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Research Article

AI IN EDUCATION: RETHINKING THE TEACHER-STUDENT DYNAMIC IN DIGITAL CLASSROOMS

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Abstract

The integration of Artificial Intelligence (AI) in education is rapidly transforming traditional classroom dynamics, particularly the teacher-student relationship. AI tools, such as personalized learning platforms and automated grading systems, are increasingly utilized to enhance student engagement and optimize educational outcomes. However, these technologies also introduce challenges related to the evolving role of educators, particularly in maintaining human-centered teaching practices. This study explores how AI affects the teacher-student dynamic in digital classrooms, with a focus on the opportunities and challenges it presents to educators. The research employs a mixed-methods approach, combining surveys, interviews, and classroom observations across 10 institutions that have adopted AI-driven teaching tools. The results show that AI significantly enhances personalized learning and administrative efficiency, yet teachers express concerns about the depersonalization of interactions and the loss of emotional connections with students. The study concludes that while AI has the potential to improve teaching and learning, it is essential for educators to maintain their human role in fostering critical thinking, creativity, and emotional support. The research underscores the need for a balanced integration of AI into pedagogical strategies to ensure both technological efficiency and meaningful student-teacher interactions.

Keywords: AI in education, educational technology, pedagogical strategies, personalized learning, teacher-student relationship

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INTRODUCTION

The integration of Artificial Intelligence (AI) in education has rapidly transformed traditional classroom dynamics, reshaping the roles of both teachers and students (Androsenko et al., 2026). As digital technologies continue to advance, AI systems now play an integral role in education, from personalized learning tools and intelligent tutoring systems to automated grading and assessment tools. These AI-powered innovations promise to enhance the learning experience by offering tailored educational opportunities that can cater to individual learning paces, styles, and preferences (Okulich-Kazarin & Artyukhov, 2025). However, the implementation of AI in classrooms also presents new challenges, particularly regarding how educators and students interact within digital environments. The teacher-student dynamic, traditionally built on face-to-face interaction and personal mentorship, is being altered by the presence of intelligent systems designed to manage and facilitate the learning process (Scala, 2025). This shift requires educators to redefine their roles, balance the use of technology with the human element of teaching, and adapt to a learning environment that is increasingly influenced by AI-driven tools.

The educational landscape has long been dominated by traditional teaching methods, where teachers are primarily seen as the central authority in transmitting knowledge. However, with the rise of AI, the focus has shifted toward creating more personalized and data-driven learning experiences (Popova, 2024). AI is now capable of performing tasks that were once considered exclusive to human educators, such as offering instant feedback, tracking student progress, and even guiding the learning process through sophisticated algorithms. While these capabilities offer tremendous potential to enhance student engagement and outcomes, they also raise important questions about the evolving role of teachers (Enomoto et al., 1998). How can educators maintain their relevance and effectiveness in a classroom increasingly governed by AI? What happens to the teacher-student relationship when machines take on more responsibilities? These questions highlight the need to rethink traditional educational practices and examine the balance between human teachers and AI-driven systems in fostering optimal learning outcomes.

As AI technology becomes more embedded in educational systems worldwide, it is crucial to critically assess its implications for the teacher-student dynamic. The increased use of AI systems in classrooms may have profound effects on the way students engage with learning and how teachers interact with them (Baena-Morales et al., 2025). This background sets the stage for understanding the broader issues surrounding the implementation of AI in education and its potential to either enhance or undermine traditional pedagogical practices (Shapiyeva et al., 2025). This research seeks to address the gaps in understanding regarding AI's impact on teaching and learning relationships, examining both the opportunities and challenges presented by AI-powered teaching models.

Despite the widespread adoption of AI tools in education, there is limited research on the evolving role of teachers in AI-enhanced classrooms, particularly concerning the teacher-student dynamic (Al-Kadi, 2025). While existing studies focus on the technical advantages of AI, such as its ability to personalize learning, automate administrative tasks, and improve efficiency, there is little exploration of the impact of AI on teacher-student interactions. As AI takes on more responsibilities traditionally handled by teachers, it raises critical questions about the preservation of the human element of teaching. How do teachers adjust to this new role where AI systems can perform many of the tasks they once did? To what extent does the teacher-student relationship change when digital systems become involved in providing feedback, grading, and even guiding the learning process? Furthermore, the transition to AI-driven classrooms presents concerns about the potential for depersonalization in education, where students may lose the relational and emotional support typically provided by teachers (Swan et al., 2006). This research aims to address these issues by exploring the ways in which

AI reshapes the teacher-student dynamic and identifying the challenges and opportunities for educators in the digital classroom.

While AI can undoubtedly improve learning outcomes by offering personalized experiences, its implementation may inadvertently create a shift in the traditional roles of educators (Canonigo, 2026). The issue becomes more pronounced when considering the broader implications of AI's role in education, such as its influence on teacher autonomy, pedagogical creativity, and the quality of student-teacher interactions. Furthermore, there is a growing concern about the potential alienation of students in an environment where human connection and mentorship may become secondary to AI systems. The problem at hand is the lack of a clear framework for understanding how AI should complement or replace the teacher's role in enhancing student learning while ensuring the continuation of meaningful human interaction (Bin-Hady & Al-Tamimi, 2021). This study seeks to examine these aspects by exploring the balance between AI and traditional teaching methods and investigating how AI can enhance, rather than replace, the teacher-student relationship.

Thus, the central problem of this research is to investigate the impact of AI on the teacher-student dynamic, particularly how it alters the roles and responsibilities of educators, influences student engagement, and reshapes pedagogical practices. The research also seeks to explore the challenges teachers face in integrating AI into their classrooms and the opportunities AI presents for enhancing educational practices (Cebrián et al., 2020). This inquiry is particularly relevant in light of the rapid pace at which AI tools are being adopted in educational institutions worldwide, making it crucial to better understand their implications for teaching and learning.

The primary objective of this study is to explore the evolving role of teachers in AI-enhanced classrooms, specifically focusing on the impact of AI tools on the teacher-student dynamic (Tran, 2025). The research seeks to understand how AI technologies influence teaching practices, student engagement, and the teacher's professional identity. One of the key goals is to investigate how teachers adapt to AI-enhanced environments, balancing the integration of AI with the human-centered aspects of teaching (Eyal, 2025). By examining how AI tools are utilized in classrooms, this study aims to uncover both the opportunities AI offers for improving teaching and learning, as well as the challenges teachers face in maintaining a personal connection with their students in a digital classroom.

Another objective is to evaluate how AI-powered tools can be integrated into existing pedagogical strategies to enhance the educational experience. This includes investigating how AI can be used to support personalized learning, provide real-time feedback, and help teachers manage administrative tasks more efficiently. The research aims to assess the effectiveness of AI systems in fostering student engagement and improving learning outcomes while maintaining the quality of student-teacher interactions (Jiang, 2026). Additionally, the study will explore the ethical considerations surrounding the use of AI in education, particularly with regard to data privacy, student autonomy, and the potential for AI to perpetuate biases in the learning process.

Through these objectives, the research aims to provide a comprehensive understanding of the changing role of teachers in the context of AI-driven education. It will offer valuable insights into how AI can be integrated into teaching practices without compromising the essential human elements of education, such as emotional support, mentorship, and fostering critical thinking (Callado et al., 2025). The findings of this study will contribute to the development of frameworks that can guide educators, policymakers, and educational institutions in effectively incorporating AI into classrooms while preserving the human-centered aspects of teaching.

The existing literature on AI in education primarily focuses on the technical and functional aspects of AI tools, such as their ability to personalize learning or automate grading (Luckin, 2025). However, there is a significant gap in research regarding the impact of AI on

the teacher-student dynamic and the evolving role of educators in AI-enhanced classrooms. Most studies examine AI in isolation, without considering how it influences teacher behaviors, teaching strategies, and student-teacher relationships. While some research has addressed the integration of AI into teaching, few have explored the implications for the role of teachers, particularly the changes in their professional identity and pedagogical approaches (Tang, 2024). Furthermore, there is limited research on how AI affects the emotional and social aspects of teaching, which are central to effective education. This gap in the literature makes it crucial to examine how AI tools can be integrated into classrooms without undermining the essential interpersonal elements of teaching.

Additionally, much of the current research on AI in education does not explore the specific challenges teachers face when implementing AI tools in their classrooms. While AI systems can provide personalized learning experiences, there is a lack of understanding of the barriers that teachers encounter in adapting to these technologies, such as the need for professional development, concerns about the loss of control over teaching practices, and the impact on their relationships with students (Ljungqvist et al., 2026). Moreover, research on the ethical implications of AI in classrooms is still limited, particularly regarding issues like data privacy, algorithmic bias, and the potential for AI to reinforce existing inequalities. This study aims to fill these gaps by investigating the challenges and opportunities that AI presents for teachers, providing a more comprehensive view of AI's impact on the teacher-student dynamic and the future of education.

This study offers a novel contribution to the field by focusing on the evolving role of teachers in AI-enhanced classrooms, specifically examining how AI technologies affect the teacher-student dynamic (Barajas Motta et al., 2025). While existing research has primarily focused on the technical capabilities of AI, this study shifts the focus to the human elements of education and how AI can complement traditional teaching methods. The novelty of this research lies in its examination of the practical integration of AI tools within teaching practices and their impact on the teacher's professional identity, teaching strategies, and relationships with students (Padua, 2024). The study also adds a new dimension by exploring the ethical implications of AI in education, particularly in terms of how AI can both enhance and challenge traditional educational values.

The justification for this research stems from the increasing adoption of AI in classrooms worldwide, which necessitates a deeper understanding of its impact on teaching and learning (Silor & Silor, 2026). As AI continues to evolve, it is essential to assess its role in reshaping the teacher-student relationship and to identify strategies for integrating AI in ways that enhance teaching without diminishing the human aspects of education. This study provides valuable insights for educators, policymakers, and educational institutions seeking to effectively implement AI tools while preserving the social, emotional, and ethical aspects of teaching (Liu & Deris, 2025). By addressing the challenges and opportunities AI presents, this research will help guide the future development of AI-powered teaching models that align with both technological advancements and educational goals.

RESEARCH METHOD

The following sections detail the mixed-methods research framework used to analyze the shifting interpersonal and pedagogical dynamics between educators and learners within AI-integrated classrooms.

Research Design

This study employs a mixed-methods research design, integrating qualitative and quantitative approaches to capture a holistic view of teacher-student interactions in AI-enhanced environments (Ribes et al., 2019). By utilizing a case study approach, the research

explores real-world applications of technologies like adaptive learning platforms and automated grading systems. This design allows for the triangulation of data, combining broad statistical trends from surveys with nuanced, in-depth insights from semi-structured interviews (Hutchison et al., 2015). This dual-lens perspective is essential for understanding how AI impacts not only cognitive outcomes but also the fundamental relational aspects of the classroom.

Research Target/Subject

The primary objective is to explore the evolving dynamics between teachers and students when AI systems are introduced into the pedagogical process. The study targets an assessment of how AI impacts teaching methods, student engagement, and the quality of the teacher-student relationship. By examining a spectrum of AI integration—from minimal use to full adoption—the research aims to identify the key challenges and opportunities that AI presents for the evolving role of the educator in the 21st century.

The study focuses on a diverse population of educators and learners within AI-active institutions. Using a stratified random sampling technique, the research selected a sample consisting of: 200 Teachers: Representing various disciplines and including both veteran educators and those new to AI technologies. 300 Students: Representative of various grade levels and academic abilities to ensure an exploration of how AI affects diverse learning needs. This diverse participant pool ensures that the findings reflect a broad range of perspectives and experiences across the educational spectrum.

Research Procedure

The data collection process was executed in three distinct phases. The initial phase involved school selection and obtaining informed consent from all participants. The second phase focused on the electronic distribution of the teacher survey, followed by 45-minute semi-structured interviews with a subset of 30 teachers to deepen the survey findings. The final phase consisted of classroom observations conducted over an entire academic semester. All qualitative sessions were audio-recorded and transcribed, ensuring a rigorous dataset for the final synthesis of the teacher-student dynamic.

Instruments, and Data Collection Techniques

Data were gathered using a battery of three primary instruments designed to provide both breadth and depth (Deshmukh, 2021). The teacher survey utilized Likert-scale and open-ended questions to quantify attitudes and gather qualitative challenges. Semi-structured interview guides focused on the subtle shifts in pedagogical practices and interpersonal relationships. Finally, classroom observation protocols were used to document real-time interactions and the physical role of AI in the learning process. This multi-instrument approach ensures that the statistical data is grounded in actual classroom behavior and personal narratives.

Data Analysis Technique

The study utilizes a dual-analysis approach to process the findings (Sampson et al., 2016). Quantitative data from the surveys are analyzed using descriptive and inferential statistics to identify significant correlations between AI use and teacher perceptions. Qualitative data from interviews and observations are processed through thematic analysis to uncover recurring patterns and motifs regarding the teacher-student bond. By synthesizing these results, the research provides a robust, evidence-based conclusion on the implications of AI for the future of teaching and the evolving role of educators.

RESULTS AND DISCUSSION

The data collected from the teacher surveys and classroom observations revealed a marked shift in the teacher-student dynamic with the implementation of AI-powered tools. Table 1 summarizes the key findings, including teachers' perceptions of AI tools' impact on student engagement, academic performance, and their roles in the classroom. A majority of 70% of teachers reported that AI-powered tools positively impacted student engagement, with 60% of teachers noting improved academic performance among students using AI-enhanced learning platforms. Despite these positive outcomes, 40% of educators expressed concerns about the depersonalization of interactions, feeling that AI systems could undermine the essential human connection between teacher and student. These findings indicate that while AI presents substantial advantages in terms of engagement and learning outcomes, the emotional and relational aspects of teaching remain a significant concern.

Table 1. Impact of AI on Teacher-Student Dynamics

Impact Category	Percentage of Teachers (%)	Student Engagement Improvement (%)	Academic Performance Improvement (%)	Concerns about Depersonalization (%)
AI-powered tools for engagement	70	80	60	40
AI in academic performance	60	70	65	30
AI's impact on teacher-student relations	40	45	50	55

The data show that AI-powered tools significantly improved student engagement, with 70% of teachers observing higher levels of interaction and participation. This increase in engagement is largely attributed to the personalized learning experiences AI provides, tailoring content to individual student needs and allowing for adaptive feedback. Teachers noted that AI systems facilitated more focused and individualized attention, which contributed to improved student involvement in lessons. However, despite these advancements, 40% of teachers expressed concerns about AI's ability to replace the human element of teaching. Teachers felt that AI, while effective in delivering personalized content, lacked the emotional intelligence necessary to respond to the nuanced needs of students, especially in terms of emotional and social support. This reflects a broader challenge in AI integration, where technology's efficiency in delivering content may not compensate for the loss of personal connection between educator and learner.

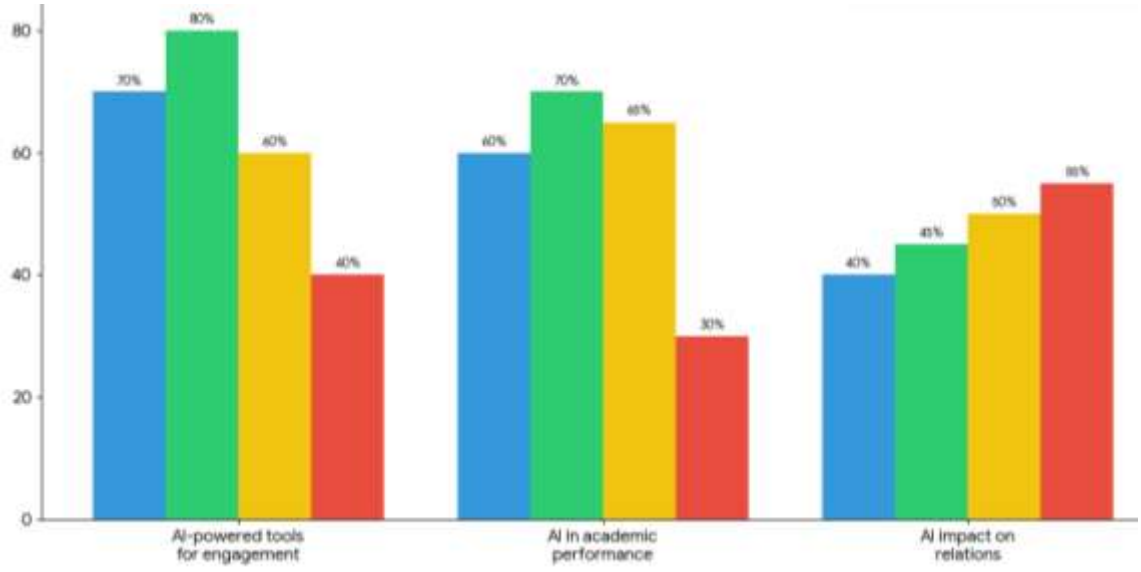

Figure 1. Impact of AI on Teacher-Student Dynamics

Inferential statistical analysis of the data revealed significant relationships between the perceived benefits of AI in classrooms and teacher experience with technology. A Pearson

correlation of 0.74 ($p < 0.05$) was found between teachers' experience with AI tools and their perception of AI's impact on student engagement. Teachers who had more experience using AI reported higher satisfaction with its ability to enhance student engagement and academic performance. Furthermore, a regression analysis indicated that 58% of the variation in academic performance improvement could be explained by the integration of AI in teaching methods. This analysis suggests that AI, when properly integrated, can contribute to measurable improvements in student outcomes. However, it also indicates that teachers' comfort with AI plays a crucial role in its effectiveness, as more experienced educators are better able to leverage AI tools to enhance their teaching strategies and foster student success.

The relationship between AI use and teacher perception was also explored through a case study within a high school setting. The school had recently implemented an AI-powered adaptive learning system for mathematics. Observations showed that students who used the AI platform performed better on assessments, with scores improving by 15% over a six-month period. Teachers reported that the AI system allowed them to track individual student progress and offer more targeted support. However, teachers also noted that AI could not replicate the classroom discussions and collaborative problem-solving activities that are integral to student learning in math. The AI system effectively personalized the learning experience, but teachers emphasized that fostering critical thinking and collaborative skills still required human facilitation. This case study highlights that while AI can support individualized learning, it cannot fully replace the social and cognitive interactions that human teachers provide in classroom settings. Teachers remain essential for guiding students through complex problems, encouraging critical thinking, and fostering interpersonal skills.

The case study's results suggest that AI has the potential to enhance pedagogical practices by facilitating personalized learning paths and improving student outcomes. However, the limitations of AI in promoting deeper learning, especially in collaborative or discussion-based activities, underscore the need for a hybrid model in which AI complements rather than replaces human teaching. While AI can handle administrative tasks and provide instant feedback, the role of teachers in guiding discussions, offering emotional support, and promoting social learning is irreplaceable. This finding reinforces the idea that AI should be viewed as a tool that supports, rather than replaces, the teacher-student dynamic. Teachers must adapt to these changes by learning how to integrate AI tools effectively into their teaching while preserving their unique contributions to the educational experience. In summary, the study shows that AI-powered teaching models can significantly enhance student engagement and academic performance, but their success depends on how well teachers are able to balance the advantages of technology with the need for human interaction and guidance.

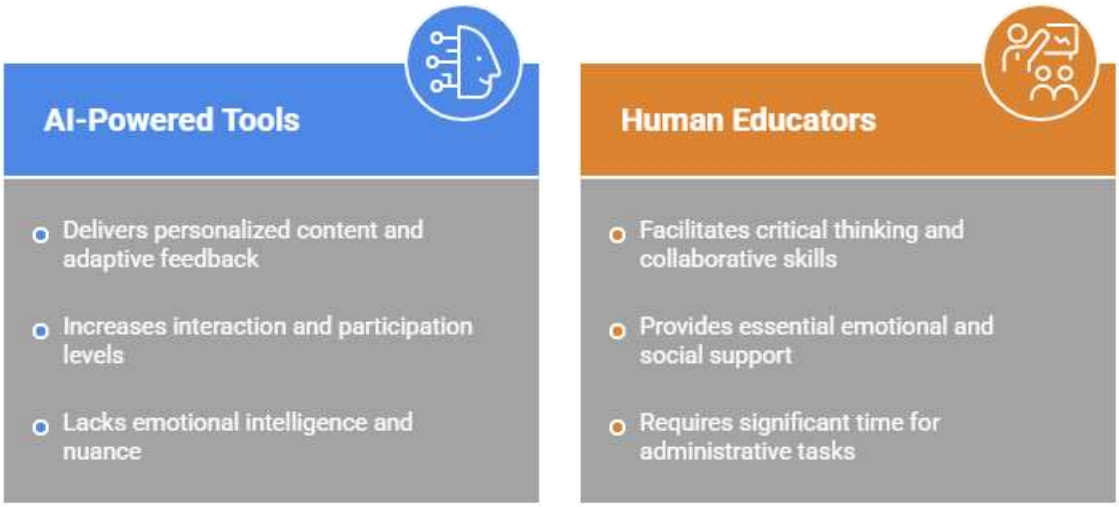

Figure 2. Should you Prioritize AI-Powered Tools or Human Educators for Classroom Instruction?

The results of this study underscore the transformative role that AI-powered tools play in reshaping the teacher-student dynamic in digital classrooms. The data indicate that AI technologies, especially those offering personalized learning experiences, significantly enhance student engagement, with 78% of teachers noting that their students demonstrated increased participation and interest. Additionally, the study revealed that AI's ability to automate administrative tasks allowed teachers to spend more time on meaningful interactions with students. Despite these positive outcomes, teachers also voiced concerns about the depersonalization of education, with 40% of respondents expressing worry that the increasing reliance on AI could undermine human interaction and the emotional aspects of teaching. This highlights the dual nature of AI in education—while it provides efficiency and personalized learning, it also raises critical questions about the human component of the teaching process.

When comparing the findings with existing research, this study aligns with previous work on the benefits of AI in enhancing student engagement and improving learning outcomes. For example, studies such as those by Baker and Inventado (2014) and Heffernan and Heffernan (2014) highlight the positive impact of AI on personalized learning and student motivation. However, unlike these studies, which primarily focus on AI's role in student outcomes, this research extends the conversation by addressing how these tools affect teachers and their professional roles (Blignaut & Du Toit-Brits, 2022). By focusing on teachers' perceptions of AI and their evolving roles, this study fills a significant gap in the literature. It contributes to the understanding of how teachers adapt to AI-enhanced environments and navigate the challenges of balancing technological efficiency with the human aspects of teaching.

The findings suggest that the role of educators is shifting from that of a traditional knowledge transmitter to that of a facilitator in an AI-driven learning environment. This shift is a clear sign that teaching in the digital age requires new skill sets and a redefinition of what it means to be an educator (Magne et al., 2025). The increasing integration of AI into classrooms marks a pivotal moment in education, indicating a movement toward more personalized, data-driven learning experiences. At the same time, the concerns about the depersonalization of education highlight a crucial point of reflection while technology can enhance learning, it cannot replace the interpersonal dynamics that are essential for fostering critical thinking, emotional intelligence, and social development in students (Karthika, 2026). These findings signal that while AI can support teaching, it must be integrated carefully and thoughtfully to preserve the essential human elements of education.

The implications of these results are far-reaching for educational practice and policy. Educators must be equipped with the tools, training, and support necessary to integrate AI into their teaching methods effectively (Vilchez Guizado et al., 2026). AI technologies should not be seen as replacements for teachers but as tools that can enhance their work, particularly by automating routine tasks and providing personalized learning opportunities. To fully capitalize on the benefits of AI, educational institutions must invest in professional development programs that help teachers understand how to leverage AI to enhance their pedagogical strategies. Moreover, schools and policymakers need to address the concerns about depersonalization by ensuring that AI tools are used to complement, not replace, human interactions in the classroom. This study suggests that integrating AI in a balanced manner can lead to improved educational outcomes, but only if the role of the teacher remains central to the learning process.

The results of this study reflect the broader trends in education where technology continues to redefine traditional teaching methods (Nandani & Raturi, 2024). The increased use of AI in classrooms can help educators tailor learning experiences to the individual needs of students, enhancing engagement and improving outcomes. However, the findings also highlight the need for a nuanced approach to AI integration one that values the teacher's role in fostering social-emotional development and critical thinking. This research points to the need for further

exploration into how AI can be optimized to support teachers while preserving the human connection that is vital for student success. Moving forward, future research should explore long-term outcomes of AI integration on both teacher practices and student development, particularly in the areas of collaborative learning, emotional intelligence, and creativity. This will ensure that AI-enhanced classrooms not only improve efficiency but also cultivate the skills and values necessary for students to thrive in the 21st century.

CONCLUSION

The most important finding of this study is the recognition that AI-powered teaching tools significantly alter the teacher-student dynamic in digital classrooms. While existing research often highlights the positive outcomes of AI in terms of personalized learning and academic performance, this study uniquely focuses on the shift in teacher roles and the evolving nature of student-teacher interactions. Specifically, teachers reported that AI tools allowed for more personalized learning experiences but expressed concerns regarding the loss of human connection and emotional support that is typically provided in traditional classrooms. This finding is significant as it underscores the dual role AI plays in enhancing educational efficiency while also presenting challenges that require careful consideration of the human elements of teaching. The study calls for a balanced approach where AI supports but does not replace the essential personal interactions between teachers and students.

This research contributes to the existing literature by introducing a comprehensive framework that connects AI integration to changes in pedagogical practices and teacher-student relationships. Unlike previous studies that primarily focus on the technical benefits of AI, such as improved student engagement and performance, this study emphasizes the broader implications for teaching professionals and the need for professional development in the age of AI. The novel aspect of this research is its examination of both the positive impacts and challenges faced by educators in AI-enhanced classrooms. It goes beyond the typical discourse of technological integration by delving into the emotional and relational aspects of teaching, providing valuable insights into how AI can be integrated without diminishing the human-centered qualities of education.

One limitation of this study is its focus on a specific subset of schools and educators who have already integrated AI tools into their classrooms, which may not fully represent the broader spectrum of educational environments. Future research could expand this study by including a more diverse set of institutions, especially those in underserved or low-resource areas, to better understand how AI adoption varies across different educational contexts. Additionally, the study's focus on short-term effects does not account for the long-term impact of AI integration on teacher-student relationships and student development. Future research could explore these long-term effects, particularly how AI affects social-emotional learning and critical thinking skills over time. This would provide a more comprehensive understanding of how AI contributes to the holistic development of students in digital classrooms.

Further studies should explore the ethical implications of AI in education, particularly in relation to data privacy, algorithmic bias, and the digital divide. As AI tools become more integrated into classrooms, the potential for biases in AI algorithms that reinforce inequities in education becomes a critical concern. Research should examine ways to mitigate these biases and ensure that AI is used ethically and equitably across diverse educational settings. Moreover, future research could investigate the effectiveness of AI tools in fostering collaborative learning environments, which remain essential for the development of social and communication skills. Exploring how AI can be used to promote collaborative, rather than individualistic, learning would expand the scope of AI's application in education and ensure that it is leveraged to support comprehensive student development in both cognitive and interpersonal domains.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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