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Preservice Teachers' Readiness for Integrating AI in Elementary Classrooms

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Abstract

This study investigates the readiness of elementary education preservice teachers to integrate Artificial Intelligence (AI) into classroom practices, focusing on their attitudes, perceptions, and the challenges they face. Using survey data, the research examines participants' familiarity with AI, beliefs about its educational impact, and views on the evolving role of teachers in AI-enhanced learning environments. Findings indicate generally positive attitudes toward AI adoption, with participants recognizing its potential to improve teaching and learning. However, concerns about limited resources and professional support highlight barriers to effective AI integration. These results underscore the need for teacher education programs to address preservice teachers' concerns and build their confidence in using AI, ultimately shaping future educators prepared for an AI-driven educational landscape.

Keywords: Artificial Intelligence (AI), preservice teachers, AI in the classroom, perceptions of AI, barriers to AI integration, teacher education programs

1. Introduction

1.1 Overview of AI in Education

The improvements that Artificial Intelligence (AI) has provided in our daily lives are immense. AI provides an opportunity for increasing the engagement of students, developing self-regulatory skills, and increasing interaction between students, their peers, and their teachers (Arslan, Yildirim, Bisen, & Yildirim, 2022). Teachers of the future will be key in incorporating and using AI to support the early development and education of children and students, helping them cultivate cognitive, social, and communication skills (Sămărescu, Bumbac, Zamfiroiu, & Iorgulescu, 2024). AI involves developing computer systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, decision-making, and perception (Russell & Norvig, 2010). In education, AI holds the potential to transform how students learn, how teachers instruct, and how educational institutions function.

AI can provide personalized learning experiences that cater to diverse learning styles, abilities, and needs, leading to improved student outcomes (Dziuban, Moskal, & Williams, 2018). Additionally, AI can automate administrative tasks, allowing educators to focus more on teaching and mentoring while also reducing institutional workloads (Raca, Bøhn, & Wasson, 2018). AI also offers scalable solutions for delivering high-quality education to large numbers of students, helping meet the increasing global demand for education (United Nations Educational, Scientific and Cultural Organization, 2019). Furthermore, AI-powered tools can support students with disabilities, language barriers, or other challenges, promoting inclusivity and equity in education (Hao, Li, & Wang, 2019).

Research demonstrates the positive impact of AI on education, including improved academic achievement (Raca et al., 2018), enhanced student engagement and motivation (Dziuban et al., 2018), and increased accessibility for diverse learners (Hao et al., 2019). However, the integration of AI into education also raises significant concerns. These include bias and fairness in AI-driven decision-making (O'Neil, 2016), potential job displacement within the teaching profession (Ford, 2015), and issues related to data privacy and security (Hao et al., 2019). To address these concerns, it is essential to develop AI systems that are transparent, explainable, and fair (Rudin, 2019). Moreover, AI should be used to enhance, rather than replace, human teachers (Baker, & Inventado, 2014), and robust data governance and protection policies must be implemented (Hao et al., 2019).

AI has the capacity to significantly improve the education by offering personalized, efficient, and scalable solutions that enhance student learning outcomes and the overall educational experience. However, it is crucial to address the challenges associated with AI adoption to ensure its benefits are distributed equitably and its risks are minimized.

This study aims to investigate the preparedness of preservice teachers to integrate AI in their teaching practices, examining their familiarity with AI and its applications in education, as well as their attitudes and perceptions towards AI, including its potential benefits and challenges. The study also seeks to understand preservice teachers' perceived changes brought by AI in education, including its impact on teaching and learning, and their thoughts on the role of educators in AI-enhanced education, including their responsibilities and opportunities. Furthermore, the study explores preservice teachers' experiences and observations with AI, including its potential to support student learning, as well as their concerns and barriers to integrating AI in education, including the need for support and resources. Additionally, the study identifies the most useful and interesting AI tools and software for educational use and examine preservice teachers' beliefs about the skills and knowledge required for future teachers to effectively use AI in education. By exploring these aspects, this study seeks to provide a comprehensive understanding of preservice teachers' readiness to harness the potential of AI in education, and to inform the development of teacher education programs, educational policies, and AI tools that support effective AI integration in teaching and learning.

1.2 Purpose and Scope of the Review

Research on preservice teachers' perceptions of AI is rapidly gaining attention, particularly in the fields of teacher education and educational technology. Preservice teachers, often referred to as teacher candidates or student teachers, are individuals preparing to become educators through undergraduate or graduate programs. Understanding their views on AI is vital, as they will be responsible for integrating AI-powered tools and technologies into their future classrooms. Studies suggest that preservice teachers' perceptions of AI significantly influence their willingness to adopt and incorporate these tools in their teaching practices (Kumar, A., Kumar, P., Shah, 2020). Therefore, it is crucial to explore their attitudes, concerns, and overall understanding of AI to inform teacher education programs and better prepare them for effective AI integration in education.

Research highlights both positive and negative perceptions among preservice teachers regarding AI. On the positive side, they express enthusiasm about AI's potential to enhance personalized learning, boost student engagement, and improve efficiency in grading and feedback (Raca et al., 2018). Additionally, they recognize AI's ability to support students with disabilities and language barriers (Bebell, Kay, & DiPietro, 2019). However, preservice teachers also voice concerns about AI's potential risks and challenges, including job displacement, bias within AI systems, and the need for continuous professional development to effectively integrate AI into teaching (Kumar et al., 2020). Some also worry that AI might negatively impact student-teacher relationships and reduce the essential human interaction in learning (Raca et al., 2018).

Several factors influence preservice teachers' perceptions of AI, such as their prior experience with technology, their understanding of AI concepts, and their exposure to AI tools during their training programs (Bebell et al., 2019). For instance, those with more experience using technology and AI-powered tools tend to have a more favorable view of AI and are more likely to integrate it into their teaching (Kumar et al., 2020).

To address the concerns and better prepare preservice teachers for AI in education, teacher education programs can take specific steps. These include offering hands-on experiences with AI tools such as adaptive learning systems, intelligent tutoring systems, and natural language processing tools (Raca et al., 2018). Additionally, courses and workshops focusing on the pedagogical and ethical implications of AI -covering topics like bias, privacy, and transparency can be valuable (Bebell et al., 2019). Lastly, ongoing support and professional development opportunities can help preservice teachers build the confidence and skills needed to effectively integrate AI into their future classrooms (Kumar et al., 2020).

In conclusion, examining preservice teachers' perceptions of AI is crucial for shaping teacher education programs and ensuring the effective integration of AI in education. By understanding their views, attitudes, and concerns, teacher education programs can better equip future educators to navigate the opportunities and challenges of teaching in an AI-driven world.

1.3 The Role of AI in Enhancing Preservice Teachers' Pedagogical Practices and Student Learning Outcomes

The integration of AI in education has attracted significant attention in recent years, with researchers and policymakers recognizing its potential to transform learning experiences (Luckin, Holmes, Griffiths, & Forcier, 2016; Raca et al., 2018). While existing literature has explored AI's impact on education, there remains a need for a more comprehensive and diverse examination of this rapidly evolving field.

AI is being integrated into educational systems worldwide in a variety of ways. For instance, a study conducted in

China found that AI-powered adaptive learning systems significantly improved student outcomes in mathematics (Wang, Chen, & Hwang, 2021). Similarly, research in the United States explored the use of AI-driven chatbots to support student engagement and motivation (Dziuban et al., 2018). These examples highlight how AI tools are enhancing student learning and providing personalized support.

The application of AI in education extends across varied contexts. In vocational training, AI-powered simulation-based training has been shown to improve students' technical skills while reducing instructor workload (Chen et al., 2020). In special education, AI-driven personalized learning systems have demonstrated their potential to support students with diverse learning needs (Burgstahler, Bellman, & Lopez, 2019). These studies underscore the importance of considering the diverse educational settings where AI integration occurs.

Interdisciplinary research further enriches our understanding of AI's role in education. For example, studies combining insights from education, computer science, and psychology have explored AI's potential to support teacher professional development (Krumhuber, Manstead, & Mäkäräinen, 2020). Similarly, sociological and educational perspectives have been used to examine the impact of AI on teacher-student relationships (Selwyn, Nemorin, & Bulfin, 2020). These approaches provide a holistic view of AI's influence on educational ecosystems.

Despite the growing body of research on AI integration in education, significant gaps remain. Notably, there is limited focus on preservice teachers' preparedness for AI integration. While several studies have investigated in-service teachers' adoption of technology (Raca et al., 2018), fewer have explored the perspectives and readiness of future educators during their training. Understanding preservice teachers' attitudes, beliefs, and intentions toward AI integration is crucial, as they will play a key role in shaping the future of education.

This study aims to address this gap by exploring preservice teachers' perceptions of AI integration in education. By examining the interplay between perceived usefulness, perceived ease of use, and AI adoption, this research will provide a nuanced understanding of the factors influencing preservice teachers' readiness for AI integration. Furthermore, this study will contribute to the existing literature on AI in education, emphasizing the importance of incorporating future educators' perspectives in developing effective teacher education programs.

2. Theoretical Framework

2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM), initially proposed by Davis (1989), offers a valuable framework for understanding the factors that influence individuals' adoption of novel technologies, particularly in the context of education. At its core, TAM emphasizes the significance of two primary constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). PU assesses the degree to which a technology is perceived to enhance job performance, whereas PEU measures the ease with which a technology can be utilized. In the context of preservice teacher education, comprehension of these perceptions is crucial for the successful integration of AI tools, which have the potential to enhance teaching effectiveness and student learning outcomes.

Empirical research has consistently demonstrated that positive perceptions of PU and PEU are strong predictors of the likelihood of adopting AI technologies in educational settings, such as adaptive learning systems and intelligent tutoring systems (e.g., Kumar et al., 2020; Lee & Kim, 2020). To facilitate effective integration, it is essential to develop user-friendly AI tools, provide empirical evidence of their value through rigorous studies, and offer adequate training and support for preservice teachers. By doing so, the likelihood of successful adoption and sustained use of AI technologies can be increased.

The application of TAM in the context of preservice teacher education offers a valuable lens through which to examine the complex interplay between PU and PEU. However, a more nuanced exploration of TAM's theoretical underpinnings is warranted. While TAM has been successfully employed in numerous studies examining educational technology adoption, its specific alignment with AI tools in teacher education remains an area ripe for further investigation. A more comprehensive understanding of the relationships between PU, PEU, and AI adoption in preservice teacher education can inform the development of targeted interventions and teacher education programs.

Furthermore, consideration of alternative theoretical models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or the Technological Pedagogical Content Knowledge (TPACK) framework, can provide a more comprehensive understanding of the complex factors influencing AI adoption in preservice teacher education. A brief discussion of these models and their potential contributions can strengthen the theoretical foundation of this study, highlighting the rationale for the selection of TAM as the primary theoretical framework.

By examining the interplay between PU, PEU, and AI adoption in preservice teacher education, this study aims to contribute to the existing body of literature on educational technology adoption, ultimately informing the development of teacher education programs that effectively prepare future educators for the integration of AI tools in modern classrooms.

3. Review of Literature

3.1 Benefits and Challenges of AI in Education

The integration of AI in education has been a topic of significant interest, with various studies highlighting its potential to enhance student learning outcomes, improve teacher professional development, and increase educational efficiency (Hwang, Chang, & Chen, 2020; Luckin et al., 2016; VanLehn, 2011; Wang et al., 2021). AI-driven adaptive assessments can provide a more accurate and comprehensive measure of student knowledge and skills, while AI-powered learning analytics can identify patterns and trends in student learning behavior, informing data-driven instructional design (Picciano, 2009; Shute, 2008). Furthermore, AI can support teacher professional development, providing personalized feedback and support (Guskey, 2002).

3.2. Preservice Teachers and AI

3.2.1 Preservice Teachers' Familiarity with AI

Research has consistently shown that preservice teachers' familiarity with AI is a crucial factor in their ability to effectively integrate AI into their teaching practices (Lee & Kim, 2020, Wang & Li, 2019). A study by Chen and Chang (2020) found that preservice teachers' knowledge and understanding of AI were limited, with many reporting a lack of exposure to AI in their teacher preparation programs. This lack of exposure can lead to a lack of confidence in using AI in the classroom (Kim & Lee, 2019).

The curriculum and exposure to technology have been identified as significant factors influencing preservice teachers' familiarity with AI. For instance, Li & Zhang (2020) found that preservice teachers who had taken courses in educational technology were more likely to have a positive attitude towards AI and be more familiar with its applications. Similarly, Wang & Li (2019) found that preservice teachers who had participated in AI-based projects during their teacher preparation program reported higher levels of familiarity with AI.

3.2.2 Attitudes and Perceptions

Research has also explored preservice teachers' attitudes towards AI in teaching and learning. A study by Lee and Kim (2020) found that preservice teachers held positive attitudes towards AI, with many believing it had the potential to enhance student learning outcomes. However, Chen and Chang (2020) found that preservice teachers also expressed concerns about the potential drawbacks of AI, such as job replacement and decreased human interaction.

Preservice teachers' perceived benefits of AI include increased efficiency, personalized learning, and enhanced student engagement (Kim & Lee, 2019). On the other hand, perceived drawbacks include concerns about bias, lack of transparency, and job replacement (Li & Zhang, 2020). These attitudes and perceptions can influence preservice teachers' willingness to adopt AI in their teaching practices.

3.2.3 Behavioral Intentions to Use AI

Several factors have been identified as influencing preservice teachers' willingness to adopt AI, including perceived usefulness, perceived ease of use, and social influences (Wang & Li, 2019). For instance, Li and Kim found that preservice teachers who perceived AI as useful and easy to use were more likely to intend to use it in their teaching practices (2020). Social influences, such as support from colleagues and school administrators, have also been found to play a significant role in preservice teachers' intentions to use AI (Chen & Chang, 2020).

However, barriers to adoption, such as lack of resources, support, and training, can hinder preservice teachers' willingness to use AI (Kim & Lee, 2019). A study by (Li & Zhang, 2020) found that preservice teachers who lacked access to AI-related resources and support were less likely to intend to use AI in their teaching practices.

In conclusion, preservice teachers' familiarity with AI, attitudes, and behavioral intentions to use AI are critical factors in the successful integration of AI into teaching practices. Teacher preparation programs can play a significant role in enhancing preservice teachers' knowledge and understanding of AI, as well as promoting positive attitudes towards its use. Furthermore, addressing barriers to adoption, such as lack of resources and support, can help to increase preservice teachers' willingness to use AI in their teaching practices.

4. Research Questions

1) What are the levels of familiarity with and perceived usefulness of AI among preservice teachers with and without field experience?

2) Are there significant differences between preservice teachers with field experience and those without in their attitudes, perceptions, and readiness to integrate AI into future teaching?

3) What factors influence the willingness of preservice teachers with and without field experience to integrate AI into their future teaching practices?

5. Methodology

5.1 Survey Instrument Development

The survey instrument used in this study was designed to explore preservice teachers' attitudes, perceptions, and readiness to integrate AI into their teaching practices. The development of this survey was guided by the Technology Acceptance Model (TAM) framework (Davis, 1989), which emphasizes perceived usefulness and perceived ease of use as critical factors influencing technology adoption. Each survey item was carefully aligned with TAM constructs, ensuring that the questions measured preservice teachers' attitudes toward AI, their perceptions of AI's usefulness, and their views on the perceived changes AI might bring to education.

To ensure the survey's credibility, several items were adapted from validated instruments used in previous research on educational technology adoption (Kumar et al., 2020; Lee & Kim, 2020). Where necessary, new questions were developed to address specific aspects of AI integration in education, particularly in the context of teacher preparation. The survey underwent a thorough review process by experts, including two K-12 educators and two faculty members specializing in educational technology and teacher education. This expert review helped refine the wording, structure, and alignment of the items, ensuring both content validity and contextual relevance.

5.2 Sampling Strategy

The study targeted preservice teachers enrolled in an undergraduate elementary education program at a southeastern university. These participants were selected because they represent future educators who will be tasked with integrating AI tools into their classroom practices. The group included third, and fourth-year students, some with no prior internship experience and others with internship experience, making them well-positioned to reflect on the practical applications of AI in education.

The demographic profile of the participants included 174 preservice teachers, 78 of whom had no field experience, while 96 had field experience. The participants were aged between 20 and 24. These preservice teachers are enrolled in an elementary education program at a southern university, which prepares future educators for certification in teaching K-5 students. The program is designed to integrate both theoretical knowledge and practical classroom experience, with courses focusing on pedagogy, child development, special education, and literacy instruction. In addition to coursework, students engage in multiple field experiences, including internships, where they apply their learning in real classroom settings.

The homogeneity of the sample -primarily students from similar age groups and educational backgrounds- reflects the typical enrollment demographics of the program. However, this characteristic presents certain limitations regarding the generalizability of the findings to a broader population. Nonetheless, the shared background in educational coursework and classroom field experiences provides a rich context for exploring preservice teachers' readiness and perceptions of AI integration in future classrooms.

5.3 Reliability and Validity Measures

The survey's reliability was established through the calculation of Cronbach's alpha, yielding a coefficient of 0.943, which indicates excellent internal consistency. To further strengthen the instrument's validity, an exploratory factor analysis (EFA) was conducted. The EFA confirmed the underlying structure of the survey, aligning the items with the TAM framework's key dimensions: attitudes, perceived usefulness, and perceived changes brought by AI in education.

In addition to content validity established through expert review, the survey's construct validity was assessed through EFA results. Future iterations of this research could also employ confirmatory factor analysis (CFA) to validate the stability and fit of the proposed model. These combined efforts ensure that the survey instrument provides a robust and credible measure of preservice teachers' perspectives on AI in education.

6. Results

6.1 Descriptive Statistics

This study provides insights into preservice teachers' attitudes and perceptions of integrating AI in education. The findings are organized into four areas: Attitudes Toward AI, Perceptions of AI Usefulness, Perceived Changes in Education Due to AI, and Reasons for Using AI.

Table 1. Comparison of AI attitudes and perceptions toward the integration of AI

Survey Sections- AI Dimensions	No field experience n=78		Field experiences n=96		All participants		t-test	
	Mean	SD	Mean	SD	Mean	SD	Sig.	F
Attitudes	3.41	.37	3.55	.49	3.48	.45	.004*	8.334
Perceptions	3.40	.38	3.55	.47	3.48	.44	.049	3.931
Perceived Changes	3.31	.26	3.46	.41	3.39	.36	.001*	25.813
Reasons for Using AI	3.36	.38	3.48	.50	3.43	.45	.016	5.923

p>.005

Overall, preservice teachers have positive attitudes toward AI, with a mean score of 3.48 (SD = .45). They also see AI as useful for teaching, with a mean of 3.48 (SD = .44). Their views on AI's potential to change education showed a mean of 3.39 (SD = .36). Preservice teachers also recognize the advantages of using AI, with a mean score of 3.43 (SD = .45). Descriptive statistics were used to calculate the mean and standard deviation of the four dimensions. The study found that preservice teachers with and without experience showed significantly different attitudes and perceptions of AI. Table 1 above presents the mean scores for the four AI dimensions of preservice teachers.

6.2 Attitudes Toward AI

Table 2. Preservice teachers' attitudes toward AI

Attitudes toward AI	No field experience n=78		Field experiences n=96	
	Mean	SD	Mean	SD
I have sufficient knowledge and can explain what AI means.	3.55	.714	3.66	.693
I know how to exploit the benefits of AI in school.	3.35	.621	3.53	.648
Students appreciate teachers who use AI.	3.32	.522	3.46	.614
AI changes the role of the educator.	3.45	.595	3.52	.615
AI will help to improve student-teacher interaction.	3.40	.566	3.59	.625

The survey results show that preservice teachers with field experience had higher mean scores than those without field experience. Table 2 above shows the preservice teachers' attitudes toward AI.

6.3 Perceptions of AI Usefulness

Table 3. Preservice teachers' perceptions of AI usefulness

Perceptions of AI Usefulness	No field experience n=78		Field experiences n=96	
	Mean	SD	Mean	SD
I consider myself able to teach using AI.	3.35	.530	3.64	.600
A future teacher must master and use AI.	3.29	.486	3.48	.580
I think there are more advantages to AI than disadvantages.	3.42	.593	3.49	.562
I am willing to use AI in my future teaching career.	3.54	.618	3.60	.624

There are no significant differences between preservice teachers with and without field experience. Overall, preservice teachers hold positive opinions about the usefulness of AI. Table 3 above displays the preservice teachers' perceptions of AI's usefulness.

6.4 Perceived Changes Brought by AI

Table 4. Preservice teachers perceived changes brought by AI in education

Perceived Changes Brought by AI in Education	No field experience n=78		Field experiences n=96	
	Mean	SD	Mean	SD
Teachers will use AI as a teaching tool.	3.59	.568	3.53	.561
AI will be the virtual assistant of the teacher.	3.50	.552	3.50	.543
AI will be used by learners to customize the learning experience.	3.35	.479	3.50	.543
AI will not change the educational process.	3.04	.194	3.42	.556
AI will replace the teacher.	3.17	.375	3.31	.509
AI will shift the educator's role from traditional instruction to facilitation and mentoring.	3.32	.497	3.41	.573
AI will provide instant and personalized feedback instead of general and delayed feedback.	3.35	.554	3.52	.598
AI will facilitate a shift from mass learning to personalized learning.	3.31	.542	3.48	.598
AI will enable instant lesson design without preplanning.	3.32	.522	3.48	.580
AI will extend learning time outside the classroom.	3.29	.561	3.54	.579
AI will relieve teachers from administrative tasks (e.g., parent feedback, centralization of various situations).	3.22	.501	3.43	.557

The mean score of preservice teachers with field experience was significantly higher than that of preservice teachers with no field experience in terms of the perceived changes brought by AI in education. Table 4 above shows the mean score and standard deviation of preservice teachers' perceptions of the changes AI could bring to education.

6.5 Reason for Using AI

Table 5. Preservice teachers' reasons for using AI in education

Reasons for Using AI in Education	No field experience n=78		Field experiences n=96	
	Mean	SD	Mean	SD
Schoolchildren value the teacher who applies AI.	3.35	.599	3.54	.597
AI will help to improve student-teacher interaction.	3.38	.586	3.53	.632
AI will contribute to improving the learning experience and transitioning to personalized education.	3.36	.644	3.46	.614
I believe there are more future advantages generated by AI than there are disadvantages.	3.29	.486	3.42	.556
I consider myself capable of teaching using AI.	3.45	.658	3.49	.615
I can see myself using AI in my future profession.	3.35	.577	3.50	.665

There is no significant difference between preservice teachers with no field experience and those with field experience in terms of the reasons for using AI in education. The dataset has a mean of 3.43 and a standard deviation of 0.45, with most observations ranging between 3.29 and 3.54. Table 5 above shows the mean scores and standard deviation for preservice teachers' views on using AI in education.

6.6 Tools or Software Found Useful

Table 6. Tools or software preservice teachers found most interesting for educational use

AI tools/software	No field experience n=78	Percentage	Field experiences n=96	Percentage
Kahoot	43	55%	56	58%
Quizlet	33	42%	45	47%
Google Classroom	21	27%	37	38%
ChatGPT	47	60%	62	64%
Grammarly	30	38%	25	26%
Khan Academy	21	27%	17	18%
Duolingo	23	30%	17	18%
Magic Schools	11	14%	21	22%
Gimkit	6	8%	23	24%
CoPilot	12	15%	10	10%
Squirrel	18	23%	13	13%
Blooket	10	13%	33	34%
Curipod	12	15%	29	30%
Khanmigo	10	13%	17	18%

Preservice teachers without field experience are more likely to use tools for personal learning and exploration. Since they are still focused on coursework, they tend to use AI and EdTech tools to study for exams, complete assignments, create content for class projects, or explore new tools out of curiosity.

The most used tools include: Grammarly – for writing assignments, especially lesson plans and essays. Quizlet – for self-study and review. ChatGPT – to help understand readings, draft reflections, or brainstorm ideas. Squirrel.ai and Khan Academy – used more as learners than as teachers. Duolingo – often used if enrolled in language-related courses or for personal interest. Copilot (Microsoft AI) – for assistance with writing or presentations

This pattern likely reflects their current stage in the program, where their use of technology is more academic and individually focused rather than centered on classroom teaching.

Preservice teachers with field experience likely to use more practical, instructional tools. These students have been in real classrooms, so their tool choices often reflect actual teaching needs. They're more likely to choose tools that engage students interactively, support classroom management, and aid in lesson delivery or assessment.

Most used tools include: Kahoot, Blooket, and Gimkit – Popular for formative assessment, student engagement, and gamified learning. Google Classroom – Essential for classroom management, assignments, communication. Quizlet – Often used to support vocabulary, quick review activities. MagicSchool.ai or Khanmigo – For lesson planning support and quick AI-assisted content generation. ChatGPT – For generating lesson ideas, reflections, or modifying lesson plans quickly. Curipod – Used to create interactive slide decks, polls, or collaborative tasks with students.

This may be the result of they've seen what works with real kids and are likely adapting their tool use to match what cooperating teachers use or what they see as effective in practice. The frequency analysis of the responses is presented on Table 6 above.

6.7 Concerns about AI Integration

Open-Ended Question 1: What concerns or reservations do you have about integrating AI into educational settings?

Concerns About Integrating AI in Education. Preservice teachers raised many concerns about using AI in schools. These include fears that AI could replace teachers, give wrong information, increase cheating, and reduce student thinking skills. While both groups share similar concerns, their experiences shaped how they view these issues.

Responses From Preservice Teachers without Field Experience. Preservice teachers without classroom experience expressed strong concerns about AI's impact. Many worried that AI could replace human teachers or harm student-teacher relationships. For example, one said, "The AI will become more important than the teachers 10–20 years from now." Others feared that students would become lazy or cheat more, saying things like, "Plagiarism is the most concerning topic for AI usage." They also questioned whether AI could be trusted, noting it may provide "incorrect solutions" or "bad lesson plans." A common worry was that AI would limit student creativity and thinking. These concerns reflect a more theoretical view, as these preservice teachers haven't yet used AI in real classrooms. Research supports their worries -Holmes, Bialik, and Fadel (2021) found that educators fear losing meaningful relationships with students, and Wilkins and Morrow (2020) highlight the risks of inaccurate AI-generated content.

Responses From Preservice Teachers with Field Experience. Preservice teachers with classroom experience shared similar concerns but added more practical points. Like the others, they were concerned about AI replacing teachers and weakening personal connections with students. However, their focus was often on how AI is used. For example, one said, "We need appropriate training on how to use AI as a tool and not as something that takes the learning and teaching away." They also worried about cheating and accuracy but discussed these within the context of real assignments. Some mentioned that overuse of AI might make both students and teachers overly dependent, reducing effort and critical thinking. Their responses suggest a more balanced view—seeing the risks but also considering how to manage them in real classrooms. This aligns with Hwang, Chang, and Chen (2020), who emphasize the importance of thoughtful AI implementation.

Table 7. Preservice teachers concern with integrating AI

Concerns with integrating AI	No field experience n=78	Percentage	Field experiences n=96	Percentage
Concerns about AI replacing human teachers	38	49%	21	22%
Accuracy and reliability concerns	32	41%	18	19%
Cheating and plagiarism concerns	28	36%	15	16%
Impact on critical thinking skills	24	31%	18	19%
Implementation concerns	18	23%	10	10%
Loss of personalization or connection	15	19%	8	8%

Key Differences. Preservice teachers without field experience tended to be more cautious and focused on broad, theoretical concerns -like AI replacing teachers or harming student learning. Their responses showed more fear and uncertainty, often based on what they imagine could go wrong. In contrast, those with field experience shared many of the same concerns but were more focused on practical challenges like implementation, balance, and responsible use. Their experience helped them think about how AI could be used effectively if teachers are trained and thoughtful. This reflects what Duffy (2019) and Luckin et al. (2016) describe -AI should support teaching, not replace it, and successful use depends on careful planning. Table 7 shows the number and percentage of preservice teachers' responses, highlighting key themes that emerged from the data.

6.8 Views on Educators' Future Role

Open-Ended Question 2: How do you think AI will change the role of educators in the future?

AI and the Role of Educators in the Future. The responses to how AI will change the role of educators in the future show different views, especially between preservice teachers with field experience and those without. Some are optimistic, while others are concerned about the negative impacts. Here's a summary of what each group said.

Responses From Preservice Teachers with No Field Experience. Preservice teachers without field experience expressed more caution and uncertainty regarding AI's future role in education. Many acknowledged AI's potential to assist with grading and lesson planning, with one teacher saying, "AI will help teachers when it comes to grading, coming up with lessons, and so much more." However, a significant number also feared that AI could eventually replace teachers or reduce their creativity. For example, one teacher worried, "The AI will become more important than the teachers in 10-20 years." Others voiced concerns about AI's negative impact on student learning, such as, "Students may struggle to think for themselves." These concerns likely stem from a lack of practical experience using AI in classrooms, and thus they view AI through a more theoretical lens. Research by Brynjolfsson and McAfee (2014) supports these fears, suggesting that over-reliance on technology could stifle teacher creativity and diminish the personal connection between students and educators.

Responses From Preservice Teachers with Field Experience. In contrast, preservice teachers with field experience were more confident in AI's potential benefits for teaching. These teachers shared concrete examples of how AI supported their lesson planning and classroom activities. One teacher said, "I use Magic Schools to give me ideas for lesson planning and behavior management." Others mentioned using AI to help clarify written statements and correct grammatical errors, showing how they viewed AI as a useful tool for enhancing their teaching. However, they also expressed some concerns, particularly about students using AI for cheating. One teacher observed, "I have seen students use AI to complete their assignments (plagiarism)." Despite these concerns, the overall sentiment was more optimistic, with many believing that AI can enhance, not replace, the teacher's role in the classroom. This optimism is consistent with research by Luckin et al. (2016), who found that AI can help personalize learning and support teachers in administrative tasks, allowing them to focus more on teaching.

Table 8. AI and the role of educators in the future

AI and the role of Educators	No field experience n=78	Percentage	Field experiences n=96	Percentage
Positive impact	38	49%	57	59%
Negative impact	36	46%	29	30%
Uncertainty	32	41%	23	24%
Conditional impact	26	33%	14	15%
Concerns about student learning	24	31%	12	13%

Key Differences. The key difference between the two groups is the level of confidence and experience with AI in the classroom. Preservice teachers without field experience expressed more skepticism, focusing on potential negative impacts like AI replacing teachers or undermining student learning. These concerns were based on theoretical knowledge rather than hands-on experience with AI tools. In contrast, those with field experience were more optimistic and saw AI as a helpful tool in their teaching practices. They were more aware of AI's practical applications, like assisting with lesson planning and providing feedback. However, both groups acknowledged that AI's impact depends on how it is used, aligning with research from Hwang et al. (2020), which emphasizes the need for proper training and mindful integration of AI tools to maximize their benefits while minimizing drawbacks. Table 8 above shows the responses of preservice teachers.

6.9 Observations or Experiences

Open-ended questions 3: Can you share any experiences or observations you've had with AI in an educational context, either as a student or during your teacher training?

Preservice Teachers Without Field Experience. These students mostly describe their personal use of AI, like getting help with homework or correcting grammar. They've used AI to clarify statements or complete assignments, but they don't have much experience with AI in the classroom context. Some also express concerns about the misuse of AI, such as cheating or plagiarism. For example, they've observed peers using AI to complete assignments dishonestly. They also discuss their mixed feelings about AI, noting that it can make tasks easier but might also complicate the learning process. Their reflections align with McKenzie and Schmitz (2022), who found that AI's potential for misuse, such as academic dishonesty, is a significant concern in education.

Preservice Teachers with Field Experience. These students share more practical experiences with AI in actual classrooms. They talk about using AI for lesson planning, behavior management, and student reading tracking. They also note that AI can help with teaching specific standards or provide quick, useful feedback. They seem to understand AI's classroom role better, recognizing its potential benefits and drawbacks. For example, they mention using AI tools in math and science classes to support lessons and provide insights. Their experiences highlight a more hands-on approach to integrating AI into teaching, as discussed by Luckin et al. (2016), who emphasize AI's role in personalizing learning and supporting teachers in lesson planning.

Table 9. Experiences and observations with AI

Experiences or observations preservice teachers had	No field experience n=78	Percentage	Field experiences n=96	Percentage
Direct Use of AI for Academic Tasks	38	49%	44	44%
Observations of Others Using AI (Including Misuse or Concerns)	32	41%	43	43%
Reflections or Attitudes Toward AI	28	36%	37	37%
Perceptions of What Teachers Need to Know About AI	25	32%	34	34%
No Experience or Unclear Responses	17	22%	25	25%

Key Differences. Preservice teachers without field experience primarily discussed their personal use of AI -such as for homework help or grammar correction- and expressed concerns about potential misuse, including plagiarism. Preservice teachers with field experience focused on real-world classroom applications, such as using AI for lesson planning and tracking student progress and demonstrated a deeper understanding of AI's role in education. This contrast highlights how field experience provides preservice teachers with a more nuanced understanding of AI's practical use and its impact on teaching and learning. Research by Chai, Koh, and Tsai (2020) supports this, noting that teachers with field experience are more likely to integrate AI tools effectively into classroom settings. Additionally, Hwang et al. (2020) emphasize the importance of professional development to help teachers use AI in ways that enhance student learning while avoiding potential pitfalls. Table 9 above shows the preservice teachers' responses.

6.10 Required Teacher Skills

Open-ended question 4: In Your Opinion, What Are the Most Important Skills and Knowledge Future Teachers Need to Effectively Use AI in Their Classrooms?

Preservice Teachers without Field Experience. These students focus on basic knowledge of AI, its potential risks, and how to use it carefully. They emphasize the importance of understanding AI's limitations, being aware of issues like plagiarism, and knowing how to use AI without relying on it too much. They also mention the need for good judgment and appropriate training to integrate AI into teaching while maintaining student relationships. This concern about the potential misuses of AI, such as plagiarism and overreliance, aligns with findings from McKenzie and Schmitz (2022), who highlight the need for educators to understand AI's ethical implications and foster academic integrity.

Preservice Teachers with Field Experience. These students provide a more practical perspective, discussing the use of AI for specific tasks like lesson planning and managing student behavior. They highlight the importance of knowing how to prompt AI effectively, adapting lessons, and maintaining a balance between AI and traditional teaching methods. Their responses show a deeper understanding of integrating AI in the classroom based on real-world experience. As noted by Chai et al. (2020), teachers who are equipped with the right skills can effectively integrate AI tools to enhance learning outcomes and engagement.

Table 10. Skills and knowledge

Skills and Knowledge Future Teachers Need to Effectively Use AI	No field experience n=78	Percentage	Field experiences n=96	Percentage
Awareness of AI Limitations	36	46	43	43
Understanding AI's potential misuses	33	42	40	40
Effective Use of AI	26	33	34	36
Teacher Training and Judgment	25	32	28	35
Pedagogical Balance	19	24	23	27

Key Differences. Preservice teachers without field experience focused on theoretical understanding, including the basics of AI, and expressed concerns about its misuse and potential overreliance. Preservice teachers with field experience emphasized the practical use of AI tools, particularly in lesson planning, and highlighted the importance of maintaining a balance between AI integration and teacher-student interaction. This shows how field experience shapes a more applied and nuanced approach to using AI in teaching. Research by Hwang et al., (2020) supports the idea that effective training can help teachers make informed decisions about AI use, ensuring it complements rather than replaces traditional methods. Table 10 above shows preservice teachers' responses on the skills and knowledge they need to effectively use AI.

7. Summary

This study explored preservice teachers' familiarity, attitudes, and perceptions of AI in education, with a focus on comparing those with and without field experience. The findings reveal that preservice teachers generally view AI positively, recognizing its potential to enhance teaching through personalized learning, streamlined instruction, and increased student engagement (Baker & Inventado, 2014; Luckin et al., 2016). However, differences emerged between the two groups. Teachers without field experience tended to express theoretical concerns, especially around the risks of overreliance on AI, reduced creativity, and loss of human connection in the classroom, while those with field experience provided more concrete examples of AI use—such as adaptive lesson planning and behavior support (Brynjolfsson & McAfee, 2014; Holmes et al., 2021). For instance, one participant shared, "I could use AI tools like ChatGPT to help generate writing prompts or to model how to revise a paragraph, especially for students who struggle with writing." Another noted, "I would like to use AI-based reading apps that adapt to each student's level to help differentiate instruction during literacy centers." These examples highlight how practical experience may enhance preservice teachers' ability to envision specific, classroom-based applications of AI tools.

8. Conclusion

The results suggest that preservice teachers are in a transitional phase when it comes to AI integration. While most recognize the value of AI in supporting instruction, many -particularly those without classroom experience- remain cautious about its broader implications. Teachers with field experience demonstrated greater confidence, more nuanced understandings of AI tools, and a stronger awareness of pedagogical balance (Chai et al., 2020). This divide emphasizes the importance of practical exposure in helping preservice teachers move from theoretical awareness to confident application. Teacher preparation programs must address this gap by offering structured opportunities for real-world or simulated use of AI tools, along with guidance on how to evaluate, prompt, and ethically apply AI in instruction (Hwang et al., 2020).

9. Implementation

To better prepare future educators for AI integration, teacher education programs should embed hands-on opportunities to engage with AI tools. Activities could include AI-supported lesson design, critical evaluation of AI-generated content, and reflections on ethical concerns such as data privacy and academic integrity (McKenzie & Schmitz, 2022). Courses should teach skills such as prompt engineering, interpreting AI feedback, and using AI in differentiated instruction. Incorporating real classroom examples and providing mentorship from educators experienced in AI can help bridge the gap between abstract understanding and classroom practice. This approach will foster both competence and confidence in preservice teachers as they prepare to teach in increasingly tech-driven environments (Thomas, Hong, & Chiu, 2021).

10. Limitations

While the study offers valuable insights, it is limited by its scope and sample. Data were collected from 174 preservice teachers at a single southern college, which may not reflect broader national or international trends. The participants were primarily in elementary education internships (3rd and 4th grade), limiting the generalizability of findings to other grade levels or subject areas. Additionally, the self-reported nature of the survey and open-ended responses introduces potential bias, and the qualitative data may be subject to interpretation variability. Because the study was conducted within one teacher preparation program, the findings may not be generalizable to broader populations of preservice teachers in different contexts. Future research with more diverse and representative samples could provide a more comprehensive picture of preservice teachers' perceptions of AI.

11. Recommendations for Future Research

Further research should examine the long-term effects of AI training in teacher education, particularly through longitudinal studies that track how preservice teachers implement AI in their classrooms after certification (Holmes et al., 2021). Comparing different models of AI training could identify best practices for fostering effective and ethical use (Hwang et al., 2020). Research should also explore the impact of AI use on student outcomes, engagement, and teacher-student relationships across grade levels and educational settings (Chai et al., 2020). Additionally, including perspectives from in-service teachers and administrators would enrich our understanding of barriers to AI integration. Expanding studies to include diverse geographic, cultural, and instructional contexts will help ensure more equitable and adaptable strategies for future AI use in education. A follow-up study tracking preservice teachers after they enter the profession could offer valuable insight into how their perceptions of AI evolve and how they apply AI tools in real classroom settings.

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