the concept of artificial intelligence on the internet. I also heard it from my teacher friends and I had attended an online training on this subject» (Ö32).

Evaluation of the Views of Teachers Working in Science and Art Centers on the Usage Areas of Artificial Intelligence Technologies and Their Use in Education

The themes and codes developed based on the participants' responses to the questions «What do you think are the usage areas of artificial intelligence?» and «What do you think about the use of artificial intelligence technologies in the field of education?» in the semi-structured interview form developed by the researcher are given in Table 2.

Table 2. Themes and Codes for the Views of Teachers Working in Science and Art Centers on the Usage Areas of Artificial Intelligence Technologies and Their Use in Education

Themes	Codes	f
Usage Areas	Healthcare	15
	Computer Games	10
	Electronic Technology	20
	Military Technologies	7
	Education Field	12
	Daily Life	5
	Robotic Studies	6
	Space	9
	Information/Computer Technologies	13
Use in Education	Lesson Teaching	12
	Making the Lesson Fun	17
	In Homework	11
	Saving Time	13
	Permanent Learning	16
	Facilitating Learning	9
	Individualized Education	10
	Virtual Learning Environments	16
	Enriching the Classroom Environment	22

Some teacher views on the usage areas of artificial intelligence technologies and their use in education are stated below;

«I use it more in education and communication fields. It is progressing more in electronic technologies» (Ö6).

«I use navigation, e-commerce, language translations a lot. I think it also contributes to medicine, military, health, and education fields» (Ö5).

«When artificial intelligence technologies are mentioned, assistant robots and voice command applications come to my mind. I know that it is important to develop virtual learning environments to enrich the learning environment, education field, healthcare, and defense industry» (Ö8).

«Our daily life becomes much easier with artificial intelligence. I am of the opinion that it will benefit robotic studies and space-related research» (Ö17).

«I use it most in the field of education. It saves time, increases the permanence of learning. I can say that it has made teaching more enjoyable for me» (Ö21).

Evaluation of the Views of Teachers Working in Science and Art Centers on the Advantages of Using Artificial Intelligence Technologies in Education

The themes and codes created in line with the participants' answers to the question «What are the conveniences of using artificial intelligence technologies in the field of education?» in the semi-structured interview form developed by the researcher are given in Table 3.

Table 3. Themes and Codes Created According to the Views of Teachers Working in Science and Art Centers on the Advantages of Using Artificial Intelligence Technology in Education

Themes	Codes	f
Usage Areas	Healthcare	15
	Computer Games	10
	Electronic Technology	20
	Military Technologies	7
	Education Field	12
	Daily Life	5
	Robotic Studies	6
	Space	9
	Information/Computer Technologies	13
Use in Education	Lesson Teaching	12
	Making the Lesson Fun	17
	In Homework	11
	Saving Time	13
	Permanent Learning	16
	Facilitating Learning	9
	Individualized Education	10
	Virtual Learning Environments	16
Enriching the Classroom Environment	22	

Some teacher views on the advantages of using artificial intelligence technologies in education are stated below;

«It facilitates following the actuality and following this age of today's technology age» (Ö42).

«It makes learning visually and mentally permanent. Its use in lessons makes the work of teachers, that is, us, easier. Students learn more easily and participate in the lesson with love. It attracts students' attention» (Ö16).

«It saves time and space. It makes it easier to do experiments in the form of simulations. I think it prevents possible accidents as well as saving materials.» (Ö4)

«It provides immediate feedback to students. It facilitates the measurement and evaluation process. I see the deficiencies of the students and it helps me while designing activities that I can do to complete them» (Ö22).

«It prevents waste of time, reduces paper usage. Access to information is fast. Thus, the workload is reduced and students learn more enjoyably and permanently by using technology with different applications» (Ö6).

Evaluation of the Views of Teachers Working in Science and Art Centers on the Disadvantages of Using Artificial Intelligence Technologies in Education

The themes and codes created in line with the participants' answers to the question «What are the difficulties of using artificial intelligence technologies in the field of education?» in the semi-structured interview form developed by the researcher are given in Table 4.

Table 4. Themes and Codes Created According to the Views of Teachers Working in Science and Art Centers on the Disadvantages of Using Artificial Intelligence Technology in Education

Themes	Codes	f
Access to Information	Increase in Learning Speed	14
	Ensuring Permanence	7
	Ease in Accessing Information	23
	Equal Opportunity in Education	5
Interaction and Communication	Increasing Interest in the Lesson	11
	Making the Lesson Fun	13
Time and Efficiency	Saving Time	15
	Ease of Individual Learning	12

Themes	Codes	f
	Economic	6
	Concretization of Information	9
Technological Development	Development in Technology Use	4
	Following Innovations	10
Teaching and Assessment	Helping to Develop Oneself	17
	Facilitating Measurement and Evaluation	5

Some teacher views on the disadvantages of using artificial intelligence technologies in education are stated below;

«It may accustom students to readiness, accessing information easily, without much effort, without making an effort may create problems» (Ö32).

«It can lead to decreased creativity, not thinking deeply, and making people lazy by pushing them to readiness» (Ö18).

«It causes people to become emotionless and mechanized by reducing their communication» (Ö2).

«There may be a risk of misuse in artificial intelligence applications. It doesn't seem very safe to me» (Ö21).

Conclusion. Artificial intelligence and artificial intelligence technologies have emerged as a concept that has been widely discussed, attracted attention, and developed rapidly in recent years. The impact of this concept and technology on the field of education and its use in this field are also increasing. Teachers working in Science and Art Centers carry out different activities with students whose special talents have been identified in order to nurture these talents. For this reason, they need to develop themselves in their fields. In addition, it is important for BİLSEM teachers to know artificial intelligence technologies, to use them in their teaching processes, to contribute to the development of students, and to prepare them for the future. Popenici and Kerr [15] stated that teachers should have knowledge about new technologies and should incorporate these information technologies into their lessons.

The use of artificial intelligence technologies by BİLSEM teachers helps them to develop their teaching skills and enables them to prepare their students in accordance with the demands of the modern era. This research was conducted to determine the views of teachers working in Science and Art Centers on artificial intelligence and the use of artificial

intelligence in education. As a result of analyzing the views of 42 teachers with diverse demographic characteristics, the following results were reached.

It is seen that all teachers participating in the research have heard of the concept of artificial intelligence before. It is a positive outcome that all teachers have knowledge about artificial intelligence from various or similar sources. Teachers expressed the areas where they most heard the concept of artificial intelligence as follows: digital areas (internet, social media, television...), social areas (friends, students...), and personal development areas (in-service training, projects...). According to the research results, teachers stated that artificial intelligence technologies are mostly used in electronic technology, healthcare, informatics, and education fields today. Then, it was listed as space research, computer games, robotic studies, and daily life, respectively. This situation reveals that teachers are aware of different usage areas of artificial intelligence technologies.

It was concluded that the teachers participating in the research use artificial intelligence technologies in education to enrich the classroom environment, make the lesson fun, create virtual learning environments, and make learning permanent. In addition, it is seen that they are used in lesson teaching, homework, and individualized education. It is seen as a positive result that teachers employ these technologies for different purposes. Similarly, in the research of Bayraktar et al. [4], it was stated that the effect of artificial intelligence technologies in education has positive results in a wide range from personalizing students' learning experiences to increasing motivation and interest.

Teachers' views on the advantages of using artificial intelligence technologies in education were also examined. Teachers found that the most significant advantage of using artificial intelligence technologies in the field of education is the access to information theme, including an increase in students' learning speeds, permanent learning, and ease in accessing information. In addition, it is among the obtained results that they think it has different advantages such as saving time and efficiency, using and following technological developments, and diversifying and simplifying measurement and evaluation. Similar to this result, in the research conducted by Çam et al. [8], it was seen that they reached the conclusion that artificial intelligence can be used in education to support the teacher, evaluate students

individually, and eliminate their deficiencies, as well as to teach lessons and carry out in-class teaching practices in the teaching process.

Finally, teachers' views on the disadvantages of using artificial intelligence technologies in education were examined. Teachers found that the most significant disadvantage of using artificial intelligence technologies in the field of education is the technical requirements and difficulty's theme, including the necessity of technological infrastructure, the high cost of technological infrastructure and tools, the difficulty of learning this technology, and the need for training. In this context, a study conducted by Özer et al. [14] emphasized that difficulties such as the lack of universal access to technology and high costs should be taken into account. Similarly, in the research of Xie and Reider [17], it was stated that teachers need education and support to use artificial intelligence technologies and tools effectively. Furthermore, it was concluded that security, privacy, and ethical issues are among the most critical disadvantages. Additionally, it is among the prominent research results that it may cause negative habits and discomforts such as promoting laziness, readiness, distraction, technology addiction, physical discomforts, and lack of emotion.

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**BİLİM VE SANAT MERKEZLERİNDE GÖREV YAPAN
ÖĞRETMENLERİN GÖRÜŞLERİNE YAPAY ZEKA
TEKNOLOJİLERİNİN EĞİTİMDE KULLANIMI**

Bu araştırmanın amacı, Bilim ve Sanat Merkezlerinde (BİLSEM) görev yapan öğretmenlerin yapay zekâ ve eğitimdeki kullanımını hakkındaki görüşlerini belirlemektir. Durum çalışması yöntemiyle gerçekleştirilen araştırmada, 42 öğretmenle yarı yapılandırılmış görüşmeler yapılmış ve içerik analizi uygulanmıştır. Sonuçlar, öğretmenlerin yapay zekâ teknolojilerini eğitimde farklı şekillerde kullandıklarını ve bu teknolojilerin eğitim dışında elektronik, sağlık, bilişim gibi alanlarda da kullanımından haberdar olduklarını göstermiştir. Ayrıca, öğretmenlerin yapay zekânın eğitimdeki avantajları ve dezavantajlarıyla ilgili görüşlerine de yer verilmiştir.

Anahtar kelimeler: öğretmen, yapay zekâ, eğitim, teknoloji, sanat.