AI and the Future of Teaching: Preservice Teachers' Reflections on the Use of Artificial Intelligence in Open and Distributed Learning

Fatih Karataş[1] and Erkan Yüce[2]
[1]*Nevsehir Haci Bektas Veli University, Nevsehir, Türkiye;* [2]*Aksaray University, Aksaray, Türkiye*

Abstract

The rapid advancement of artificial intelligence (AI) in education underscores transformative prospects for open and distributed learning, encompassing distance, hybrid, and blended learning environments. This qualitative study, grounded in narrative inquiry, investigates the experiences and perceptions of 141 preservice teachers engaged with AI, mainly through ChatGPT, over a 3-week implementation on Zoom to understand its influence on their evolving professional identities and instructional methodologies. Employing Strauss and Corbin's methodological approach of open, axial, and selective coding to analyze reflective narratives, the study unveils significant themes that underscore the dual nature of AI in education. Key findings reveal ChatGPT's role in enhancing educational effectiveness and accessibility while raising ethical concerns regarding academic integrity and balanced usage. Specifically, ChatGPT was found to empower personalized learning and streamline procedures, yet challenges involving information accuracy and data security remained. The study significantly contributes to teacher education discourse by revealing AI's complex educational impacts, highlighting an urgent need for comprehensive ethical AI literacy in teacher training curricula. However, critical ethical considerations and practical challenges involving academic integrity, information accuracy, and balanced AI use are also brought to light. The research also spotlights the need for responsible AI implementation in open and distributed learning to optimize educational outcomes while addressing potential risks. The study's insights advocate for future-focused AI literacy frameworks that integrate technological adeptness with ethical considerations, preparing teacher candidates for an intelligent digital educational landscape.

Keywords: artificial intelligence (AI), ChatGPT, AI in education, AIED, AI in teacher education, narrative inquiry

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The integration of artificial intelligence (AI) in teacher education marks a significant paradigm shift, fundamentally altering pedagogical methods and the role of educators (Cavalcanti et al., 2021; ElSayary, 2024). AI technologies including deep learning generative AI, intelligent tutoring systems, and automated grading are transforming teaching and learning processes, emphasizing the need for teachers to possess a thorough understanding of these technologies (Celik, 2023; Edwards et al., 2018). However, the rapid progress of AI in education presents challenges, such as the gap in teachers' AI knowledge and capabilities, and the redefinition of their roles in an increasingly AI-supported teaching and learning environments (Guilherme, 2019; Nazaretsky et al., 2022). This evolving landscape necessitates a comprehensive approach in teacher education, focusing on AI literacy and the ethical, practical, and pedagogical implications of AI integration (Tan & Lim, 2018). As AI continues to reshape education, it is crucial to align these technological advancements with educational goals to enhance learning while preserving the essential human elements of teaching.

Literature Review

The integration of digital technologies into education is significantly influenced by teachers' perspectives on digital learning, which are shaped by their professional experiences and external factors (Liu & Wang, 2024). Recent challenges, such as the increase in teacher disengagement during online lessons and questions regarding the efficacy of digital instruction brought on by the pandemic, have highlighted the intricate nature of digital education (Wang, 2023; Wang et al., 2023). Furthermore, the adoption of educational technology is heavily reliant on teachers' emotional intelligence and their beliefs in their abilities, emphasizing the critical role of psychological aspects in the successful implementation of digital tools in teaching practices (Zhi et al., 2023). This underscores the essential need for fostering digital competencies among teachers, encompassing both technical skills and the psychological readiness to navigate and use digital learning environments effectively.

Digital teacher competencies increasingly emphasize the integration of AI in education, marking a transformative era in teacher education through tools like ChatGPT, which offer personalized learning experiences and enhance student engagement (Addo & Sentance, 2023; Cavalcanti et al., 2021). The COVID-19 pandemic has accentuated AI's role in facilitating online learning, with significant implications for educational and psychological well-being (Jiang et al., 2022; Vadivel et al., 2023). The pandemic has further underscored AI's importance in education, particularly in data mining and information retrieval for enriching learning experiences, as evidenced by Araka et al. (2022) and Cheng et al. (2022), and in its impact on curriculum development (Hsu et al., 2022), illustrating the technology's potential to personalize education and predict student performance, which are crucial for reducing dropout rates (Hwang et al., 2022; Rodriguez et al., 2022; Tzeng et al., 2022).

However, the adoption of AI in teaching faces challenges, including technical, ethical, and legal issues, highlighting the need for updated pedagogical frameworks that incorporate AI literacy and ethical considerations (Celik, 2023; García-Peñalvo, 2023). The literature suggests that ensuring ethical use, transparency, and fairness in the integration of AI technologies is vital for equitable learning outcomes and maintaining educational integrity (ElSayary, 2024; Hashem et al., 2024; Keeley, 2023). Addressing these challenges requires educators to be equipped with the skills to navigate AI technologies effectively;

comprehensive professional development will be crucial for acquiring AI competencies (Kim et al., 2022; Lawrence et al., 2024; Ng et al., 2023).

Studies on teachers' use of AI in education highlight its benefits in lesson customization and material discovery, alongside challenges in practical problem-solving (Keeley, 2023). Concerns about bias, accuracy, and the lack of human interaction in AI teaching tools underscore the need for further exploration (ElSayary, 2024). The literature calls for comprehensive ethical AI literacy in teacher training curricula to prepare teachers for a digitally intelligent educational landscape, advocating for a balanced, ethical approach to AI integration in teacher education (Addo & Sentance, 2023; Gentile et al., 2023). However, realizing AI technologies' full potential is contingent on adequately equipping educators with the necessary skills to effectively navigate and use them. Despite the progress in adopting AI in education, a significant gap remains in understanding how future educators perceive and engage with AI applications like ChatGPT. This gap is crucial, as it influences their readiness and enthusiasm to use AI in fostering accessible, flexible, and personalized learning experiences across diverse educational settings. In addressing this gap, this research aims to provide a comprehensive understanding of preservice teachers' encounters with AI tools, shedding light on both the perceived benefits and challenges. Addressing this critical gap, our research probes the following research question:

> RQ: How do preservice teachers perceive the integration of AI applications in teaching, and how does this integration shape their teaching styles and professional identities?

The insights gained are anticipated to inform the design of teacher education curricula and professional development programs, underscoring the need for augmented support and training in proficiently using AI applications in open and distributed learning contexts.

Methodology

Research Design

This study adopted a narrative inquiry approach, as defined by Kutsyuruba and Stasel (2023) and further elaborated by Chase (2005), to explore the perceptions and experiences of preservice teachers regarding AI in educational settings. Narrative inquiry, deeply rooted in understanding the social and cultural dimensions of individual and community narratives (Adama et al., 2016), is particularly apt for examining the evolving professional identities of preservice teachers as they interact with AI technologies such as ChatGPT. This methodology allows for a profound exploration of personal and shared experiences over time, emphasizing the significance of these narratives in shaping identities and practices within educational contexts. By centering on participants' perspectives, narrative inquiry offers a nuanced understanding of preservice teachers' subjective realities and experiences, thereby aligning with the study's objective and research question. Acknowledging the inherent subjectivity and the potential for bias in narrative inquiry, this study incorporates member checking (Bower et al., 2021) to enhance methodological rigor and credibility.

Participants

The selection of 141 preservice teachers from a state university was based on purposeful sampling, aimed at capturing a broad spectrum of experiences with ChatGPT across various departments and levels of AI familiarity (Cohen et al., 2017; Özdil & Kunt, 2023). This diverse group reflects a thoughtfully structured

selection process, ensuring a rich and diverse range of perspectives by establishing an ideal relationship between researchers and participants, thereby contributing to a comprehensive understanding of how future educators perceive and interact with AI technologies such as ChatGPT. Accordingly, Table 1 presents the department, age, gender, and prior AI experience of the participants. Since all participants were higher education students from the education faculty of a university in Türkiye, it was considered unnecessary to include citizenship information in the table, as any differences arising from citizenship would not be significant.

Table 1

Participants' Demographic Data

Department[a]	Age	Gender	Prior AI experience
Preschool education ($n = 53$)	17–18 ($n = 38$)	Female ($n = 23$)	Yes ($n = 9$)
			No ($n = 14$)
		Male ($n = 15$)	Yes ($n = 4$)
			No ($n = 11$)
	19–21 ($n = 15$)	Female ($n = 9$)	Yes ($n = 3$)
			No ($n = 6$)
		Male ($n = 6$)	Yes ($n = 2$)
			No ($n = 4$)
Elementary science education (ESE) ($n = 49$)	17–18 ($n = 34$)	Female ($n = 21$)	Yes ($n = 10$)
			No ($n = 11$)
		Male ($n = 13$)	Yes ($n = 4$)
			No ($n = 9$)
	19–21 ($n = 15$)	Female ($n = 8$)	Yes ($n = 3$)
			No ($n = 5$)
		Male ($n = 7$)	Yes ($n = 2$)
			No ($n = 5$)
Physical education and sports teacher department ($n = 39$)	17–18 ($n = 27$)	Female ($n = 17$)	Yes ($n = 6$)
			No ($n = 11$)
		Male ($n = 10$)	Yes ($n = 3$)
			No ($n = 7$)
	19–21 ($n = 12$)	Female ($n = 7$)	Yes ($n = 2$)
			No ($n = 5$)
		Male ($n = 5$)	Yes ($n = 0$)
			No ($n = 5$)

Note. [a] Department indicates the programs the students were studying.

Data Collection Tool and Procedure

Using reflection papers as the data collection tool, this research adopts narrative inquiry principles to collect and analyze reflective narratives from preservice teachers (Kaminski, 2003; Kayima, 2021). At the end of the 3-week implementation using the Zoom online learning platform, which focused on the use of AI in teaching practices, participants used reflective writing as a means to delve into and express their perceptions, experiences, and readiness to integrate AI technologies such as ChatGPT into their future educational practices. Guiding questions based on narrative inquiry principles (Clandinin, 2006; Xu & Connelly, 2010) were provided to aid in participants' expression of perceptions and experiences, encouraging them to explore beyond these questions to fully articulate their insights and learning

outcomes. These guiding questions, outlined in Table 2, were instrumental in prompting students to describe their experiences and insights gained throughout the study.

Table 2

Prompts to Guide Reflections

Category	Reflections prompt
Exploring early perceptions and practical encounters with AI	Think about your initial thoughts on AI such as ChatGPT in education and compare them with your actual experiences during the course. Were there surprises or did things match up? (Carvalho et al., 2022; Gentile et al., 2023) Describe how using AI tools in specific tasks changed or confirmed your original beliefs about them. (Cavalcanti et al., 2021; ElSayary, 2024)
Evaluating AI's influence on pedagogical techniques and educator identity	Discuss how AI can support or enhance traditional teaching methods, using real or imagined examples where AI improves education. (Guilherme, 2019; Kim et al., 2022) Reflect on how using AI in teaching affects your view of being an educator. Do these experiences align with or challenge your initial idea of a teacher's role? (Kim & Kwon, 2023)
Preparedness for incorporating AI and ethical reflections	Assess your readiness and willingness to use AI in your teaching. Are you concerned about any specific issues? (Celik, 2023; Ng et al., 2021) Talk about the ethical challenges or dilemmas you foresee or have faced with AI in education and suggest possible solutions. (Edwards et al., 2018; Tan & Lim, 2018)
Impacts on learner engagement and educator's development	How do you think AI tools affect student engagement and learning? Share your observations or thoughts on students' reactions to AI. (Kim et al., 2022) Reflect on how your understanding of AI in education has evolved. Mention key lessons and how they will shape your future as an educator. (Celik, 2023; Lawrence et al., 2024)
Anticipating future trends and concluding insights	Based on your experience, how can AI be smoothly integrated into education? Suggest ways to improve teacher training for AI in education. (Kim et al., 2022; Nazaretsky et al., 2022) Share any final thoughts on your experience with AI in education not previously mentioned. (Lawrence et al., 2024; Ng et al., 2021)

Note. AI = artificial intelligence.

Reflective Learning Activities and Procedure

The 3-week teacher training course, depicted in Table 3, employed ChatGPT to enhance students' understanding and application of various educational theories. The activities stimulated reflective practice and discussion, empowering teachers to integrate AI into their future teaching methodologies. Table 3 outlines preservice teachers' diverse approaches to engaging with ChatGPT across various educational activities.

Table 3

Reflective Learning Activities and Procedures

Week	Content	Activities	Procedures
1 (2 hours)	Behavioral learning principles	• Presentation and discussion on behavioral learning principles • AIED exploration activity • Activity to analyze student behavior in classroom management scenarios using AI tools	Preservice teachers investigate how AI influences learning and teaching processes by examining case studies. Preservice teachers work on classroom management case studies (generated by AI) to analyze student behavior effectively.
2 (2 hours)	Cognitive learning concepts	• Presentation and discussion on cognitive learning theories • AI-assisted cognitive mapping activity	Participants undertake a task where they use AI tools to create cognitive maps of complex topics; process involves identifying key concepts, relationships, and structures within these topics.
3 (2 hours)	Humanist learning perspective	• Presentation and discussion on humanist education philosophy • AI-driven personalized learning quests • Discussion on use of AI tools enhancing teacher autonomy and personalized teaching practice	Preservice teachers develop AI-supported learning quests tailored to individual student needs. Preservice teachers use AI to support learner autonomy in personalized teaching practice, sharing insights in group discussions.

*Note*. AI = artificial intelligence; AIED = AI in education.

Preservice teachers undertook various activities over the 3 weeks via Zoom. These activities highlighted AI's versatility in educational settings and encouraged critical thinking about teaching practices.

Data Analysis

The narrative data from reflection papers were analyzed using Strauss and Corbin's (2008) open, axial, and selective coding technique, facilitated by NVivo 12 software. The coding technique involves three stages: (a) open coding, which entails the detailed examination of data to identify concepts and explore similarities and differences between events; (b) axial coding, which analyzes the relationships between these concepts to understand them in a broader context; and (c) selective coding, which examines the connections between axial codes to develop an overall theory or framework of understanding. This method focused on narratives to deeply understand preservice teachers' views on AI, offering detailed insights while acknowledging its subjectivity and addressing validity concerns through member checking (Bower et al., 2021). Figure 1 shows the coding process, including open, axial, and selective coding stages.

Figure 1

Open, Axial, and Selective Coding Process
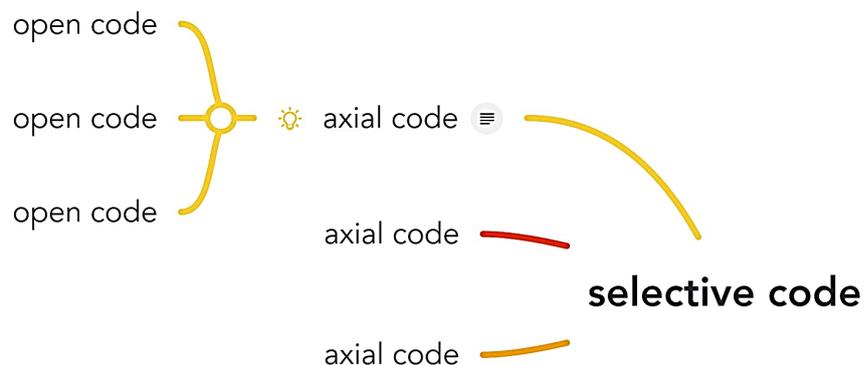
To mitigate the variable effect of students' language proficiency, reflection papers were requested in their native language, Turkish. Analyses were initially conducted in Turkish language, with findings translated into English by the researchers during the manuscript preparation process.

Results

This section presents the findings of our study, exploring how preservice teachers perceive and engage with AI applications in educational settings, mainly focusing on their interactions with ChatGPT. Our narrative inquiry approach enabled us to delve into their experiences, beliefs, and attitudes toward AI's integration into teaching. The research results culminated in six selective codes, each represented by a figure.
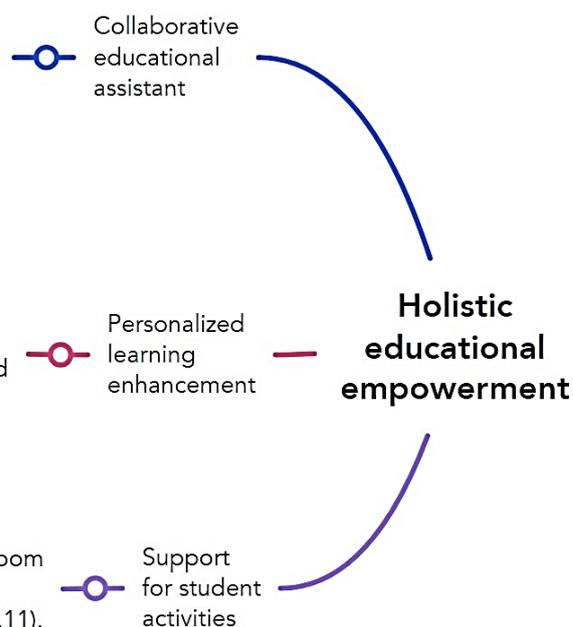
Figure 2

Holistic Educational Empowerment

ChatGPT helps create sample exam questions for students and educators (s,10; r,12).
ChatGPT offers support to educators in simplifying their tasks (s,14; r,18).
ChatGPT helps educators lessen their workload and consistently aids in effective teaching (s,14; r,16).
ChatGPT assists educators in creating assessments and providing examples (s,23; r,27).
ChatGPT functions as a valuable aide and repository of knowledge for educators (s,10; r,11).

Individual differences in education can be considered to improve quality (s,9; r,9).
ChatGPT offers students extra resources and feedback, enhancing their learning (s,17; r,19).
ChatGPT helps prospective teachers develop creativity and originality (s,11; r,12).
It is believed that ChatGPT can be helpful for prospective teachers' future careers (s,22; r,24).

ChatGPT is useful for student activities (s,27; r,32).
It strengthens communication and interaction in the classroom (s,8; r,10).
ChatGPT helps solve educational problems quickly (s,10; r,11).
It provides accurate and up-to-date information (s,9; r,10).

Collaborative educational assistant

Personalized learning enhancement

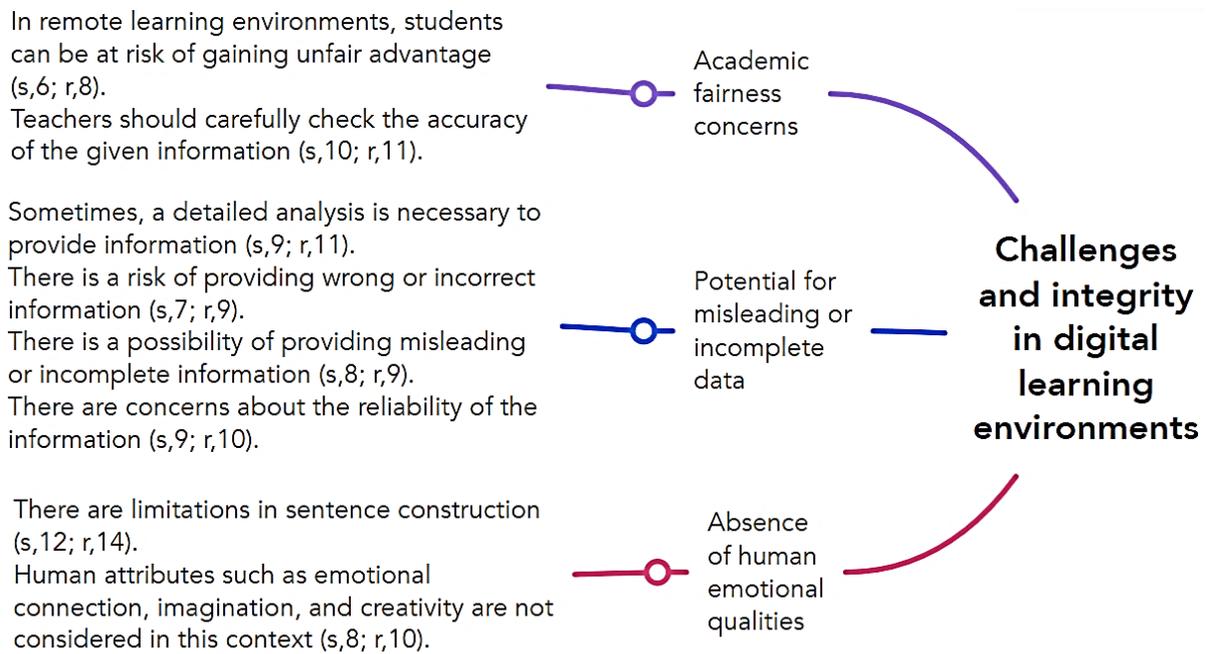Support for student activities

Holistic educational empowerment

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

As illustrated in Figure 2, the findings illuminate ChatGPT's substantial impact on holistic educational empowerment within teaching environments. As a collaborative educational assistant, ChatGPT has significantly reduced educators' workload while enhancing teaching effectiveness; as noted by one student (S45), "ChatGPT's role in reducing educator workload and enabling more personalized teaching is appreciated." The role of ChatGPT goes beyond assisting educators. It is a vital knowledge repository, enriching the teaching–learning process with updated information. The participants stressed its effectiveness in addressing individual learning differences, promoting personalized learning, and fostering inclusivity. One student (S36) noted that "ChatGPT's capability to generate exam questions and offer personalized feedback enhances the learning experience."

Furthermore, the tool facilitates student engagement, strengthens classroom interaction and communication, and fosters creativity among prospective educators. These features simplify educational procedures and cultivate a dynamic, interactive, and personalized learning environment. Nevertheless, one student (S78) advised, "ChatGPT should assist, not substitute, human interaction in education." ChatGPT's comprehensive capabilities significantly contribute to the holistic development of educators and students, aligning with the emergence of an empowered and innovative era in education, as indicated by the qualitative analysis of the student interviews.

Figure 3

Challenges and Integrity in Digital Learning Environments

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

As outlined in Figure 3, insights from student reflection papers highlighted critical challenges in ensuring integrity and accuracy within digital learning environments. Concerns about the potential for unfair advantages in learning settings were widespread, shedding light on broader academic fairness issues. A common concern among students was that using ChatGPT in the learning environment could result in unfair benefits and potentially diminish critical thinking skills. Students emphasized the responsibility placed on educators to rigorously verify the accuracy of information, highlighting the risks associated with disseminating incorrect or misleading content. It was widely recognized that using ChatGPT in education necessitates extensive fact-checking and explicit guidelines for its use, underlining the critical need for careful scrutiny in selecting and distributing digital educational resources. Additionally, apprehensions regarding the reliability of digitally furnished information were evident, with students noting occasional compromises in their dependability. Concerns were also raised regarding the constraints in sentence construction on digital platforms, which may impede clear communication and comprehension. A notable deficiency identified by the students was the need for more human emotional attributes in digital learning spaces, with core aspects such as emotional connection, imagination, and creativity being marginalized.

Figure 4

Efficient Knowledge Management and Accessibility

ChatGPT assists in activity planning and implementation (s,13; r,15).
It provides translation and subject-based support (s,17; r,21).
ChatGPT is a versatile AI platform (s,9; r,11).

⊶ Subject matter expertise

Efficient knowledge management and accessibility

It helps quickly access information (s,19; r,21).
ChatGPT saves time and provides an enjoyable learning experience (s,13; r,16).

⊶ Ease of access to knowledge

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

Figure 4 provides a comprehensive overview of ChatGPT's pivotal role in elevating educational efficiency and broadening accessibility. Specifically, it emerged as a key tool in facilitating activity planning and implementation in educational settings, and students noted its effectiveness in streamlining organizational tasks. This aspect was particularly highlighted in the context of overcoming the logistical challenges in education. As noted by a student (S14), "ChatGPT's customization features and multilingual support are significant for me, aiding in overcoming language obstacles and delivering specialized academic assistance." ChatGPT's capacity to offer translation and subject-specific assistance was greatly appreciated. Students highlighted its essential role in closing language divides and delivering specialized knowledge, thus enriching educational experiences in various learning settings. A prominent benefit of ChatGPT is its rapid access to information, which students credited for significantly improving the efficiency of their learning and research activities. Moreover, the tool was acknowledged to contribute to saved time and more enjoyable learning experiences, which are aspects that students associate with enhanced engagement and satisfaction in the educational process.
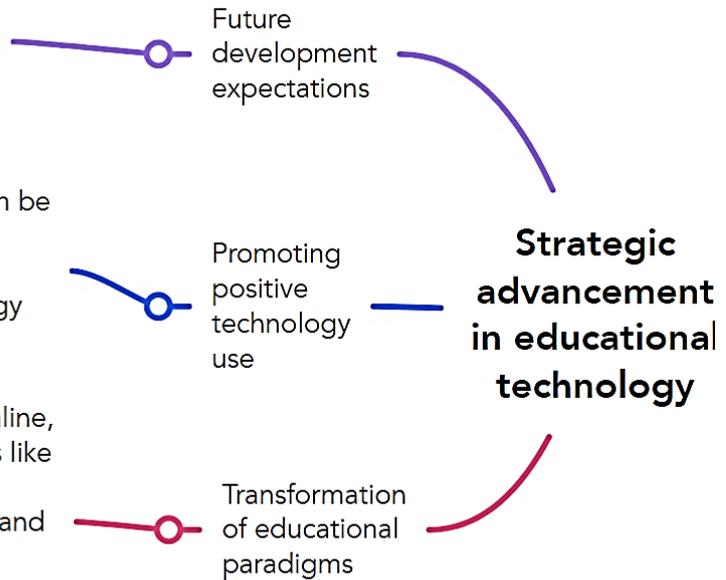
Figure 5

Strategic Advancement in Educational Technology

Undertakes assessments that involve critique and demonstrates capacity for growth and development (s,9; r,12). It is expected to be more developed in the future (s,16; r,19).

We should focus on how technology can be more productively utilized (s,11; r,14). It is useful for students and parents to encourage the positive use of technology (s,7; r,9).

In the future, education will be more online, which increases the importance of tools like ChatGPT (s,15; r,16). It is valuable for the future of humanity and education (s,21; r,24). In the long run, the demand for human teachers may decrease (s,18; r,20).

Future development expectations

Promoting positive technology use

Transformation of educational paradigms

Strategic advancement in educational technology

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

As outlined in Figure 5, student reflections revealed general agreement on the strategic progression of educational technology. There was clear recognition among students of technology's crucial role in their development and growth, with expectations for more advanced tools to emerge in the future. Students perceived considerable potential in AI tools such as ChatGPT for improving learning experiences, automating tasks, and making education more accessible to people from various socioeconomic backgrounds. Students could foresee the anticipated move toward education, a shift that is likely to heighten the importance of tools like ChatGPT, reflecting a profound change in educational models. In this context, another student remarked that AI presents both opportunities and challenges, improving personalized education while underscoring the need for ethical usage and maintaining human interaction. This shift underscores the importance of technology in shaping the future trajectory of education and its impact on society. Concurrently, the future role of human educators was contemplated, with some students predicting a diminishing demand in the face of advancing digital tools.
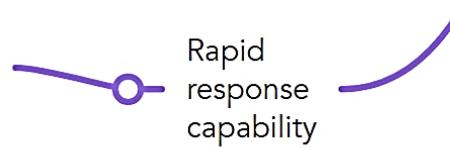
Figure 6

User-Friendly Interface

It is easy to use the application (s,18; r,21).
It has a user-friendly interface and saves time (s,16; r,21).

User experience design

User-friendly interface

This platform offers expeditious responses and engages in reciprocal communication (s,8; r,9).
It provides free services for a limited set of questions and offers a paid premium plan with expanded capabilities (s,10; r,14).
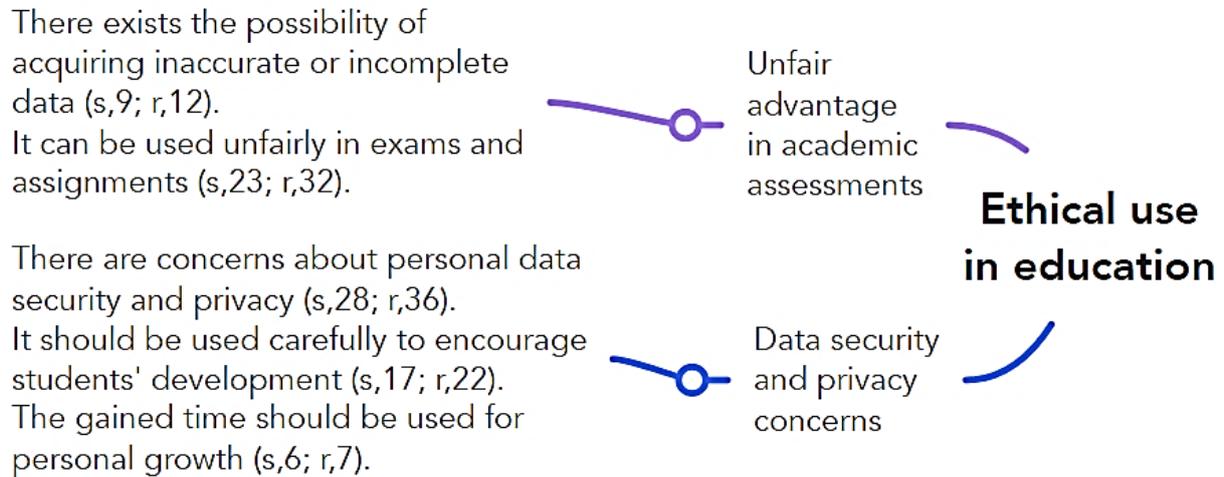
Rapid response capability

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

Figure 6 provides a clear visual summary of how a user-friendly interface is highly valued by students, as reflected in their responses. The findings indicate that students placed high value on a user-friendly interface, which facilitates efficient interaction with the application. Echoing this sentiment, one student (S73) noted, "ChatGPT's user-friendly and responsive interface is accessible to users with different levels of technical skills, which is a major benefit." The importance of intuitive design was underscored by its role in accelerating adoption and saving time. In contrast, a platform's rapid response capability is essential for promoting active communication and enhancing the learning experience. Additionally, free services for basic features and a paid premium plan offering extended capabilities address a broad spectrum of user requirements. This was underscored by a student's (S82) observation: "While I value ChatGPT's user-friendly interface for different applications, the constraints of its free version bring up issues regarding accessibility and inclusivity." Such a strategy reflects a deliberate attempt to balance easy access and offer sophisticated functionalities, a striving to satisfy varied user demands while sustaining a practical financial framework.

Figure 7

Ethical Concerns Regarding AI Use in Education

Note. s = source item; shows the number of data sources (number of learners); and r = reference; shows the number of statements reached from the sources.

As outlined in Figure 7, our data show a strong focus among students on the ethical implications of integrating AI technologies in educational contexts. The data highlight apprehensions about acquiring inaccurate or incomplete data, which may confer an unfair advantage in academic assessments, suggesting the need for rigorous checks to maintain assessment integrity. Students believed that the effectiveness of AI in education largely would depend on prioritizing accuracy (S26, S49, S51), data security (S23, S67, S100), and ethical development to minimize risks and enhance benefits (S16, S88, S109).The discourse extends to the responsible use of technology to foster academic and personal development, with a call to ethically channel time savings from technology use toward personal growth. These perspectives underscore the urgency of incorporating ethical guidelines into the application of educational technologies, ensuring a balance that upholds the integrity of educational practices while maximizing the benefits of technological advancements. Our study advocates for a balanced integration of AI in education. This approach focuses on a framework that not only respects educational integrity but also harnesses technological advancements for empowerment, aiming to minimize inequalities.

Discussion

This research aimed to delve into preservice teachers' perceptions regarding the integration of AI applications, particularly ChatGPT, within educational contexts, with a keen focus on its implications for open and distributed learning environments. It sought to unravel how these emerging digital tools shape future educators' teaching methodologies and professional identities, especially as open and distributed learning becomes increasingly prevalent.

First, the findings on holistic educational empowerment through AI align with broader narratives of AI's potential (e.g., Nazaretsky et al., 2022) and expand on existing research by showcasing AI's ability to

reduce workload, personalize teaching, and enhance learning experiences (Hashem et al., 2024). The findings also corroborate with research (Addo & Sentance, 2023; Keeley, 2023), highlighting the significance of ChatGPT in fostering educational effectiveness, accessibility, and teacher–student rapport. Similarly, ElSayary (2024) has provided comparative insights that enrich our understanding of preservice teachers' engagement with ChatGPT. Integrating AI tools like ChatGPT may be more beneficial and transformative than previously anticipated, bridging the gap between theoretical expectations and practical realities of AI in education.

Second, the qualitative analysis revealing ChatGPT's significant role in enhancing educational efficiency and accessibility underscores its value in AI integration within teacher education curricula. Integrating AI into teacher training aligns with calls for its use in education (Chiu et al., 2023; McGovern & Fager, 2007), creating dynamic and flexible learning environments. ChatGPT helps by simplifying tasks, translating languages, offering subject-specific support, addressing language barriers, and diversifying learning methods (ElSayary, 2024; Henry et al., 2021). ChatGPT can be a lifesaver for teachers facing practical challenges (Hashem et al., 2024; Ng et al., 2023), from answering basic questions to solving tough issues. Not only should AI tools be included in teacher training, but they should also be used to manage knowledge efficiently and make education more accessible, ultimately improving teaching practices in the digital age.

Third, the findings on the challenges and integrity in digital learning environments, particularly with AI tools like ChatGPT, resonate deeply with current academic concerns about integrity and the ethical use of technology in open and distributed learning. As highlighted in the literature (Chan, 2023; Chiu et al., 2023), concerns exist that AI tools in education could facilitate cheating. For example, students might use translation apps or automatic grading systems rather than doing the work themselves. This reinforces existing literature highlighting educator guidance as crucial for maintaining academic integrity, especially in online settings (Carvalho et al., 2022; Ng et al., 2021).

Next, the findings illuminate the pivotal role of AI in the strategic advancement of educational technology, particularly resonating with themes of integrating AI in teacher education curricula and the evolution of teacher roles with AI advancements. Reflecting on the implications for teacher education and AI literacy, this study underscores the necessity of integrating AI literacy into teacher education programs, as suggested by Wang and Lu (2023). The comprehensive approach to AI literacy should not only cover the technical use of AI tools but also emphasize ethical considerations and effective strategies for using AI tools (Karataş et al., 2024) in educational settings. This emphasizes the need to prepare future educators for an AI-infused future, where technology augments learning and reshapes teaching. These insights suggest a paradigm shift, highlighting the need for a balanced and ethical approach to AI, where technology and educators work together to enrich the educational experience.

Furthermore, ChatGPT's user-friendly interface, highlighted in this study, aligns with the importance of technology usability for educational adoption (Heintz, 2021). Its intuitive design and broad accessibility support its wide use, echoing calls for user-friendly AI tools in teacher education (Aung et al., 2022). This emphasizes the need for sophisticated yet approachable AI to enhance learning and create a more inclusive educational environment.

Finally, students' ethical concerns about AI in education, including data accuracy and bias, echo existing discussions. Recent studies stress the need for ethical AI use in education, focusing on privacy, bias reduction, and fair access to technology's benefits (Addo & Sentance, 2023; Ng et al., 2021). The link

between teachers' understanding of AI and their teaching effectiveness highlights the importance of combining human knowledge with AI technologies (Nazaretsky et al., 2022). To address these issues, research suggests incorporating ethical AI principles into teacher training and curriculum design, aiming for AI integration that respects educational values and promotes inclusivity (Le-Nguyen & Tran, 2023; Wang & Lu, 2023). Participants in our study voiced concerns about AI's accuracy, privacy, and ethical development, emphasizing the need for AI literacy in teacher education to prevent disparities. Echoing this, Keeley (2023) and ElSayary (2024) have called for comprehensive AI literacy programs that include ethical considerations. Additionally, Le-Nguyen and Tran (2023) suggested preparing future educators with strategies to counteract AI's potential negative impacts, advocating for a well-rounded approach to AI literacy that combines technical skills with ethical awareness.

Implications and Significance of the Study in the Context of Teacher Education

This study significantly contributes to the field of teacher education by highlighting the imperative integration of AI literacy, particularly in the context of emerging technologies like ChatGPT, and its relevance for open and distributed learning environments. The findings reveal that AI tools can remarkably enhance holistic educational empowerment, underscoring the need for future educators to be adept in these technologies in order to improve teaching methodologies and address diverse student needs across various learning settings. These insights resonate with current academic discourse that advocates for the inclusion of AI in teacher education curricula (Chiu et al., 2023; Ng et al., 2022). Additionally, the study brings forward critical ethical considerations and practical challenges associated with AI in educational settings, such as concerns over academic integrity and the accuracy of information. The nuanced understanding gained from this research, alongside contributions from ElSayary (2024) and Keeley (2023), further emphasizes the importance of preparing educators for the digital age by incorporating AI literacy into teacher education programs. It is essential to equip preservice teachers with the competencies to use AI tools ethically and effectively, addressing the challenges identified. These revelations underscore the urgency for comprehensive AI literacy programs that balance technological proficiency with ethical use, guiding future research and policy development toward creating a more effective, inclusive, and ethically responsible educational environment. Thus, this research enriches the existing academic dialogue and charts a course for the strategic development of teacher education in an increasingly digital world.

Conclusion

Exploring preservice teachers' perceptions of AI integration in education, particularly within open and distributed learning, uncovers mixed reactions. They see AI as beneficial for enhancing education and tailoring learning to individual needs, yet they express concerns over potential threats to academic integrity and the reliability of information. Reflecting on the narrative inquiry approach, this research highlights preservice teachers' nuanced understanding of AI's role in education, balancing its potential with ethical implications. These insights contribute to the discourse on AI in education and highlight the imperative for balanced, ethically sound, and critical integration of AI technologies in educational settings, including those that extend beyond traditional classroom boundaries. This study contributes new insights into the evolving landscape of teacher education, emphasizing the necessity of a balanced approach to AI integration. It concludes by underscoring AI's transformative yet complex role in education, marking a significant step forward in understanding and preparing for the future of teaching and learning in an increasingly digital and distributed world.

Limitations

This study, investigating preservice teachers' reflections on AI-supported applications in teacher education at a single university, highlights the limited generalizability of findings to broader populations. To extend its applicability, future research should explore diverse educational contexts and include a wider range of participants. The narrative inquiry methodology, while offering deep, personalized insights, introduces subjectivity in data interpretation. Future studies could employ mixed methods to balance subjective narratives with objective measurements, enhancing reliability. Despite these limitations, the insights into AI's integration in teacher education suggest policies should support educators in navigating AI tools, emphasizing training that fosters critical and reflective use. Practices in teacher education must evolve to incorporate AI fluently, preparing educators for AI-augmented teaching environments. This study provides useful insights but is limited by its focus on a specific group. Future research should include participants of diverse nationalities for a more comprehensive understanding, examine the effectiveness of AI tools in diverse educational settings, and create ethical and pedagogical strategies for their integration, addressing the specific advantages and challenges of these technologies.

Recommendations for Future Research and Policy Development

Drawing on the extensive implications of this study, the following recommendations are presented. (a) Future research should focus on evaluating the effectiveness of AI tools such as ChatGPT in varied educational contexts, from open to more structured learning environments, underlining the importance of curriculum development to integrate AI literacy into teacher education curricula, equipping future educators with the skills to use AI tools ethically and effectively (Addo & Sentance, 2023; Wang & Lu, 2023). (b) Particular attention should be paid to developing ethical and pedagogical strategies for integrating AI in ways that enhance learning, alongside professional development opportunities focused on ethical AI use and strategies for leveraging AI to enhance teaching and learning (Nazaretsky et al., 2022; Ng et al., 2023). (c) Simultaneously, policies and regulations need to evolve to foster more AI-inclusive education models, considering the unique benefits and challenges introduced by these technologies across different settings. This includes development and implementation of ethical guidelines for ethical AI use in educational settings to address concerns about academic integrity, information accuracy, and the balance between AI and human interaction in teaching (Le-Nguyen & Tran, 2023). (d) Teachers will likely require enhanced training in both the technical use and ethical implications of AI tools, so investments in educational infrastructure and teacher professional development are warranted. Essential too is (e) further integrating AI literacy, including technical skills as well as considerations of academic integrity and ethical use into teacher training and preparation curricula. Overall, the goal should be developing frameworks for effectively combining AI technologies with more traditional teaching methods and content, aiming to foster a more effective, inclusive, and ethically responsible educational environment.

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Ethical Approval

This research received ethical approval from the Scientific Research and Publication Ethics Committee at Nevsehir Hacı Bektas Veli University in Türkiye, as per decision number 2300062992.

Ethical Use of AI Tools

During the preparation of this research, the authors used Paperpal and Quillbot (AI tools) to paraphrase their writing for more academic enhancement, and ChatGPT and DeepL (AI tools) for language translation and text reduction. After using these AI tools, the authors reviewed and edited the content as necessary, and take full responsibility for the content of the publication. Alongside using AI tools for language tasks, the authors thoroughly reviewed and accurately cited all references in this research. They verified each reference's authenticity, including DOI links. It's crucial to note that all data and findings come from properly cited sources, not AI- generated. The authors fully ensure the research's integrity and accuracy.

Disclosure Statement

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Data Availability

The data and materials used in this study are available upon request from the corresponding author.

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