



Integration of AI into Education: Teachers' Perspectives on Competencies, Challenges, and Needs

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This qualitative study examines the perspectives of in-service teachers regarding the integration of Artificial Intelligence (AI) into educational settings. A purposive sampling framework combining criterion and snowball sampling strategies was employed, semi-structured interviews were conducted with 23 in-service teachers. Data were analyzed through content analysis. The analysis revealed three themes: teachers' current digital practices, AI acceptance and integration of AI. The findings showed that teachers currently use digital technologies for various pedagogical purposes and have also begun using AI technologies in educational settings. Also, teachers perceived AI as useful because of easier access to information, time efficiency, decision-making support, personalized feedback, and professional development. However, they also expressed pedagogical and ethical concerns regarding student overreliance, academic dishonesty, the potential misuse of AI, data security, and the digital divide. The results indicate that, given the multifaceted nature of AI technologies successful AI integration requires specific teacher competencies, particularly critical AI literacy and ethical awareness competencies. Findings also suggest that successful integration requires practical, subject-specific training for both in-service and pre-service teachers, training for students, family engagement, and financial support. This study provides insights into how teachers use AI technologies, their perceptions of required competencies, the challenges and concerns they perceive. Limitations and suggestions for future research are also discussed.

1. Introduction

According to recent global reports, the successful integration of AI technology has the potential to address persistent challenges in education (World Economic Forum Report [WEF], 2024; Robert et al., 2025). Without sufficient time to evaluate the potential benefits and risks, educators suddenly found this technology placed at the center of the educational setting. The reaction of educators ranged from anxiety to enthusiasm. Some of them feared issues like cheating, plagiarism, and academic integrity, along with other negative impacts of this technology on students (Mishra et al., 2023). Concurrently, research studies began exploring the pedagogical applications of GenAI, such as using AI-based chatbots to provide learner feedback (Dao et al., 2023), generating role-playing activities for real-world applications (Mogavi et al., 2023), facilitating after-class reviews (Lee et al., 2022) and collaborating with AI-based chatbots on lesson plan preparation (Lou, 2023).

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While utilizing and studying the potential of AI-based tools, AI literacy concepts have also come to light. AI literacy was introduced in the literature and defined as understanding the basic techniques and concepts behind AI tools (Kandlhofer et al., 2019). Later research expanded this definition to include communication and collaboration with AI, initiating discussion on introducing AI literacy to K-12 students (Long & Magerko, 2020). Generative AI technologies are transforming the role of educational stakeholders, particularly teachers. Teachers are at the center of this pedagogical adaptation, facing a critical need to develop specific competencies for the effective use of AI technologies (Celik, 2023; Ning et al., 2024).

Teachers play a significant role in effective technology integration. For successful technology integration, the Technological Pedagogical Content Knowledge (TPACK) framework provides a foundational model for understanding its dynamics (Mishra & Koehler, 2006). According to Koehler and Mishra (2009), there are three equally important knowledge areas for teachers: content, pedagogy, and technology, which interact with one another. In the end, these independent domains converge into TPACK, which represents the synthesized competence required to seamlessly integrate the most appropriate technological tools with effective pedagogical approaches to teach specific content effectively (Mishra & Koehler, 2006). In other words, for effective technology integration, teachers must not only understand the technology itself but also the pedagogical approaches necessary for teaching the content.

As this technology spreads rapidly in education, extended TPACK models have emerged in literature. For instance, Ning et al. (2024) reexamined the interrelationship of technology, pedagogy, and content knowledge and defined AI literacy as a subset of technology literacy and proposed the field of AI-TPACK as a subset of TPACK, which is defined as the intersection of technology, pedagogy, and content knowledge. As they defined it, AI-TPACK includes the AI technological capacity to use AI to explain subject concepts, employ pedagogical skills creatively in teaching with this tool, utilize AI to deal with concept learning challenges that students face, and use its applications to either develop new epistemologies or reinforce existing ones based on fundamental principles. Moreover, Çelik (2023) underlined the importance of teachers' AI-specific technology, pedagogical knowledge, and ethical evaluation of AI to successful technology integration and extended the TPACK model as intelligent-TPACK. In this model, Çelik (2023) integrated ethical knowledge of teachers on AI-based tools into the TPACK model.

On the other hand, UNESCO (2023) published guidance for GenAI use in education and research, then developed competency frameworks for both teachers (2024a) and students (2024b) to effectively use AI in educational settings. UNESCO's competency framework for teachers addresses both the potential and challenges of AI in teaching by defining five core aspects: "human-centered mindset", "ethics of AI", "AI foundation and applications", "AI pedagogy", and "AI for professional development", structured across three levels of progression.

Despite the growing body of literature on integration of AI in educational settings, teaching AI literacy, needed competencies, and the effect of AI tools on learning outcomes, there is a necessity to understand the perspectives of the key drivers of this adaptation: the teachers. Teachers need to develop specific competencies for effective AI use in education (Çelik, 2023). Studies in the literature on teachers seem to cover specific groups of subject areas such as Mnguni et al. (2025) underlined the importance of context-specific support for science teachers, while Özenoğlu et al. (2026) focused exclusively on preschool teachers. Besides, some studies provide localized regional perspectives. Tripathi et al. (2025) revealed that while teachers in

India embrace potential of AI tools to improve learning, they also suspect students' overdependence and erosion of critical thinking. Therefore, understanding how teachers perceive and use AI technologies in educational settings and their perspectives on required teacher competencies for effective AI integration will address the gap in literature. Therefore, this qualitative study aims to explore the holistic perspectives of in-service teachers who have actively utilized AI tools in educational settings. To achieve this goal, this study is guided by the following research questions:

- (1) What are the current digital practices of teachers in their professional lives?
- (2) How do teachers perceive and use AI technologies within educational contexts?
- (3) What are the required competencies and needs for successful AI integration into education?

2. Methodology

2.1. Research design

This study employed a qualitative research design. Qualitative research is a type of research that follows a qualitative process aimed at exploring perceptions and experiences in a realistic and holistic manner within natural setting (Yıldırım & Şimşek, 2016). According to Creswell (2013), qualitative research is particularly well-suited for investigating novel subjects when existing understanding is still limited. A qualitative approach aims "rely as much as possible on the participants' views of the situation" (Creswell, 2013). This design was specifically chosen to explore how teachers experience the integration of AI and how they perceive its associated benefits, challenges, and ethical considerations in education.

2.2 Participants

This study utilized a combination of criterion and snowball sampling strategies. To ensure the depth of the data, two criteria were established for participant selection: (1) having a minimum of two years of teaching experience and (2) actively integrating AI technologies into their professional practice. Furthermore, a snowball sampling technique was employed; initial participants were asked to recommend colleagues who actively use AI in education. Consequently, 23 volunteer in-service teachers (10 male and 13 female teachers) participated in the study. Participants were drawn from five Turkish cities, with the majority working in Amasya (n = 11) and Ankara (n = 6), followed by Çorum (n = 3), Istanbul (n = 2), and Hakkari (n = 1). The demographic characteristics of the participants are presented in Table 1.

Table 1. Characteristics of participants

Participant	Gender	Subject Area	Teaching Experience	School Level
T01	Female	Information technology	22	Elementary school
T02	Male	Special education	7	Special education school
T03	Male	Information technology	7	High school
T04	Male	Information technology	8	High school
T05	Female	Information technology	2	Elementary school
T06	Male	Information technology	20	Middle school and high school
T07	Male	Information technology	17	Middle school
T08	Female	English language teaching	7	Middle school
T09	Female	Physical education	6	Preschool

T10	Male	Technology and design	18	Middle school
T11	Female	English language teaching	22	High school
T12	Male	English language teaching	3	High school
T13	Male	Primary education	14	Elementary school
T14	Female	Primary education	31	Elementary school
T15	Male	Information technology	6	Middle school
T16	Female	Visual arts	30	High school
T17	Female	German language teaching	10	High school
T18	Female	Visual arts	3	Middle school and high school
T19	Female	Primary education	3	Elementary school
T20	Male	Music	13	Middle school
T21	Female	Turkish language	19	Middle school
T22	Female	Religious culture and ethics	3	Middle school
T23	Female	Information technology	8	High school

2.3 Data collection and analysis

Data collection was initiated after receiving formal approval from the ethics committee of Amasya University. (Ref No: XXX). Data were collected using semi-structured interview forms. The interview form was initially developed by the researcher based on a comprehensive literature review. Subsequently, an experienced qualitative researcher in the field of instructional technology and the researcher discussed each of the questions and agreed on the final version of the form. Following this, a pilot interview was conducted. The researcher revised the form based on the interviewee's feedback. The interview form included questions such as, "What competencies do you believe are necessary for a teacher to utilize AI technologies effectively within educational settings?" and "In your opinion, how should AI applications be integrated into educational settings?"

Data were collected through face-to-face interviews. A total of 463 minutes of digital audio recordings were obtained. Content analysis was used to analyze and interpret the data. Creswell's (2012) six-step framework guided the analysis. Initially, the data were prepared for analysis by transcribing the interviews and ensuring participant anonymity using pseudonyms. The transcribed dataset consisted of 48,053 words. The transcribed interview files were labeled as T1, T2 etc. to provide anonymity. These files were then imported into NVivo 9 for analysis. In the second stage, the researcher read and reread the transcripts to gain a comprehensive overview of the data before initiating the coding process. Third, to ensure coding credibility, the researcher and two specialized qualitative researchers initially coded one interview individually and then reviewed the codes, decided on themes together by negotiation, and agreed on codebook. While the rest of the interviews were coded by using this code book, emerging codes were also discussed and agreed with these two specialized qualitative researchers. After that, the primary researcher and an independent qualitative researcher (a PhD holder in Educational Technology) independently coded three selected interviews and intercoder reliability was calculated by the formula ($Reliability = \frac{Number\ of\ Agreements}{[Total\ Number\ of\ Agreements + Disagreements]}$) suggested by Miles and Huberman and the agreement rate was 87% (1994, p.64).

Then, the researcher determined the most effective way to visualize and represent these findings. Fifth, the results were interpreted in relation to the existing literature. Finally, the accuracy and credibility of the findings were validated through rigorous qualitative measures



such as member checking, peer debriefing and detailed description.

3. Findings

The findings are organized and presented according to the themes that emerged namely, teachers' current digital practices, AI acceptance, and AI integration in education. These themes are presented in Table 2.

Table 2. Themes, categories and codes

Theme	Category	Codes
Current digital practices	Reason to use technology	content preparation material development engagement project design assessment and evaluation and professional development
	Type of technologies utilized	web 2.0 tools video editing tools audio editing tool open education platforms
AI acceptance	Perceived usefulness	practicality ease of info access time-saving decision-making support individualized feedback professional development
	Perceived challenges and ethical concerns	overreliance data security hallucination academic dishonesty digital divide the potential misuse of AI deep fake manipulation
AI integration	Possible utilization of AI in education	assessment & evaluation planning material development activity design personalized instruction ai-supported trips behavior analysis
	competencies	digital literacy AI literacy digital citizenship critical thinking ethical awareness pedagogical leadership professional development guiding students in AI usage and family engagement
	Needs	in-service training training for students

documents
financial support
pre-service teacher training

3.1. Teachers' current digital practices

This theme reveals the specific purposes and types of technologies teachers integrate into their professional practice. According to the findings (see Table 2), all participating teachers use technology in their classrooms. They use it for *content preparation, material development, student engagement, project design, and assessment and evaluation*. For instance, T12 emphasized the role of digital platforms in instructional planning as “*While lecturing, we get ideas from there [digital platforms]; we get ideas on how to explain a topic or how to conduct the lesson.*” Similarly, T22 highlighted the use of technology in material development as “*I use technology both for creating bulletin board materials and preparing visuals to provide effective learning for students.*” Furthermore, T2 and T15 noted that they use technology for student engagement, while T5 and T7 emphasized its importance in project development. One of the teachers (T10) stated using technology in preparing exam questions for assessment and evaluation.

The findings also showed that teachers use various technologies in their professional lives. Teachers stressed that they use technology in and outside school. Most of the participants reported using Web 2.0 technologies in the classroom. T14 noted, “*I use Web 2.0 tools to create, ..., I create cartoons and I use them in the lectures. Like, I use Kahoot.*” T22 pointed out, “*I use Web 2.0 tools regarding video design or editing visuals for the work our children do*”. They also underlined that they use technology for editing videos and preparing presentations. Besides these, participants pointed out that they use technology for professional development. They stated that they use open educational platforms like the Education Information Network (a digital platform of the local ministry of education), YouTube, Udemy, and Khan Academy. For example, T2 stressed that as “*There are open-source websites. One of them is Udemy, and I try to use it.*”

3.2. AI acceptance

Another theme that emerged from the findings is *AI acceptance*. Under this theme, two main categories were identified: perceived usefulness, and perceived challenges and ethical concerns.

3.2.1. Perceived usefulness

According to the data, all of the participants consider AI useful for their daily and professional lives. For example, T13 stressed that “*Overall, for society, and more precisely for individuals, this [AI] is actually an invaluable asset. If it develops further, which it seems it will, it could greatly benefit individuals. It could contribute significantly.*” Similarly, T2 expressed his perception and concerns by stating “*Yes, AI actually has great benefits for society, but the purpose for which these AI tools collect data from people is very important. That sometimes bothers me.*”

Participants highlighted the usefulness of AI in various aspects. The most frequently mentioned one was *practicality* (n = 15). For instance, T3 described practicality as “*I can say that you can create a presentation within minutes using its application, which would normally take 4 or 5 hours of your day.*” Moreover, T8 and T6 qualified AI with the *in vivo* code “practical.” The

second one was ease of access to information (n = 10). T18 explained this ease as follows: *"I can easily access everything without putting in any effort. That's good for me, why? Because I do research, I prepare for classes."* Similarly, T2 underlined this issue as *"In terms of benefits, society can now access information more quickly and effectively."* The third one was time-saving (n = 7). In this regard T21 exemplified this as *"I think people realize that the most valuable thing right now is time, even more than money. And in terms of saving time, I find AI quite suitable."* The next code in this category was *decision-making support*. Participants emphasized that AI technology presents many possibilities, and this helps with decision-making. T22 explained it as *"Presenting us with variety sometimes allows us to use ideas we hadn't thought of at that moment, or to use the visual in a different way. When we see an example, it helps us to improve it further."* Moreover, AI was perceived as useful in giving advice. For example, T4 highlighted this as *"AI, where the teacher gets blocked, when they ask about the points they are stuck, can give them the answers that a truly experienced teacher could give; it can guide them."* Under this category, *individualized feedback* (n = 1), *professional development* (n = 1) and *updating subject knowledge* (n = 1) were also identified.

3.2.2. Perceived challenges and ethical concerns

Despite the perceived usefulness, participants underlined significant concerns about utilizing AI in education. First, *overreliance* (n = 14) and *academic dishonesty* (n = 5) emerged as the primary pedagogical concerns among teachers. For instance, T21 stated, *"Its potential harm is that it will get people and students used to taking the easy way out. It will get people used to taking the easy way out like this. It has such a harm."* Regarding academic dishonesty, another teacher explained: *"Well, as for its risky aspects, I think for students, I mean, it can be risky with student use. You give an assignment. And the child can just do it on ChatGPT and bring it to you...That's how I think it is."* One participant also highlighted their ability to intuitively detect AI-generated homework, noting: *"I mean, the assignments I give, generally, especially the writing assignments, my students have AI do them. We can feel this."* Second, participants stressed *data security* and *AI hallucinations* as the main technical and personal concerns. According to the data, data security was the most frequently mentioned concern (n = 17). Most of the participants questioned the trustworthiness of AI. For instance, T2 highlighted the worry of third-party data sharing, stating, *"The moment people start using AI, they ask everything ... I have security concerns regarding whether the shared information, you know, is shared with other people."* Beyond third-party use, T8 highlighted the issue of data harvesting, expressing their concern as *"It actually gets hold of all your personal information. I mean, from the moment you download it to your mobile phone, whether it's the scans or the things you search for."* In addition to security, participants pointed out *hallucination* as a significant technical limitation. For example, T10 exemplified this issue through a personal experience, stating: *"From time to time, it can provide incorrect information, it can mislead; for example, in one of our projects, it wrote the wrong code."* Moreover, one of the participants underlined the risk of a widening *digital divide*, explaining, *"It's advancing very rapidly. And because it's advancing so rapidly, I also see this as a somewhat negative aspect: keeping up and providing these opportunities can sometimes be difficult. This is partly due to insufficient financial resources. Therefore, while some children in the world, or in any country, or even within a classroom, may have quicker access to these AI-related opportunities, others may have less access, leading to a situation where, how should I put it, some children may fall behind."*

The data revealed that alongside the perceived challenges of AI, teachers had ethical concerns regarding AI utilization. *The potential misuse of AI* (n = 16) emerged as a leading issue in this

regard. For instance, T16 underlined the dual-use nature of AI: *“As with everything, the risks are very high, of course. If used well and for good purposes, AI is wonderful, but if used for evil, it can become something very dangerous.”* Furthermore, T17 exemplified the risk of malicious use concerning children and the lack of content moderation: *“Now, in situations where the use of AI is improper, students learn everything they shouldn't learn. I mean, it can start with learning bad words.”* Within the data, *deepfakes* and *manipulation* were described as forms of malicious use. Highlighting this issue, T20 noted: *“I also think that AI, in the hands of an individual with moral issues, could put people in very difficult situations. For example, it could take a short conversation a person has and turn it into different or disturbing audio recordings.”* Moreover, T15 stressed the possibility of using AI to deceive people, while T2 questioned the underlying intentions of tech firms in collecting such a vast amount of data.

3.3 AI integration in education

According to the data analysis, teachers have started to use AI technologies, and they believe it can be used in various aspects of education. They also think that for successful AI integration there are specific needs, and teachers should possess certain competencies. Therefore, the *use of AI in education*, *competencies*, and *needs* were the categories that emerged under this theme.

3.3.1. Use of AI in education

The data analysis showed that participants had started to use AI technologies in education for various purposes and thought that it could be beneficial for education in many areas. *Assessment and evaluation* (n = 15), *instructional planning* (n = 11), *material development* (n = 9), *activity design* (n = 7), *personalized instruction* (n = 4), *AI-supported trips* (n = 3), and *behavioral analysis* (n = 1) were the codes that emerged under this category. First, most of the teachers stated that AI technologies can be used for assessment and evaluation purposes, and some of them noted that they had begun to use it for this purpose. For example, T19 stated that AI can be used to design evaluation tests for students, and T21 stated that AI can be used to design individualized tests according to students' needs. Similarly, T6 underlined the capacity of AI in evaluating student performance: *“When you give AI needed data and the grades received on the exams, it can tell you with a very high probability which students did not understand which topics.”*

Second, participants stated that they had started to use AI technology for planning their lessons. For instance, T17 explained this as *“In lesson preparation, for example, a short summary from ChatGPT of the topic I will teach the next day, or, you know, a variety of exercises when I give the right level-based prompts, but again, after it goes through my review... this is how I use it.”* In addition, T13 underlined the potential of AI in understanding students' needs and planning instruction accordingly:

If it were used right from the very beginning...of the 1st grade, it would be very beneficial in this regard. Who is lacking where? Which child has an aptitude for which area, let's say, this is also an important issue, I mean. It would be very beneficial. In instructional preparation, if we know exactly what those children need, if we know exactly, literally, what and to which topic how much time should be allocated, it would be very beneficial.

Third, participants stated that they use AI for material development and thought that AI could be useful for this in education. For example, T1 shared that they used AI in preparing personalized storybooks for 1st graders. T2 mentioned using AI technologies for visual material

preparation. Emphasizing efficiency in creating presentations, T10 explained: *“In preparing presentations, again, there are times we use AI, we benefit from AI. Again, when we type the content in, it automatically divides it into pages according to the content itself.”* Besides this, teachers stated that they use AI for designing classroom activities. For instance, T19 emphasized how AI is used in activity design: *“Sometimes we can also experience difficulties in generating activities; I mean, we want different activities, and actually, we can also find different activities by asking ChatGPT.”* Similarly, T4 shared how they practically use AI in designing activities as *“I have a class tomorrow, I will do an activity, but if no activity comes to my mind, for example, I use AI.”*

Another potential use of AI in education that participants stated was personalized education. Three of the participants emphasized the use of AI in second language teaching and its capacity for individualized speaking practice. One of the participants highlighted its potential in supplementary education and addressing specific learning gaps: *“Especially in subjects the student cannot understand, the parts where they fall short can be completed with the support of AI. I mean, it can be used for supplementary education.”*

Surprisingly, AI-supported trips were another possible use of AI in education that emerged from the data. Two of the participants stated that with the help of virtual reality glasses and AI, students who do not have the opportunity to go to important areas related to the curriculum could virtually see them. Interestingly, one of the participants emphasized AI’s use in virtual historical trips, noting, *“For example, it could be historical sites...to a student who has never been to Anıtkabir or has never seen Çanakkale, with AI, they can be made to feel as if they have been there, even though they haven't actually gone.”*

Lastly, another participant teacher, whose subject area was special education, highlighted AI’s potential for behavior analysis as *“Perhaps, if the classroom environment could be monitored with AI through a camera, if it could be monitored with AI support, it could measure or evaluate for me, you know, to what level the students' problem behaviors are escalating.”*

3.3.2 Competencies

According to the data, the effective use of AI in education requires specific competencies on the part of the teacher. These competencies emerged as *digital literacy* (n = 16), *AI literacy* (n = 15), *digital citizenship* (n = 6), *critical thinking* (n = 6), *ethical awareness* (n = 6), *pedagogical leadership* (n = 4), *professional development* (n = 2), *guiding students in AI usage* (n = 2), and *family engagement* (n = 1). First, most of the participants stressed the importance of digital literacy as a prerequisite competency to effectively utilize AI in education. For example, T1 underlined the importance of digital literacy stating: *“teacher, they need to know technology well. It is not possible for someone who doesn't know technology to say, 'Let me find something related to AI and integrate it into my classroom, into my lessons.’”* Similarly, T23 emphasized the importance of technological knowledge: *“Teachers need to have good knowledge of technology in order to be able to use AI well in the educational process.”* Building upon digital literacy, participants strongly emphasized the necessity of AI literacy. Participant teachers were aware of the necessity of AI literacy to use it effectively in education. T2 noted this in their own words as *“Every teacher needs to learn how to use AI applications, especially ChatGPT.”* Additionally, participants stressed the importance of digital citizenship, underlining that teachers should know what personal data is, how to protect their students’ data, and their responsibilities as digital citizens.

The data analysis also reveals that participants underlined the importance of critical thinking in

utilizing AI. This competency was associated with judging the reliability of the AI-generated information and choosing the best content and AI tool for students. For example, T22 pointed out the importance of critically analyzing AI-generated information and eliminating hallucinated or fake content. Highlighting the pedagogical aspect of this skill, T24 emphasized critical thinking by stating: *“First, I think [a teacher] needs to have the skill to use several AIs and identify their similarities, differences, and which ones are unsuitable for the material or instructional design it will develop.”* Another competency that participants frequently mentioned was ethical awareness. With respect to this code, T2 and T4 used the *in vivo* phrase “being ethical” to describe an important competency for AI integration. T5 underlined ethical behavior on the Internet, stating that teachers should know and adhere to digital ethics. Furthermore, T6 explained the ethical role-model responsibility of teachers: *“First of all, teachers themselves need to adhere to ethical rules. For example, AI can prepare a presentation using information it receives but taking that presentation and directly presenting it to the student is completely wrong.”*

Furthermore, another competency identified in the data was pedagogical leadership. Participants thought that teachers who are competent in AI use should act as pedagogical leaders within the school. T22 clearly underlined this role as *“If we ourselves possess this expertise [AI knowledge], we can help our colleagues. This is very effective in the teachers' room. For example, when someone doesn't know can asks someone who does, ‘How should I use AI? How should I design it here?’, it actually becomes a kind of interactive learning environment. For instance, while you're explaining something I don't know, someone who doesn't know it also learns it.”* Moreover, two of the participants underlined the importance of professional development, stating that teachers should have the competence to continuously improve themselves and integrate new technologies into their classrooms. Besides this, two of the teachers underlined the importance of supporting students, describing it as a necessary competency of teachers for AI integration. For example, T3 explained this as *“Perhaps we should also allow students to learn by using AI to do some things.”* Interestingly, only T1 highlighted family engagement as a competency in AI integration. As a primary school teacher, T1 underlined the role of the family in supporting students' proper technology use at home, concluding that competency in family engagement plays an important role in AI integration in education.

3.3.3. Needs

The data analysis revealed that all participants expressed the need for certain conditions to be met for proper AI integration. These needs were organized under codes such as *in-service training* (n = 22), *training for students* (n = 4), *documents* (n = 2), *financial support* (n = 2), and *pre-service teacher training* (n = 1). First, participants voiced their demand for in-service training. For instance, T3 pointed out that: *“First of all, you must start by training the teacher. Directly. Now, we cannot just say to the student, ‘Here, my child, take AI and use it’; we need to start with the teacher first. The teacher needs to be aware of this technology so that they have the knowledge and skills to integrate it into their lessons, into their own subject area.”* Building on this, participants specified the desired format of this in-service training, expressing a clear preference for applied learning over theoretical instruction. Illustrating this demand, T12 stated that *“AI training workshops can be organized; for instance, I would provide practical hands-on sessions.”* In a similar tone, T17 underlined that in these in-service training sessions, the use of AI tools across subject areas and educational levels should be demonstrated.

Transitioning from teacher-focused needs to student-focused requirements, T14 underlined the

importance of the security issues and stated: *“As I was saying, since we are of a certain age, we can determine its reliability, but that is exactly why we need to show children the methods of safe use.”* Similarly, T11 and T15 emphasized the students’ need for guidance in using AI. Additionally, participants stressed the need for documents about how to use and apply AI technologies in education. For example, T2 expressed their needs regarding AI integration as follows: *“If I had the authority, my first action would be to provide in-service training to teachers on the use of AI. Beyond that, I might distribute printed materials on what can be done regarding AI applications.”* Remarkably, two of the participant teachers pointed out the cost of this technology and stressed that there should be financial support for teachers to maintain the technical infrastructure and pay subscription fees for these AI tools. Lastly, one of the participants stressed the importance of pre-service teacher training by saying, *“First of all, I think there should be training in faculties and universities right now. For teachers or educators. There should be courses related to AI.”*

4. Discussion and conclusion

AI is fundamentally restructuring the educational system by altering our understanding of learning, teaching, and the world itself (UNESCO, 2025). Within this transformation process, the role of teachers is crucial for effective adaptation of this technology. Aiming to explore the perspectives and lived experiences of the teachers, the findings of this study revealed teachers’ current digital technology practices, their acceptance of AI technologies, and their perceptions regarding effective AI integration in educational settings. In this section, these findings are discussed with existing literature.

4.1. Teachers’ current digital practices

The first theme that emerged from the data was the current digital practices of teachers. Results showed that teachers utilize digital technologies for a wide array of pedagogical purposes, such as content preparation, material development, student engagement, project design, assessment and evaluation, and professional development. Furthermore, they predominantly use Web 2.0 tools. These findings align closely with Mcknight et al. (2016), who found that teachers used technology for instructional planning, updating content, meeting students’ needs, and grading. Similarly, Blikstad-Balas and Klette (2020) concluded that teachers frequently use Web 2.0 tools -such as YouTube, Spotify, and Kahoot- in the classroom and reported utilization of presentations and educational websites.

A teacher’s ability to use various digital tools is a marker of their ICT competency (Van Braak, 2004) and it is described as one of the primary factors for effective technology integration in education (Lou, 2023; Turgut & Aslan, 2021). Moreover, *the European Commission’s Selfie for Teachers* framework explicitly identifies the skills to use digital technologies for material development, professional development, assessment and evaluation, and facilitating students’ performance identified as the core domains of digital competence for teachers (Economou, 2023). Therefore, the current digital practices observed in this study imply that teachers are actively broadening their technology utilization, employing various digital tools to support technology integration in schools.

4.2. AI acceptance

The second theme, AI acceptance, was linked to perceived usefulness, challenges and ethical concerns. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are the two key factors that lead to intention of technology

use (Davis, 1989). The current study revealed that teachers perceive AI as a highly practical and easy way to access information. Moreover, they think that it helps to save time. In addition, they perceived it as a reliable support in decision-making, updating their subject-area knowledge, and professional development. Furthermore, AI was perceived to be beneficial in providing individualized feedback. Overall, according to this study, teachers view AI – specifically GenAI- as a useful technology. Like our results, Sanusi et al. (2024) showed that teachers considering significant use of AI technology will enhance their instructional effectiveness. Likewise, in a large-scale study conducted in Estonia, Granström and Oppi (2025) concluded that perceived usefulness and teacher readiness are the most significant predictors of AI acceptance in teaching. Hence, our results support existing literature and suggest that teachers consider AI as a useful tool serves as a promising starting point for effective AI integration into educational settings.

In contrast to these positive perceptions about the usefulness of AI technologies, results also highlighted some drawbacks and ethical concerns. Overreliance, academic dishonesty, data security, AI hallucinations and the digital divide were highlighted as major concerns. In the literature, these challenges are not only K-12 teachers' worries, but also exist in higher education, including medical schools. For instance, recent studies underline the negative effects of AI on the critical thinking of users in health programs (Rosas-Jiménez et al., 2026), as well as deskilling medical students and its possibility to negatively affect medical education (El Tarhouny & Farghaly, 2026). Titus et al. (2026) also emphasize overreliance and cheating as a challenge in using AI in education. Supporting our findings, Döğler and Göçen (2025) found that K-12 teachers view privacy, overreliance, and the digital divide as the major problems, together with concerns about bias and AI-driven capitalism. Moreover, Pratiwi et al. (2025) revealed that doctoral students perceive overreliance and academic dishonesty as a possible problem in education and stress the need for verification methods for AI-generated content.

Interestingly, the results also revealed that teachers perceive AI tools as risky depending on the user's intentions. Teachers emphasized the dual-use nature of the technology and underlined that with harmful intentions; AI can become a dangerous tool for both society and education. Similarly, Umbrello and Natale (2024) underlined the possibility of deception and malicious use of technology with AI technologies as challenges.

4.3. Integration of AI into educational settings

For successful AI integration, teachers emphasized the importance of understanding how to use AI technology, identifying necessary competencies for teachers, and addressing needs. Previous studies underlined that lesson planning, material development, and personalized instruction are the areas that GenAI perceived to have potential (Zhang & Tur, 2024). Moreover, Çelik et al. (2022) underlined the potential of AI in those areas and added the potential of AI in digital assessment. Parallel to these studies, the findings of this study showed that teachers have already begun using AI for assessment and evaluation, instructional planning, material development, and activity design, and are determined to continue. In addition, teachers underlined the potential of AI in providing personalized education and behavioral analysis of students but noted that they have not yet utilized AI for these purposes. This potential is supported by Lee et al. (2022), who applied AI-based chatbots to provide feedback after class and showed an improvement in student's performance, self-efficacy, learning attitude, and motivation.

Despite this enthusiasm, the results clearly indicate that for a successful AI integration in

education, teachers should have some competencies. Digital literacy and AI literacy were the most frequently emphasized competency for successful integration. In addition to this, digital citizenship, critical thinking, ethical awareness, pedagogical leadership, professional development, and the ability to guide students, and family engagement were underlined as the competencies that teachers should have. These findings align with the AI competencies of teachers defined by UNESCO (2024a), which list AI literacy, the ethics of AI, critical AI pedagogy, and professional development as the competencies that teachers should have for successful integration. Moreover, Tagera et al. (2025) argued that understanding how AI works, critically analyzing the AI-generated content, and sensitivity to ethical issues are the skills that teachers should have for ethical AI literacy.

In addition to teachers' use of AI, teachers have a primary role in students' AI literacy. One of the important findings of this study is that teachers should have the competence to lead students' AI literacy. Similar to our findings, UNESCO underlines the guiding role of the teachers in leading AI literacy for students (2024b). Additionally, supporting our findings on family engagement, Zhang and Tur (2024) emphasized the family engagement and concluded that parents' use of GenAI has potential for supporting students' learning, providing resources, and enhancing interaction with the school.

Lastly, the findings showed that in-service teachers need practical, subject-oriented training on how to use AI in education. Findings showed that teachers need to see the practical implications of AI tools especially for their subject areas. Similarly, several studies have underlined the teachers need for training (Çelik et al., 2022; Tagera et al., 2025; Çelik, 2023; UNESCO, 2024a; Starr & Wickam, 2025; Chiu & Chai, 2020). Findings also showed the need for pre-service teacher training and students training. Carrillo et al. (2025) also underlines the potential of AI in enhancing teaching and learning and stressed the importance of developing pre-service teachers' and faculty members' AI literacy.

Beyond training, the need for documents that guide the teachers in AI integration in education is another issue in AI integration according to findings. 67 countries had published national strategy documents related to AI by 2023 (UNESCO, 2023) and AI competency frameworks were developed for teachers and students (UNESCO 2024a, UNESCO 2024b). Moreover, India and South Korea have integrated the AI literacy into K-12 curricula (Tagera et al., 2025). However, teachers in this study reported a need for documents that provide practical, subject-specific guidance that show exactly how they are going to utilize AI tools in the classroom.

Finally, the findings highlighted that for an effective AI integration, there is a need for financial support. As UNESCO warned, the limited educational budgets of low-income countries risk being diverted to technology corporations instead of other fundamental needs in education (UNESCO, 2025). Therefore, integrating AI technology has the potential to be a burden on the budgets of schools, teachers, and students. Hence, there is a need for financial support.

4.4. Conclusion and limitations

In conclusion, according to the findings of this qualitative study, integration of AI technology in educational settings is far more complex than broad technological adaptation. It requires a profound pedagogical paradigm shift. While teachers use AI technologies in education and perceive them as useful, there are challenges and ethical concerns in this regard. While realizing the true potential of AI in education, there are concerns like academic dishonesty and overreliance. Therefore, for the successful integration of AI into education, teachers should have competencies such as critical AI literacy, continuous professional

development, and a strong ethical perspective. Furthermore, empowering teachers with practical in-service, and pre-service training, as well as systemic financial support, is a necessity for successful AI integration.

This study reveals the perspectives of in-service teachers in integrating AI into education. However, there are some limitations. First, this study is limited to perceptions of in-service teachers. AI integration process includes other stakeholders such as administrators, policy makers, parents, and students. In future studies, the perceptions of these stakeholders should be considered. Second, interviews were the only source of data in this study. In future studies, other sources of data can be used to triangulate data.

Declarations

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Ethics Statements: *The authors state that the research conducted with human participants was carried out in accordance with ethical principles and that the necessary ethical approvals were obtained.*

Conflict of Interest: *The authors declare no conflict of interest.*

Informed Consent: *Informed consent was obtained from all subjects involved in the study.*

Data availability: *The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.*

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