EĞİTİMDE KURAM VE UYGULAMA (EKU)
JOURNAL OF THEORY AND PRACTICE IN EDUCATION
ISSN: 1304-9496
EKU, 2026: 22(1), 16-33

RESEARCH ARTICLE

# TEACHERS' OPINIONS ON ARTIFICIAL INTELLIGENCE TOOLS USED IN EDUCATION (THE CASE OF KIRŞEHIR)*

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## Abstract

This study, which examines the extent to which teachers are familiar with and use the AI tools introduced in the AI tools handbook prepared by the Ministry of National Education (MEB) for teachers, as well as teachers' opinions on the use of AI tools, adopts the phenomenological research design from among qualitative research designs. The study group consists of 30 teachers working in public and private schools affiliated. The data collected through the interview form, which served as the data collection tool, was subjected to content analysis. The data obtained from the participants revealed that very few AI tools are known and therefore used in private and public institutions. It was observed that the frequency of AI tool use is higher in private schools than in public schools. It was found that participants with fewer years of experience prefer to use AI tools more frequently. The study concluded that AI tools will replace teachers in the future, personalized education will come to the fore, communication skills will weaken, students will become more inclined to take the easy way out rather than simply accessing information more easily, and teacher training will need to accelerate in the age of technology.

***Keyword:*** Artificial intelligence tools, artificial intelligence in education, teachers' opinions

**Received: 2 July 2025** **Accepted: 1 January 2026**

** This study was produced from the first author's completed doctoral seminar work, supervised by the second author.*

**Corresponding author:** Aybike DAĞISTAN

**Citation:** Dağıstan, A., & Taşdemir, M. (2026). Teachers' opinions on artificial intelligence tools used in education (The case of Kırşehir). *Eğitimde Kuram ve Uygulama, 22*(1), 16-33. https://doi.org/10.17244/eku.1733017

**A R A Ş T I R M A M A K A L E S İ**

# EĞİTİMDE KULLANILAN YAPAY ZEKÂ ARAÇLARINA İLİŞKİN ÖĞRETMEN GÖRÜŞLERİ (KIRŞEHİR ÖRNEĞİ)*

**Öz**

MEB tarafından öğretmenlere yönelik hazırlanan YZ araçları el kitabında tanıtılan araçların, öğretmenler tarafından ne kadarı tanındığını, kullanıldığını ve öğretmenlerin YZ araçlarının kullanımına ilişkin görüşlerini inceleyen bu çalışmada, nitel araştırma desenlerinden olgubilim desenini benimsemektedir. Çalışma gurubunu Kırşehir İl Milli Eğitime Bağlı Merkez devlet ve özel okullarında görev yapan 30 öğretmen oluşturmaktadır. Veri toplama aracı olan görüşme formu ile elde edilen veriler içerik analizine tabi tutulmuştur. Katılımcılardan elde edilen veriler yoluyla, özel kurumlarda ve devlet kurumlarında YZ araçlarının çok azının tanındığı, dolayısıyla kullanıldığı ortaya çıkmıştır. YZ araçlarının kullanma sıklığının ise özel okullarda devlet okullarına göre daha çok olduğu görülmüştür. YZ araçlarını kıdem yılı az olan katılımcıların daha çok kullanmayı tercih ettiğini ortaya çıkmıştır. YZ araçlarının etki ettiği alanları somutlaştırıcı etki, pratik yapma, görsel zenginlik, zamandan tasarruf, motivasyon, dikkat çekme olarak tanımlamışlardır. YZ araçlarının kullanım zorlukları açısından, değişime direnç ve teknoloji kullanım becerisinden, ortam donanımı, öğrenci profili, hazırlık aşamasında zaman alıcı ve pro yükseltmeleri olarak değerlendirmişlerdir. YZ araçlarının gelecekte öğretmenin yerini alacağını, kişiselleştirilmiş eğitimin öne çıkacağı, buna karşılık iletişim becerisinin zayıflayacağını, öğrencilerin bilgiye ulaşmasında kolaylaştırmadan öte öğrencilerin kolaycılığa kaçma eğilimin artıracağına, teknoloji çağında öğretmen eğitiminin hız kazanmasının gerekliliği sonuçlarına ulaşılmıştır.

***Anahtar Kelimeler:*** Yapay zeka araçları, eğitimde yapay zeka, öğretmen görüşleri

**Geliş:** 2 Temmuz 2025 **Kabul:** 1 Ocak 2026

* *Bu çalışma, birinci yazarın ikinci yazar danışmanlığında hazırladığı tamamlanmış doktora semineri çalışmasından üretilmiştir.*

**Sorumlu yazar:** Aybike DAĞISTAN

**Kaynak Gösterimi:** Dağıstan, A., & Taşdemir, M. (2026). Teachers' opinions on artificial intelligence tools used in education (The case of Kırşehir). *Eğitimde Kuram ve Uygulama, 22*(1), 16-33. https://doi.org/10.17244/eku.1733017

## INTRODUCTION

Today, digitalization and technology are increasingly impacting every aspect of life. Among these innovative digital technologies, Artificial Intelligence (AI) stands out as a significant area on which many countries are developing national strategies. Initially focused on research and development, these strategy documents have gradually evolved into unique plans with similar main axes. This transformation, coupled with the continuous development of AI, is moving it beyond being a simple technological tool and causing it to create a comprehensive change that profoundly affects all socio-economic dynamics.

When examining the 2024-2025 Turkey National AI Strategy action plan, it is evident that the actions are not focused on a single area; they are carried out in many different fields such as defense, health, and education, and these fields are addressed in interaction with each other. This approach demonstrates that Turkey has adopted a holistic, multi-dimensional strategy for the field of AI and aims to maximize its potential.

### What is Artificial Intelligence?

It is stated that the journey of AI began in the 1950s with the evolution of technology towards machines, when scientists started searching for answers to the questions "Can machines think?" and "How can they think?", and that the concept was first explicitly defined and gained scientific field status at the Dartmouth Conference held in 1956. A brief summary of the history of AI development is given in Table 1 below.

**Table 1.** History of AI development.

| Period | Important Developments |
|---|---|
| The Birth of Artificial Intelligence 1943-1956 | The term artificial intelligence was coined at the McCarthy Dortmouth Conference. |
| The Golden Age 1956-1974 | Unimation: the first industrial robot company was founded. |
| Artificial Intelligence Winter 1974-1996 | - |
| The Reawakening 1996 – 2011 | Deep Blue vs Kasporov comparison |
| The CPU Era 2012-Present | GAN: This opens the way for artificial intelligence to create realistic-looking fake versions. |

AI, defined as a theory of information that develops by simulating the functioning of advanced cognitive functions of natural intelligence, is considered to be even more effective in the coming years due to its continuous renewal and development, and the constant introduction of new products (Russell and Norving, 2016: 1-2).

With the impact of globalization, AI is eliminating all kinds of borders between countries, forcing them into fierce competition, including the modernization of administrative structures. This situation, which directs countries to develop strategies, is also evident in the field of education due to its socio-economic dimensions, and AI is of critical importance. It is possible to follow discussions on many platforms regarding the correct positioning of AI as intelligent systems in education (Luckin et al., 2016).

### Artificial Intelligence in Education

AI in education has great potential to transform not only teaching methods but also learning processes. AI allows for different applications in education by taking into account student individuality. Some key areas of how AI is used are given below [United Nations Educational, Scientific and Cultural Organization (UNESCO), 2024]:

*Use in Personalized Learning*: AI creates personalized learning plans by analyzing student learning styles, speeds, and needs. For example, intelligent educational platforms identify areas where students are weak and suggest additional applications in those areas.

*Automated Assessment*: Artificial intelligence supports teachers by automatically evaluating exams and homework, reducing their workload. These systems analyze student performance and provide feedback, offering insights into the learning process.

*Teaching Assistants*: AI-powered virtual assistants make functions such as providing information, answering questions, and guiding students and teachers about course content more interactive.

*Data Analytics*: Educational institutions use AI to analyze student data, improve academic performance and teaching processes, and develop strategies to enhance student success.

*Talent Development*: AI offers various applications to help students discover and develop their talents. For example, applications for math or language skills are enriched with gamification elements to make learning fun.

*Distance Learning and E-learning:* In the distance education model, which gained even more importance during the Covid Pandemic, AI-based tools help managing online educational activities, creating interactive learning environments, and increasing student participation.

*Educational Management*: AI can also optimize the administrative processes of educational institutions. AI-based solutions make management processes more efficient in areas such as student registration, tracking, and planning.

Some research in the literature on these fundamental areas also reports that AI personalizes the learning process by providing content tailored to students' individual paces, identifying learning gaps, and offering feedback by Holmes and Tuomi (2022); increasing student motivation and participation by providing interactive environments by Zawacki et al. (2019); providing accessibility support for students with learning disabilities in special education by Almarzouq et al. (2025); and enhancing creativity and higher-order skills by Kim et al. (2025).

Some studies suggest that the necessary integration between digital technologies and education is not happening quickly enough which is facing resistance, and that teachers, as implementers, are a significant factor in this process (Clark-Wilson et al., 2014; Drijvers et al., 2010; Ifenthaler & Schweinbenz, 2019; UNESCO, 2023; Yurtsever & Yurtsever, 2025). There are studies showing that teachers prefer smart boards for simpler tasks like presentations rather than for interactive applications (Avcı et al., 2019; Keleş et al., 2013; Özay & Keskin, 2022). At this point, although AI has the potential to create revolutionary transformations in education, it is necessary to identify the best AI tools in this process and develop solutions to ensure their sustainable applicability. Therefore, the opinions and skills of teachers regarding the use of AI tools are of great importance and playing a key role.

In this context, the Ministry of National Education (MEB), as the responsible institution for the action, organizes in-service seminars based on action code 15, “Increasing teachers’ awareness and capacity in the field of AI through in-service training [Digital Transformation Office (DDO), 2024, 3-4]”, which is one of the target statements numbered 11-12-13-14-15-16-17-18-19-20 in the National AI Strategy 2024-2025 Action Plan. The AI tools used in education handbook, published in May 2024, introduces and recommends adaptable AI tools for teachers as implementers in the teaching process, based on their subject area (MEB, 2024). The recommended AI tools from the AI tools used in education teacher handbook prepared by the MEB are listed in Table 2 below.

**Table 2.** AI tools used in education: AI tools recommended in the teacher's handbook.

| Field | Artificial Intelligence Tools Used |
|---|---|
| Primary Education | Homer, ReadingIQ, Reading Eggs, Duolingo, ABCmouse, Starfall, Seesaw, Epic! RazKids. |
| Turkish Language and Literature Education | Ello, Edufy, Preply, TalkPal AI, Vocabulary.com, WordBrain, Babbel, Quizlet |
| Mathematics Education | MathGPTPro, QANDA Math Coch, DreamBox Learning, IXL Learning, Prodigy, Wolfram Alpha, Microsoft Math Solver, Mathway, SymboLab, DragonBox, Desmos, Zearn Math, Algebrator, Cymath, Buzzmath, Mathletics, Kahoot! Mathseeds, MathFacts Pro, Mathspace, Mathigon, Polyup, Algodoo, DragonBox Algebra, Geogebra 3D, SplashLearn, Smodin Omni, Photomath, Maple Calculator, CameraMath, Brilliant, MyScript |
| Science Education | Science360, Toca Lab: Elements, Simple Machines by Tinybop, Mystery Science, DIY Nano, The Magic School Bus, DIY Sun Science, Science Experiments, Little Alchemy, The Robot Factory by Tinybop, Thinkrolls, Science Journal, Physics Toolbox Suite, Cognimates, MIT App Inventor, IBM Watson, Google Teachable Machine |
| Physics Education | Algodoo, PhysX, Virtual Physics Simulations, Physbot, PhET Interactive Simulations, Khan Academy Physics, "Isaac Physics", Wolfram Alpha, Physics Toolbox Suite, PhysicsCalc, Socrat AI, Symbolab, Phet Simülasyonları, Easy Java Simulations, Virtual Physics Labs, Simulink, Labvıew, MATLAB/Simulink with AI Toolbox |
| Biology Education | UCSF ChimeraX, PyMOL, VMD (Visual Molecular Dynamics), CHARMM (Chemistry at HARvard Macromolecular Mechanics), Genetik Analiz Araçları, BLAST (Basic Local Alignment Search Tool), ClustalW, EMBOSS, Geneious, SnapGene, CLC Genomics Workbench, NCBI GenBank, Avogadro,PyMOL, VMD (Visual Molecular Dynamics), Gaussian, CHARMM (Chemistry at HARvard Molecular Mechanics) |
| Chemistry Education | Avogadro, ChemDraw, RasMol, ChemDoodle, Chematica,Synthia, Atomwise, ChemProp, ChemML, RDKit, ChemDes, Chemoinformatics Tools, Chemical Reaction, Prediction Models, Environmental Fate Modeling, Tox21, Chem101, Chemistry Quiz, Chemistry MCQ, Chemistry Questions, ChemCollective |
| Social Sciences (Republic of Turkey) Education | Time Zone X, Mission US, GeoGuessr, National Geographic Kids, BrainPOP,iTooch, ClassDojo, Nearpod, iCivics, Quizlet, Khan Academy, Brainly, TimeMaps, Historia, Google Earth |
| Information Technology Education | Code.org, Swift Playgrounds, Blockly, Kodable, BrainPOP Jr., ABCmouse, Epic! Daisy the Dinosaur, Mathletics, PythonTurtle, Cognimates, IBM Watson Studio, Microsoft Azure Machine Learning, Google Cloud AI Platform, TensorFlow, PyTorch, Keras, OpenCV, NLTK (Natural Language Toolkit), SpaCy |
| Foreign Language Education | pi.ai, TalkPal, Tutor Lily, Lola Speak, EIGO.AI, DeepL.io, tinywow, speechcoach.io, gliglish, Speakable.io, Elsa Speak, kippy.ai, furwee.ai, Langotalk, TutorAI, Langeek, Reverso, univerbal, Soofy, Duolingo, Rosetta Stone, Rosetta Stone Online Dil Öğrenme Aracı, Mondly, Busuu, Memrise, Babbel, İtalki, Lingodeer, Sider |

According to Table 2,it is seen that the Ministry of National Education's (MEB) teacher's handbook on AI tools used in education recommends 8 AI tools in the field of classroom education, 6 in Turkish Language and Literature education, 32 in Mathematics education, 17 in Science education, 18 in Physics education, 15 in Biology education, 18 in Chemistry education, 15 in Social Sciences (Turkish Republic) education, 19 in Information Technology education, and 27 in Foreign Language education. While the number of AI tools recommended by the MEB for each field is quite large, their usability and functional application by teachers for educational purposes is of vital importance.

This research aims to determine how many of the AI tools introduced in the handbook prepared by the Ministry of National Education for teachers are known and used by teachers working in public and private educational institutions, and to reveal teachers' opinions on the use of AI tools. In line with this main objective, the following sub-problems were addressed:

1. Which AI tools do teachers use in their areas of expertise?
2. What are teachers' opinions on the impact of AI tools on their areas of expertise?
3. What challenges do teachers face regarding the use of AI tools?
4. When teachers want to receive training on AI tools, which methods and resources do they prefer?
5. How do teachers interpret the impact of AI tools on their professional future?

Research limitations and potential impacts:

✓ The study's generalizability is limited to the Kırşehir province sample and 1st, 5th, and 9th grade teachers.

✓ The study's reliance solely on semi-structured interviews as a data source, preventing the use of additional data types such as observation, the brevity of the responses despite the use of probe questions, and the time constraint of interviews being limited to a single academic term, preventing long-term follow-up, are considered limitations that could affect the research findings

✓ The tendency of teachers to give positive responses as a social expectation effect may affect the objectivity of the responses.

## METHOD

### Research Design

In this research, which aims to reveal teachers' opinions on the use of AI tools, a phenomenological design, one of the qualitative research designs, was adopted. Phenomenological research, by its nature as a qualitative research, may not provide definitive and generalizable findings, but it provides explanations, experiences, and suggestions for a better understanding of a particular phenomenon. From this perspective, phenomenological studies make significant contributions to both scientific literature and practice. In addition, the phenomenological design provides a suitable research ground for research that investigates phenomena that are partly known but not fully understood (Yıldırım & Şimşek, 2013).

### Working Group

In phenomenological research, data sources are individuals or groups who directly experience the phenomenon at the center of the research and have the capacity to express these experiences. These individuals contribute to understanding the complex nature of phenomena by providing researchers with in-depth insights into how a particular phenomenon is perceived, felt, and experienced (Yıldırım & Şimşek, 2013). This research, which aims to determine teachers' opinions on the use of AI tools in education, includes a sample of teachers who are currently actively working and have professional experience with AI tools.

The focus of this research is the use of artificial intelligence tools by teachers working in public and private institutions affiliated with the Kırşehir Provincial Directorate of National Education. Due to the qualitative nature of the research design, the study group was selected using convenient sampling, a type of purposive sampling, to provide both readily available data and a wealth of information. The aim of choosing maximum diversity sampling is to identify common or shared phenomena among diverse situations, rather than making generalizations, and to determine different dimensions of the problem based on this diversity. Therefore, the study group consisted of 30 teachers in 10 different fields at the 1st, 5th, and 9th grade levels; 15 working in public institutions and 15 in private institutions. The distribution of participant codes for the study group is given in Table 3.

**Table 3.** Participant code distribution.

| Education fields | 1. Grade | | 5. Grade | | 9. Grade | |
|---|---|---|---|---|---|---|
| | Pu | Pr | Pu | Pr | Pu | Pr |
| Primary Education | P14 | P12 | | | | |
| Turkish-literature education | | | P3 | P18 | P7 | P8 |
| Mathematics education | | | P2 | P22 | P16 | P4 |
| Science education | | | P5 | P11 | | |
| Physics education | | | | | P17 | P23 |
| Biology education | | | | | P13 | P21 |
| Chemistry education | | | | | P28 | P25 |
| Social sciences education | | | P1 | P10 | P27 | P26 |
| Information technology education | | | P24 | P19 | P29 | P30 |
| Foreign language education | | | P15 | P9 | P20 | P6 |

Participant Codes:

- ✓ Institution Type: Public: Pu; Private: Pr
- ✓ Gender: Female:F; Male:M
- ✓ Education Level: Bachelor's: B; Master's: M; Doctorate: D
- ✓ Years of Experience: [0-10 years (1); 11-20 years (2); 21-30 years (3); 30 and 30+ (4)]
- ✓ Grade Level: (1, 5 and 9)
- ✓ Fields: Primary Education: P; Turkish: T; Mathematics: M; Science: S; Physics: P; Biology: B; Chemistry: C; Social Studies: So; Information Technology: I; Foreign Language: F.

For example; Code Pu2DMB25M: The teacher interviewed with code 2 works in a public institution, is male, has a bachelor's degree, has 11-20 years of experience, works at the 5th grade level, and states that he is in the field of Mathematics education.

**Data Collection Tool and Process**

In phenomenological research, the most important data collection tool is the interview method. This method offers researchers the opportunity to deeply explore the experiences and meanings of the phenomena experienced by the participants. The interaction, flexibility, and in-depth questioning possibilities provided by the interview help reveal experiences that participants have previously overlooked or not deeply considered. In this process, interviews allow for a better understanding of individuals' inner worlds and experiences, enriching the research and enabling a more comprehensive presentation of the complex nature of phenomena (Bogdan & Biklen, 1992).

The interview form used in the research was drafted by the researchers as a semi-structured form consisting of 5 questions, taking into account the identified sub-problems. To further develop this draft, it was revised based on the suggestions of two academics and three teachers working at the Ministry of National Education. The final version of the "Semi-Structured Interview Form" was then presented to an education sciences expert, a foreign language teacher, and a classroom teacher for their opinions. The experts' opinions on the suitability of the form's items were calculated using the Miles & Huberman (1994) formula. The calculated fit coefficient for each item and the form as a whole is 1.00. Following all these reviews, the final interview form consists of questions containing participants' demographic information and questions aimed at obtaining their opinions on AI tools.

Interviews were conducted with the approval of the Ahi Evran University Social and Human Sciences Scientific Publication Ethics Committee and with research implementation permission from the Ministry of National Education.

**Data Analysis**

In phenomenological research, content analysis aims to reveal individuals' experiences and the meanings behind those experiences. Through content analysis, data is transformed into themes and presented in a descriptive style, often supported by direct quotations from participants. The findings, based on identified themes and patterns, are interpreted and explained in detail (Yıldırım & Şimşek, 2013).

In the first stage of content analysis, the data obtained from the interview recordings were organized and transferred to a Word file. Secondly, in the stage of identifying meaningful data, recurring words and words with the same meaning were identified. These identified words and phrases were coded to create preliminary framework themes, and after organization, the themes were finalized. The themes were organized under the sub-problems of the research and visualized in tables. In organizing the themes and codes, the researchers initially created themes independently and then combined these themes. The created themes and participant statements were submitted to two experts for evaluation to obtain their opinions on their suitability. The calculated agreement coefficient between the participants' opinions was 0.91. On issues where consensus was not reached, the researchers refocused and made relevant decisions. The findings obtained in this way were explained in summary tables, directly supported and explained with original quotations expressing the participants' opinions.

**Credibility and Consistency of the Research**

Erlandson et al. (1993), designed concepts equivalent to validity and reliability—traditionally accepted as important criteria in quantitative research—and considered alternatives more suitable to the nature of qualitative research.

To ensure credibility (internal validity), probe questions were asked during the interview to allow participants to fully express their opinions in order to collect in-depth data. Participant confirmation was conducted after the interview to ensure that the data collected from the participants matched their true thoughts and feelings. During the process of developing the interview form, interviews were conducted with five experts—two academics and three teachers—and some statements were revised and reviewed based on their suggestions. Additionally, the developed interview form was tested on three teachers, the scope of the questions, the clarity and comprehensibility of the item stems were evaluated, and the form was finalized.

To ensure transferability (external validity), the raw data was reorganized according to emerging concepts and themes, and a detailed description was provided without adding interpretation to the reader and remaining as faithful as possible to the nature of the data. Since identifying participants to encompass diverse perspectives was crucial, maximum diversity sampling, a type of purposeful sampling, was used.

To ensure consistency (internal reliability), all research steps were systematically recorded to demonstrate traceability throughout the research process. A consistency review was conducted by an external expert to verify the internal consistency of all aspects of the process.

To ensure confirmability (external reliability), the compatibility of the analysis method used and the collected data was subjected to a confirmation review by an external expert.

**Ethical Information**

Research and publication ethics have been adhered to. Ethical approval for this research was obtained from the Kırşehir Ahi Evran University Social and Human Sciences Scientific Research Ethics Committee (Date: 30.04.2025, Number: 2025/08-43). According to the Circular on Research Implementation Permits, the implementation permit for the research with application number MEB.TT.2025.026522 has been approved by the relevant units of the Ministry of National Education (MEB).

## FINDINGS

In this qualitative, phenomenological study, the data obtained are presented by thematically examining the views of participants working in public and private educational institutions through sub-problems.

### Participant information

Demographic information regarding participants in public and private institutions is presented in Table 4.

**Table 4.** Demographic information of the participants.

| Demografic Area | Variable | Public(n) | Private (n) | Total(n) |
|---|---|---|---|---|
| Gender | Female | 8 | 7 | 15 |
| | Male | 8 | 7 | 15 |
| Seniority | 0-10 years | 0 | 5 | 5 |
| | 11-20 years | 7 | 5 | 12 |
| | 21-30 years | 8 | 5 | 13 |
| Educational Background | Bachelor | 13 | 9 | 22 |
| | Master | 1 | 5 | 6 |
| | Doctorate | 1 | 1 | 2 |
| Total | | | | 30 |

According to Table 4, there are a total of 30 teachers, five men and five women, employed in public and private educational institutions. Five teachers have 0-10 years of experience, twelve have 11-20 years, and thirteen have 21-30 years of experience. Of those employed in public institutions, 13 have a bachelor's degree, 1 has a master's degree, and 1 has a doctorate. Of those employed in private educational institutions, 9 have a bachelor's degree, 5 have a master's degree, and 1 has a doctorate.

### Findings Related to the First Sub-Problem of the Research

The findings regarding the data obtained from the participants on the sub-problem "Which AI tools do teachers use in their areas of expertise?" are presented in Table 5 below.

**Table 5**. AI tools used for different fields.

| Field | Public | | | Private | | | Total |
|---|---|---|---|---|---|---|---|
| | f | AI Tools Used | Other | f | AI Tools Used | Othermb | f |
| Primary Education | 1 | Duolingo | - | 1 | Duolingo | - | 2 |
| Turkish-Literature Education | 2 | Quizlet, WordBrain | - | 2 | Quizlet | Gemini, Chatgpt | 4 |
| Mathematics Education | 5 | Kahoot! Mathigon, Geogebra 3D, Mathgpt pro | Chatgpt | 10 | Kahoot! Mathletics, Mathigon, Dreambox Learning, IXL Learning, Wolfram Alpha, Geogebra 3D, Mathgpt pro, Desmos, Buzzmath, Mathspace, | - | 15 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Science Education | 2 | Science360 | Canva | 5 | Mystery Science, Little Alchemy, Science Journal, Physics Toolbox Suite, Google Teachable Machine | - | 7 |
| Physics Education | 2 | PhysX, PhET Simülasyonları | - | 2 | PhysX, PhET Simülasyonları | - | 4 |
| Biology Education | 2 | Charmm | Chatgpt | 2 | Charmm | Chatgpt | 4 |
| Chemistry Education | 1 | - | Chatgpt | 2 | Avagodro, Chemistry Questions | - | 3 |
| Social Sciences Education | 3 | N. Geographic Kids, Historia, Google Earth | - | 1 | Time Zone X, Historia | - | 4 |
| Information Technology Education | 3 | Code.org, Blockly, Kodable, Mathletics, | - | 4 | Code.org, Blockly, Kodable, Daisy the Dinosaur | - | 7 |
| Foreign Language Education | 4 | Gliglish, Reverso | Canva, Liveworksheets | 8 | Pi.ai, DeepL.io, Duolingo, Memrise | Claude 3.7 sonnet reasoning, sora Ai, Suno ai | 12 |

Table 5 shows that, according to their total values, participants used 2 of the AI tools recommended by the Ministry of National Education in classroom education, 4 in Turkish-Literature education, 15 in Mathematics education, 7 in Science education, 7 in Physics education, 4 in Biology education, 3 in Chemistry education, 4 in Social Sciences (Turkish-Republican) education, 7 in Information Technology education, and 12 in Foreign Language education. Accordingly, it is seen that the areas where AI tools were used most frequently were Mathematics education and Foreign Language education, while the areas where they were used least frequently were primary education and Chemistry education.

According to Table 5, among the AI tools suggested for the fields of study of participants working in public institutions, 1 was used in Primary Education, 2 in Turkish-Literature Education, 5 in Mathematics Education (with ChatGPT as the other tool), 1 in Science Education (with Canva as the other tool), 2 in Physics Education, 1 in Biology Education (with ChatGPT as the other tool), none in Chemistry Education (with ChatGPT as the other tool), 3 in Social Sciences (Turkish-Republican) Education, 3 in Information Technology Education, 2 in Foreign Language Education (with Canva and LiveWorksheets as other tools). It is observed that among public sector participants, those whose field is Mathematics Education use AI tools more than those in other fields. Furthermore, participants mostly prefer ChatGPT and Canva tools under the "other" category.

Table 5 also shows that among the AI tools recommended for the fields of study of participants working in private institutions, 1 was used in Primary education, 1 was used in Turkish-Literature education (with gemini and chatgpt as other tools), 10 were used in Mathematics education, 5 were used in Science education, 2 were used in Physics education, 1 was used in Biology education (with chatgpt as other tools), 2 were used in Chemistry education, 1 was used in Social Sciences (Turkish-Republican) education, 4 were used in Information Technology education, and 4 were used in Foreign Language education (with Claude, Sonnet Reasoning, Sora ai, Suno ai as other

tools). It is observed that participants whose fields are Mathematics education and Science education use AI tools more than those in other fields. In addition, participants mostly prefer the chatgpt tool under the "other" category.

**Findings Related to the Second Sub-Problem of the Research**

The findings regarding the data obtained from the participants on the sub-problem "What are teachers' opinions on the effects of AI tools in their areas of expertise?" are presented in Table 6 below.

**Table 6**. Areas of impact of AI tool usage.

| Public | | Private | |
|---|---|---|---|
| Themes | Participant opinion | Themes | Participant opinion |
| Content diversity | P2, P5, P7, P29 | Concretizing effect | P4, P11, P22, P10 |
| Practical appication | P7, P15, P20, P17 | Practical application | P8, P9, P12, P18, P19 |
| Neutral | P3, P16, P28, P27 | Neutral | P23, P26 |
| Visual richness | P5, P7, P17 | Visual richness | P11, P10 |
| Attention-grabbing | P7, P1 | Attention-grabbing | P6, P25 |
| Time-saving | P2, P20 | Time-saving | P22, P30 |
| Up-to-date information | P13 | Motivation | P4, P21 |

According to Table 6, the themes that emerged regarding the effects of AI tools on the areas of expertise of participants working in public institutions are: content diversity, practical application, visual richness, attention-grabbing, up-to-date information, time saving, and neutral. The themes that emerged regarding the areas of influence of AI tools are mostly related to content and learning experience processes. In contrast, the themes that emerged regarding the effects of AI tools on the areas of expertise of participants working in private institutions are: practical application, concretization effect, visual richness, time saving, motivation, and attention-grabbing. The themes that emerged regarding the areas of influence of AI tools are mostly related to content and learning experience processes. Original examples of participants' opinions on the effects of AI tools on their own areas of expertise are as follows:

P29PuMB29IT: *"It is significantly beneficial in creating materials for the development of instructional technologies."*
P20PuFB39F: *"Yes, it is useful for preparing presentations and practicing English speaking."*
P3PuMB25T: *"I don't know if it's effective because I haven't used it."*
P5 PuFB25S: *"It enriches the content and increases visuals, making learning more lasting."*
P1 PuMB25So: *"Yes, they are attention-grabbing."*
P2PuMB25M: *"I think it's effective for increasing variety in activities and for quick implementation."*
P13PuFB39B: *"It may have little effect, but it's good for accessing up-to-date information."*
P30PrMB29I: *"Personalized learning, time efficiency, and making learning concrete."*
P9 PrMB15F: *"Yes. It's great for creating voiceovers and visual materials, and lesson plans/programs can be prepared creatively and completely."*
P6 PrFB35F*: "Yes, the lessons become more engaging."*
P22PrFB25M: *"Yes, I think it's efficient in terms of saving time. It makes abstract concepts or topics more concrete, facilitating their transfer to the student and increasing retention."*
P18PrMB25T: *"Effective. I can easily create worksheets for reviewing topics."*
P23PrMM39F*: "I don't benefit from it."*

**Findings Related to the Third Sub-Problem of the Research**

The findings regarding the data obtained from the participants on the sub-problem "What challenges do teachers face in using AI tools?" are presented in Table 7 below.

**Table 7**. Challenges in using AI tools.

| Public | | Private | |
|---|---|---|---|
| Themes | Participant opinion | Themes | Participant opinion |

| | | | |
|---|---|---|---|
| Technological proficiency | P2, P5, P13, P16, P17, P27 | Technological proficiency | P6, P8, P12, P21, P22, P23 |
| Hardware | P1, P7, P15, P24, P20 | Hardware | P19, P22, P30, P10 |
| Student profile | P7, P15, P24 | Student profile | P9, P19 |
| Adapting to change | P3, P14 | Adapting to change | P25, P26 |
| Being paid | P29 | Being paid | P18 |
| Time-consuming | P7 | Time-consuming | P4, P11 |
| Neutral | P27, P28 | - | |
| Exam pressure | P3 | - | |

According to Table 7, the themes that emerged regarding the challenges faced by participants working in public institutions in using AI tools were technological proficiency, hardware, adapting to change, student profile, time-consuming, and exam pressure. These themes mainly stemmed from participants' lack of digital literacy rather than challenges related to the use of AI tools themselves. In contrast, the themes that emerged regarding the challenges faced by participants working in private institutions in using AI tools were technological proficiency, hardware, student profile, time-consuming, and being paid. Original examples of participant opinions on the challenges they faced in using AI tools are given below:

P2PuMB25M: *"I sometimes have difficulty using the tools and give up because I don't have much information about their detailed use."*
P15PuFB25F: *"Student attitudes, school equipment problems."*
P3PuMB25T: *"The desire to continue methods that have been applied and yielded results for years, adherence to the past, exam pressure."*
P28PuMB39C: *"I don't know because I haven't used them."*
P29PuMB29I: *"The biggest problem I encounter in using artificial intelligence tools is that the pro versions of the tools are paid and the free versions are insufficient."*
P7PuMD39T*: "Student reluctance, inadequate physical environment, the long preparation process for the teacher."*
P8 ÖFB29T: *"I can say my technology usage skills. I could use it more effectively, but I'm not a very technological person."*
P30PrMB29I: *"The computer and internet being slow*."
P25PrFM39C*: "Adapting to change."*
P9PrMB15F: *"From my point of view, there are no difficulties. Only the student profile might affect it."*
P11PrMD15S: *"Sometimes we have difficulty with things like keeping up with the curriculum, and we can't use AI tools. We generally have time constraints."*
P18PrMB25T: *"The biggest difficulty is that these tools require login everywhere and require pro upgrades."*

**Findings Related to the Fourth Sub-Problem of the Research**

The findings regarding the data obtained from the participants on the sub-problem "Which methods and resources do teachers prefer when they want to receive training on AI tools?" are presented in Table 8 below.

**Table 8.** Preferred methods and resources when seeking training on AI tools.

| Public | | Private | |
|---|---|---|---|
| Themes | Participant opinion | Themes | Participant opinion |
| Individual means | P1, P2, P5, P13, P15, P20, P27, P29 | Individual means | P4, P9, P10, P11, P19, P21, P23, P30 |
| MEB (Ministry of National Education)organizations | P3, P5, P7, P13, P15, P16, P17, P28 | MEB (Ministry of National Education)organizations | P6, P8, P12, P25, P30 |
| Technology-producing institutions | P2, P13, P14, P20, P24 | Technology-producing institutions | P18, P22, P26 |

| | | | |
|---|---|---|---|
| ÖBA (Teacher Informatics Network) | P7 | University | P4, P12, P22 |

According to Table 8, the themes preferred by participants when seeking training on AI tools, in terms of methods and resources, are ranked as follows: their own resources, Ministry of National Education organizations, technology-producing institutions, and the Teacher Informatics Network. In contrast, the themes preferred by participants working in the private sector when seeking training on AI tools, in terms of methods and resources, are: their own resources, Ministry of National Education organizations, universities, and technology-producing institutions. Original examples of participant opinions on which methods and resources they prefer when seeking training on AI tools are given below:

P20PuFB39F: *"I prefer my own resources."*
P28PuMB39C: *"Ministry of National Education organizations."*
P24PuMB35I: *"Any technology organization that is proficient in the field."*
P7PuMD39T: *"ÖBA is quite good at the basic level, and the Ministry of National Education's face-to-face trainings are also good."*
P9PrMB15F: *"I learn through YouTube or by discovering on my own how to use it."* K6 ÖKL35Y: *"Ministry of National Education organization."*
P4PrFM15M: *"My own resources and the trainings provided by the university I attend."*
P30PrMB29I: *"Generally my own resources. If I have time, Ministry of National Education trainings."*

**Findings Related to the Fifth Sub-Problem of the Research**

The findings regarding the data obtained from the participants on the sub-problem "How do teachers interpret the effects of AI tools on their professional futures?" are presented in Table 9 below.

**Table 9.** Thoughts on the career future of AI tools.

| Public | | Private | |
|---|---|---|---|
| Themes | Participant opinion | Themes | Participant opinion |
| Replacing the teacher | P2, P7, P16, P27, P29 | Replacing the teacher | P6, P9, P11, P22, P30 |
| Communication problem | P13 | Communication problem | P12, P22, P25 |
| Inclination to easy way out | P3, P14, P20, P24 | Restricting development | P8 |
| Transition to personalized education | P1, P28 | Rapid access to information | P4, P8, P10, P12, P18, P19, P21, P23, P26, P30 |
| Need for teacher training | P5 | - | - |

According to Table 9, the themes that emerged regarding participants' thoughts on AI tools for their professional futures are ranked as follows: replacing the teacher, inclination to easy way out, transition to personalized education, communication problems, and teacher training. In contrast, the themes that emerged regarding the thoughts of participants specifically on the professional futures of AI tools are ranked as: rapid access to information, replacing the teacher, communication problems, and restrictive development. Original examples of participants' opinions on how they interpret the effects of AI tools on their own professional futures are given below:

P29PuMB29I: *"Since my profession is computer-related, I can play a role in the development of artificial intelligence, but I have no doubt that artificial intelligence will replace us in all professions, not just mine."*
P3PuMB25T: *"It's true that artificial intelligence offers an unavoidable opportunity in a changing world, but it could negatively impact human creativity because it might lead to situations where AI does homework (for example, writing a story for a Turkish class assignment).*
P14PuMB31P: *"In countries like ours, it will be used more for its negative aspects, such as fraud and deception."*

P1PuMB25So: *"One of the areas that will have the biggest impact is definitely education. It will greatly contribute to self-learning."*
P16PuFB39M: *"I think it will be useful in terms of preparing and generating questions, but I think it will be negative in terms of maintaining the profession."*
P13PuFB39B: *"…communication problems may arise, as we experienced during the COVID period with distance education."*
P5PuFB25S: *"In order to cultivate academically strong students, it is necessary to train technologically strong students as well. For this, I think it is essential that teachers undergo these trainings first."*
P12PrFB31P: *"My hopes are for more effective use of information resources. My concerns are that it will damage human relations."*
P9PrMB15F: *"There may be no need for language teachers, or even language learning."*
P22PrFB25M: *"With the development of artificial intelligence, perhaps in the future there may be no need for human beings in the teaching profession. Therefore, individuals who are more technologically inclined may emerge. While this has positive aspects, it may also have negative aspects in terms of communication."*
P8PrFB29T: *"For now, it is definitely a great convenience, but in the future, I see it as an area that will restrict a person's own development."*

## CONCLUSION AND DISCUSSION

This research, based on data obtained from participants regarding AI tools used in education, reveals that very few AI tools are recognized and used in public and private educational institutions. Overall, based on their total values, only 2 AI tools recommended by the Ministry of National Education (MEB) were used in primary education, 4 in Turkish-Literature education, 15 in Mathematics education, 7 in Science education, 7 in Physics education, 4 in Biology education, 3 in Chemistry education, 4 in Social Sciences (Turkish-Republican) education, 7 in Information Technology education, and 12 in Foreign Language education. Accordingly, it is observed that AI tools are used most frequently in Mathematics education and Foreign Language education, while they are used least frequently in primary education and Chemistry education. The research shows that participants did not utilize a significant portion of the AI tools recommended by the MEB for use in education. Therefore, the fact that participants used very few of them is significant, as it may indicate that there will be considerable difficulties in widely employing AI in education in the future.

The frequency of AI tool use in private institutions is higher than in public institutions. In both types of institutions, AI tools are used more frequently in Foreign Language education and Mathematics education compared to other fields. Furthermore, ChatGPT and Canva are mostly preferred as other AI tools in all fields. The findings show that those with 0-10 and 11-20 years of experience use AI tools more than those with 21-30 and 30+ years of experience. In this respect, the research aligns with the studies of Avcı et al. (2019) and Clark-Wilson et al. (2014), which argue that the necessary integration between digital technologies and education is not happening quickly and is facing resistance. Additionally, considering that the data for this study was collected in April and May 2025, it reveals that participants did not attend in-service training on the introduction of AI tools within the framework of the 2024-2025 action plan, that these trainings were insufficient, or that no trainings existed.

The study reveals that participants from both public and private institutions share similar views regarding the impact of AI tools in education. They stated that AI tools visualize abstract concepts, making content concrete, facilitating application and practical processes, saving time, increasing motivation, and having a curiosity-inducing and attention-grabbing aspect. The findings show that participants use AI tools most effectively in the content and learning experience processes. The research aligns with the studies of İşler & Kılıç (2020) and Özer et al. (2023) in terms of providing virtual reality and immersive environments, and with the studies of Akdeniz (2019), Alanoğlu & Karabatak (2021), Çam et al. (2021), and Güler (2020) in terms of saving time.

The challenges encountered in using AI tools are classified as lack of environmental equipment, characteristics of the student profile, time-consuming preparation processes, and the fact that some AI tools are paid for due to upgrades. Furthermore, the findings reveal that participants with

20 years or more of experience show more resistance to technology use and change than to the challenges of using AI tools; in other words, this resistance stems from insufficient digital literacy levels. The research is consistent with the studies of Bayraktar et al. (2023) and Özer et al. (2023) regarding environmental equipment and student profile. The study shows that participants are willing to use AI tools and have a need for training, and while they mostly try to meet this need "through their own resources," they feel the need for the Ministry of National Education's organizations in terms of development and access to resource materials. Additionally, the fact that participants indicate learning through their own means as their first choice when receiving training on AI tools can be interpreted as an indication that they have embraced lifelong learning. This situation can also be considered an indicator that participants find the in-service training provided by their institutions insufficient.

Participants expressed the impact of AI tools on their professional futures as follows: AI tools could partially or completely replace the role of teachers, personalized education would become significantly more prominent, but communication skills among students might weaken, easier access to information could increase the risk of students becoming complacent, and accelerating teacher training in the age of technology would become a necessary need. The research supports the statements of Oakley et al. (2025) regarding AI tools making people lazy and accustomed to comfort; Alkayış (2021), Aşık et al. (2023), Çetin & Akbaş (2021), Kış (2019), and Uzun et al. (2021) regarding AI tools replacing teachers in the future; and Aslan (2019), Gençer (2019), Güler (2020), Yılmaz & Kaleci (2025), and Yılmazsoy (2020) regarding AI tools bringing personalized education to the forefront.

When the research findings are considered holistically, they indicate that AI tools are increasingly becoming a key functional tool in teaching processes, both supporting learning and enriching instructional design. The study emphasizes that AI tools have made transformation in education inevitable, and that for this transformation to occur effectively, teacher training must be strengthened, internal support mechanisms must be improved, and digital literacy urgently must be increased.

## SUGGESTIONS

Given the rapid development of AI, it is crucial for all educators to closely follow the changes in this field. In this regard, in-service AI seminars can be accelerated to help educators and administrators to improve the learning journey within their institutions by focusing on the application of AI tools in education.
The effectiveness of in-service seminars given to teachers within the Ministry of National Education can be examined and improved. The data obtained can be used to provide educational administrators and policymakers with guiding solutions in digital transformation processes.

In-service training on AI tools for teachers can be coordinated with training on AI tools for students, in terms of time and quality.

To monitor digital transformation in education and curricula, experimental, quasi-experimental, or mixed-methods studies can be conducted to examine the impact of AI tools on students. To overcome the difficulties created by upgrades in terms of using AI tools, collaborative development of domestic AI tools can be undertaken by institutions.

**Researchers' Contribution Rate**
The authors contributed equally to the study.

**Support and Acknowledgements**
The authors did not receive any financial support for this study.

**Conflict of Interest**
The authors declare that there are no conflicts of interest in this study.

**Ethics Information**
Research and publication ethics have been adhered to. Ethical approval for this research was obtained from the Kırşehir Ahi Evran University Social and Human Sciences Scientific Research Ethics Committee (Date: 30.04.2025, Number: 2025/08-43).
According to the Circular on Research Implementation Permits, the implementation permit for the research with application number MEB.TT.2025.026522 has been approved by the relevant units of the Ministry of National Education (MEB).

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