



Didakta: International Journal of Social Sciences, Language, and Education

Vol 1 No 3 July 2026, Hal 21-31

ISSN: 3124-3894 (Print) ISSN: 3124-3886 (Electronic)

Open Access: <https://researchfrontiers.id/didakta/index>

Artificial Intelligence in Education: Can AI Improve Teacher Performance or Will It Replace Them?

Nida Ul Hasanah^{1*}, Amar Ali Aulia², Muhammad Azhar Abdillah³, Novel Daud Poedjiono⁴

¹⁻⁴ Universitas Teknologi Digital, Indonesia

email: nida10524021@digitechuniversity.ac.id¹

Article Info :

Received:

27-06-2025

Revised:

03-07-2025

Accepted:

13-07-2026

Abstract

The rapid advancement of artificial intelligence (AI) has transformed educational practices and generated critical debates regarding whether AI enhances teacher performance or threatens the continuity of the teaching profession. This study aims to examine the role of AI in education by analyzing its contributions, limitations, and potential relationship with human teachers. Employing a non-empirical qualitative literature review approach, this research synthesizes international scholarly publications concerning generative AI, personalized learning, classroom management, human-AI collaboration, and the human dimensions of teaching. The findings indicate that AI significantly improves educational efficiency through automation, adaptive learning support, and data-driven instructional assistance. Nevertheless, AI remains limited in performing affective, ethical, and relational functions that constitute essential components of effective teaching. The study concludes that AI is unlikely to replace teachers entirely but will reshape their professional roles through collaborative human-AI models. This research contributes to the theoretical development of hybrid intelligence perspectives in education and provides a comprehensive understanding of technology integration that preserves the centrality of human pedagogical expertise.

Keywords: Artificial Intelligence, Education, Teacher Performance, Personalized Learning, Human-AI Collaboration



©2022 Authors.. This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.
(<https://creativecommons.org/licenses/by-nc/4.0/>)

INTRODUCTION

The accelerated integration of artificial intelligence (AI) into education represents one of the most transformative developments in contemporary educational discourse, reshaping traditional assumptions regarding teaching, learning, and the professional identity of educators. The emergence of generative AI systems, particularly large language models capable of producing human-like responses, generating instructional materials, and supporting interactive learning environments, has expanded the technological boundaries of education beyond conventional digital learning platforms. This transformation has generated a fundamental epistemological debate concerning whether AI should be understood as an advanced pedagogical instrument that enhances teacher effectiveness or as a disruptive technology capable of challenging the necessity of human teachers in future educational systems. The increasing adoption of AI-driven applications in educational contexts reflects a broader global movement toward data-driven, adaptive, and personalized learning environments, where technological systems are increasingly involved in instructional planning, assessment, classroom management, and student engagement processes (Baidoo-Anu & Ansah, 2023; Chan & Tsi, 2023). Within this changing landscape, the question of whether AI will augment or replace teachers has become a critical issue because it concerns not merely technological capability, but also the fundamental nature of teaching as a human-centered practice involving knowledge transmission, emotional interaction, ethical judgment, and social development.

Recent studies have demonstrated that AI has considerable potential to improve teacher performance through automation, personalization, and decision-support mechanisms, although the extent and sustainability of such improvements remain contested. Generative AI applications have been identified as capable of assisting teachers in developing learning materials, providing automated feedback, facilitating language learning, supporting assessment processes, and creating adaptive learning experiences tailored to individual student needs (Baidoo-Anu & Ansah, 2023). Empirical evidence from Albdarani and Al-Shargabi (2023) indicates that ChatGPT-supported learning environments can improve student engagement and understanding by enabling personalized

instructional experiences, suggesting that AI may indirectly strengthen teacher effectiveness by expanding pedagogical possibilities. Similarly, Mounkoro et al. (2024) found that AI integration in classroom management can enhance educational efficiency by supporting teachers through real-time analysis of student behavior, learning progress monitoring, and workflow optimization. These findings indicate that AI possesses substantial instrumental value in reducing administrative burdens and increasing instructional efficiency. However, existing research also suggests that technological advancement alone does not automatically produce superior educational outcomes because the effectiveness of AI implementation depends heavily on teacher competence, pedagogical integration strategies, and the ability of educators to critically interpret AI-generated information within specific learning contexts (Hadi et al., 2025).

The existing literature further reveals that the relationship between AI and teachers cannot be adequately understood through a simple replacement framework because teaching involves complex human dimensions that exceed algorithmic processing capabilities. Research examining AI-supported education has consistently highlighted the limitations of artificial intelligence in understanding emotional complexity, developing authentic interpersonal relationships, and exercising contextual pedagogical judgment. Pila (2023) argues that AI systems may effectively deliver information and manage content-based learning activities, yet they remain fundamentally limited in performing the relational and affective functions that constitute essential elements of effective teaching. Similar concerns are emphasized by Fitria (2023), who argues that although AI can replicate several instructional functions traditionally performed by teachers, the teacher's role extends beyond knowledge delivery into areas involving motivation, character formation, ethical guidance, and emotional support. Studies concerning virtual humans as potential co-teachers also demonstrate that technological simulations of human interaction continue to depend on teachers' perceptions of credibility, effectiveness, and appropriateness before they can be meaningfully integrated into educational practice (Declercq et al., 2024). These findings suggest that the central challenge is not whether AI possesses sufficient technical capability to perform educational tasks, but whether educational processes can be separated from the human qualities that define meaningful learning experiences.

Despite substantial progress in understanding AI applications in education, several conceptual and empirical gaps remain unresolved within the current body of literature. A significant limitation of previous studies is the tendency to examine AI either from a technological efficiency perspective or from a humanistic resistance perspective, creating a fragmented understanding of how AI and teachers may coexist within future educational ecosystems. Research demonstrating AI's effectiveness often focuses on measurable outcomes such as learning achievement, feedback speed, or administrative efficiency, while studies emphasizing human limitations frequently rely on philosophical or conceptual arguments regarding empathy and social interaction rather than comprehensive empirical investigations (Albdrani & Al-Shargabi, 2023; Pila, 2023). Furthermore, existing discussions have not sufficiently addressed the mechanisms through which AI transforms teacher performance, including how teachers adapt their professional competencies, redefine pedagogical responsibilities, and negotiate authority when interacting with intelligent systems. The emergence of collaborative models involving human teachers and generative AI provides promising evidence that AI may function as a pedagogical partner rather than a substitute, yet the theoretical foundation and practical framework of such collaboration remain insufficiently developed (Pahi et al., 2024; Hadi et al., 2025). This unresolved tension between technological augmentation and professional displacement represents a critical research gap requiring deeper investigation.

The urgency of examining the future relationship between AI and teachers emerges from both theoretical and practical considerations within contemporary education systems. From a theoretical perspective, the increasing sophistication of AI challenges traditional conceptualizations of teacher professionalism by requiring a redefinition of instructional expertise in an era where machines can perform increasingly complex cognitive tasks. From a practical perspective, educational institutions must develop evidence-based strategies that enable teachers to utilize AI effectively without undermining the essential human foundations of education. The absence of a comprehensive understanding regarding AI's actual position within teaching practices creates uncertainty for policymakers, educational leaders, and educators who must determine appropriate approaches for AI adoption, teacher training, and digital transformation. Current evidence suggests that the future of

education is unlikely to be characterized by complete technological substitution, but rather by a collaborative intelligence framework in which AI enhances human capabilities while teachers maintain responsibility for pedagogical direction, ethical decision-making, and meaningful student relationships (Chan & Tsi, 2023; Pahi et al., 2024). Addressing this issue requires research that moves beyond binary assumptions of replacement versus preservation and instead investigates the conditions under which human-AI collaboration can generate sustainable educational innovation.

This study positions itself within the emerging discourse on artificial intelligence in education by critically examining the central question of whether AI primarily functions as a mechanism for improving teacher performance or represents a potential force capable of replacing teachers. Rather than approaching AI as either an autonomous technological solution or an inevitable threat to the teaching profession, this research conceptualizes AI as part of a complex socio-technical educational ecosystem where technological capabilities interact with human pedagogical expertise. Through a literature-based analytical approach, this study aims to synthesize international scholarship on AI implementation, personalized learning, classroom management, human-AI collaboration, and the enduring human dimensions of teaching. The study contributes theoretically by strengthening the understanding of hybrid intelligence in education and contributes methodologically by integrating diverse perspectives from empirical, conceptual, and pedagogical studies to construct a comprehensive interpretation of AI's future role in education. The findings are expected to provide a balanced framework for understanding how AI can be strategically integrated to enhance teacher performance while preserving the indispensable human qualities that define effective education.

RESEARCH METHOD

This study employs a non-empirical research design using a qualitative literature review approach, as the research does not collect primary data from participants but analyzes existing scholarly works to examine the relationship between artificial intelligence and the future role of teachers in education. The study is conducted through a systematic examination of relevant international academic publications addressing artificial intelligence in education, particularly studies concerning generative AI, AI-supported personalized learning, classroom management systems, human-AI collaboration, virtual teachers, and the pedagogical limitations of artificial intelligence. The data sources consist of peer-reviewed journal articles, conference proceedings, and scholarly publications published within the contemporary development of AI in education, with particular attention given to studies that provide theoretical arguments, empirical findings, and conceptual frameworks regarding whether AI functions as an instrument for improving teacher performance or as a potential substitute for teachers. The selection criteria include academic relevance to the research focus, methodological clarity, contribution to discussions on AI integration in educational settings, and publication credibility within the field of education and technology studies. The collected literature is analyzed through a thematic analytical framework by categorizing findings into three central dimensions: AI as a facilitator of teacher effectiveness, AI as a mechanism for personalized and adaptive learning, and the enduring human dimensions of teaching that limit AI substitution.

The analytical procedure follows an interpretive synthesis approach, in which the selected literature is critically examined to identify patterns, convergences, contradictions, and conceptual gaps across previous studies. The analysis does not merely summarize existing findings but evaluates the extent to which current evidence supports competing perspectives regarding technological augmentation and teacher replacement. Thematic coding is applied to organize arguments related to AI capabilities, pedagogical benefits, implementation challenges, ethical concerns, and models of human-AI collaboration in educational environments. Research rigor is maintained through the use of credible academic sources, transparent selection principles, comparative examination of diverse scholarly perspectives, and consistent alignment between the analytical framework and the research objectives. The study also emphasizes analytical reflexivity by acknowledging the limitations of literature-based inquiry, particularly the dependence on available academic publications and the absence of direct observation of AI implementation in educational practices. Through this methodological approach, the research seeks to provide a comprehensive and theoretically grounded understanding of the evolving relationship between artificial intelligence and the teaching profession.

RESULTS AND DISCUSSION

Artificial Intelligence as an Enabler for Teacher Performance: Transforming the Role of Educators through Intelligent Support Systems

The literature synthesis indicates that artificial intelligence has increasingly been conceptualized as an enabling technology that enhances teacher performance rather than as an autonomous replacement mechanism within educational systems. The analytical findings demonstrate that contemporary AI applications primarily contribute through automation, instructional assistance, data interpretation, and decision-support functions that strengthen teachers’ professional capacity. This perspective challenges technological determinism, which assumes that advanced computational systems inevitably eliminate human occupational roles, by positioning AI as a complementary resource embedded within pedagogical practices (Chen et al., 2020). The reviewed studies suggest that the educational value of AI emerges from the interaction between technological capabilities and teacher expertise rather than from technological substitution alone.

The development of generative AI has expanded the functional capacity of educational technologies by enabling teachers to perform complex instructional activities more efficiently. Previous literature demonstrates that systems such as ChatGPT can assist educators in generating learning materials, designing assessment instruments, providing explanatory examples, and supporting differentiated instruction according to student needs (Baidoo-Anu & Ansah, 2023). These capabilities indicate a transformation in the nature of teacher work, where educators increasingly operate as designers, facilitators, and evaluators of AI-supported learning experiences rather than merely as transmitters of information. The analytical interpretation of these findings positions AI as an extension of teacher cognition that increases instructional flexibility while preserving human pedagogical authority.

The reviewed literature identifies classroom management as one of the domains where AI provides measurable support for improving teacher workflows and educational efficiency. AI-based classroom management systems are capable of processing learning-related information, monitoring student participation patterns, and assisting teachers in making evidence-based instructional decisions (Mounkoro et al., 2024). These functions demonstrate that AI contributes not by assuming complete responsibility for classroom processes but by reducing repetitive cognitive and administrative demands that often limit teachers’ ability to focus on higher-order pedagogical activities. The relationship between AI and teacher performance can therefore be understood through an augmentation framework, where technological systems increase professional capacity without eliminating human involvement.

The conceptual distinction between AI assistance and AI replacement becomes clearer when examining the different functions performed by intelligent systems and professional educators. The literature reveals that AI demonstrates superior capabilities in computational tasks, pattern recognition, and information processing, whereas teachers retain essential competencies related to interpretation, ethical judgment, and interpersonal communication (Kolchenko, 2018). This differentiation illustrates that teacher performance improvement does not occur because AI replicates teaching entirely, but because AI allows educators to allocate greater attention to complex pedagogical responsibilities. The following table presents the analytical categorization of AI-supported teacher functions identified across previous studies.

Table 1. AI-Supported Functions and Their Contribution to Enhancing Teacher Performance in Educational Practices

AI-Supported Function	Educational Contribution	Teacher Role After AI Supporting Integration	Literature
Automated instructional preparation	Generates learning materials and instructional resources	Curriculum designer and learning facilitator	Baidoo-Anu & Ansah (2023)
Learning analytics and monitoring	Provides data-based insights regarding student progress	Interpreter of learning evidence and decision maker	Chen et al. (2020); Mounkoro et al. (2024)

AI-Supported Function	Educational Contribution	Teacher Role After AI Supporting Integration	Literature
Personalized feedback systems	Supports adaptive responses to individual learning needs	Provider of contextual guidance and motivation	Albdrani & Al-Shargabi (2023)
AI-assisted classroom support	Reduces administrative workload and improves workflow efficiency	Manager of meaningful learning interactions	Parab (2020)

The data presented in Table 1 demonstrate that AI-supported educational practices are primarily associated with enhancement rather than displacement of teacher responsibilities. The reviewed evidence shows that AI modifies the structure of teacher activities by transferring repetitive operational tasks to intelligent systems while increasing the importance of analytical and relational competencies among educators. Albdrani and Al-Shargabi (2023) provide empirical support for this interpretation by demonstrating that ChatGPT-assisted personalized learning environments can improve learning engagement while still requiring teacher supervision to maintain educational quality. These findings reinforce the argument that AI effectiveness depends on meaningful integration within pedagogical frameworks rather than independent technological operation.

The literature further indicates that successful AI implementation requires teachers to develop new forms of professional competence associated with technological literacy and adaptive pedagogical strategies. Hadi et al. (2025) argue that human-machine collaboration in education requires teachers to understand AI capabilities, limitations, and appropriate application contexts to ensure that technology contributes positively to learning processes. This perspective reflects a shift from traditional teacher competency models toward hybrid professional identities where technological understanding becomes integrated with pedagogical expertise. The role of teachers consequently evolves from direct knowledge providers toward strategic coordinators of human and artificial intelligence resources.

Research concerning collaboration between human educators and generative AI provides additional evidence that AI functions most effectively when integrated into existing teaching structures. Pahi et al. (2024) demonstrate that collaboration between human teaching assistants and generative AI can produce improved feedback quality because each actor contributes different strengths within the instructional process. Human educators provide contextual understanding and conceptual evaluation, while AI contributes speed, consistency, and extensive information processing capabilities. This collaborative model challenges assumptions that AI development necessarily creates competition between humans and machines within educational environments.

The enabling role of AI is also reflected in broader discussions regarding higher education transformation, where AI is viewed as a mechanism for expanding institutional capacity rather than reducing the necessity of academic professionals. Chan and Tsi (2023) explain that AI technologies can assist university educators through intelligent tutoring systems, research support, and personalized academic guidance while maintaining the essential role of teachers in intellectual development and academic mentoring. Similar conclusions are found in studies examining AI adoption among teachers, where technological assistance is associated with improved educational quality when educators perceive AI as supportive infrastructure rather than professional competition (Melweth et al., 2024). These findings strengthen the argument that AI adoption should be guided by pedagogical objectives rather than technological enthusiasm alone.

The analytical synthesis reveals that AI as an educational enabler represents a transformation of teacher performance rather than a reduction of teacher significance. Existing scholarship consistently indicates that AI contributes most effectively when it addresses efficiency-related challenges, including administrative workload, information management, and personalized learning support (Joshi et al., 2021). However, these contributions remain dependent on teachers' ability to interpret AI outputs, contextualize recommendations, and integrate technological assistance into meaningful educational practices. The literature therefore supports a model of distributed intelligence in which human and artificial capabilities interact to improve educational outcomes.

The findings from this thematic analysis establish that AI should be positioned as an instrument for professional enhancement within education rather than as a substitute for teachers. The reviewed studies demonstrate that technological advancement creates opportunities for teachers to perform their

roles more effectively by expanding instructional resources, improving decision-making processes, and supporting individualized learning experiences (Nikitina & Ishchenko, 2024). The continuing relevance of teachers derives from their capacity to provide ethical guidance, emotional support, and contextual interpretation that remain beyond current AI capabilities. This analytical perspective provides the foundation for examining the next dimension of the research, namely the role of AI in personalized learning and adaptive educational experiences.

Artificial Intelligence and Personalized Learning: Expanding Adaptive Educational Experiences through Data-Driven Approaches

The thematic analysis of the reviewed literature demonstrates that personalized learning represents one of the most significant contributions of artificial intelligence within contemporary educational transformation. AI-based learning systems have introduced a shift from standardized instructional approaches toward adaptive educational models that respond dynamically to individual learner characteristics, abilities, preferences, and progress patterns. This transformation reflects a broader theoretical movement from teacher-centered knowledge transmission toward learner-centered educational ecosystems supported by intelligent data processing mechanisms (Chen et al., 2020). The literature indicates that AI does not merely function as a technological tool for delivering content but operates as an analytical infrastructure capable of assisting educators in designing more responsive and individualized learning experiences.

The integration of AI into personalized learning environments is primarily enabled by its capacity to collect, process, and interpret large volumes of educational data. Previous studies demonstrate that AI systems can identify learning patterns, predict student difficulties, and recommend appropriate instructional interventions based on continuous analysis of learner interactions (Baidoo-Anu & Ansah, 2023). These capabilities provide teachers with additional information that would be difficult to obtain through conventional observation methods alone, particularly within large and diverse classrooms. The analytical significance of AI-based personalization lies in its ability to strengthen teachers' understanding of student needs while maintaining educators as the primary decision-makers in instructional processes.

Generative AI applications, particularly ChatGPT-based learning environments, have received substantial scholarly attention because of their potential to provide individualized academic assistance beyond traditional classroom limitations. Albdarani and Al-Shargabi (2023) found that ChatGPT-supported learning frameworks can enhance student engagement and comprehension by providing immediate explanations, adaptive responses, and interactive learning opportunities. These findings illustrate that AI can function as an additional learning partner capable of extending instructional support outside formal classroom interactions. However, the same evidence also reveals that AI-generated responses require continuous teacher monitoring because inaccuracies and contextual misunderstandings may occur during automated learning interactions.

The relationship between AI and personalized learning requires careful interpretation because personalization does not solely depend on technological adaptability but also involves pedagogical judgment regarding appropriate learning strategies. AI systems can identify patterns and generate recommendations, yet the selection of meaningful educational interventions remains dependent on teachers' understanding of student psychology, classroom dynamics, and curriculum objectives (Pila, 2023). This distinction demonstrates that AI contributes analytical intelligence, whereas teachers contribute interpretive and contextual intelligence that determines whether personalized learning becomes educationally meaningful. The following table illustrates the analytical contribution of AI within personalized learning frameworks based on the reviewed literature.

Table 2. Artificial Intelligence Capabilities in Supporting Personalized Learning and Adaptive Educational Processes

AI Personalization Capability		Analytical Function		Educational Impact		Supporting Literature
Adaptive systems	learning	Adjusts learning according to performance	materials to student	Supports learning pathways	individualized	Baidoo-Anu & Ansah (2023)

AI Personalization Capability	Analytical Function	Educational Impact	Supporting Literature
Automated feedback generation	Provides responses to immediate student activities	Improves learning interaction and reflection	Albdrani & Shargabi (2023)
Learning analytics	Identifies student progress patterns and difficulties	Supports evidence-based teacher intervention	Chen et al. (2020); Mounkoro et al. (2024)
Intelligent tutoring support	Provides additional explanations and guidance	Extends learning opportunities beyond classroom time	Joshi et al. (2021)

Table 2 indicates that AI-based personalization operates through several interconnected mechanisms that enhance instructional responsiveness. The reviewed studies demonstrate that AI contributes primarily by expanding teachers' capacity to identify and address individual learning variations rather than by independently managing the entire educational process. The analytical framework developed from these findings suggests that personalization should be understood as a collaborative process where AI provides computational assistance while teachers maintain responsibility for pedagogical interpretation. This perspective corresponds with the argument that AI-supported education requires a balance between technological efficiency and human educational expertise (Chan & Tsi, 2023).

The literature further reveals that AI-based personalized learning has significant implications for educational equity because intelligent systems may provide additional learning support for students with different abilities and learning conditions. Edwards and Cheok (2018) argue that AI technologies possess potential value in addressing educational challenges such as teacher shortages by expanding access to individualized instructional assistance. However, the implementation of AI for personalization also introduces concerns regarding technological dependency, algorithmic bias, and unequal access to digital resources. Alam (2021) emphasizes that AI-driven educational innovation must consider ethical and infrastructural dimensions because technological advancement without appropriate governance may reinforce existing educational inequalities.

The application of AI in personalized learning also transforms the traditional role of teachers by shifting their responsibilities toward learning design, monitoring, and strategic intervention. Teachers are increasingly required to interpret AI-generated insights and convert computational recommendations into meaningful educational actions that correspond with students' social and cognitive conditions (Ismail et al., 2024). This transformation indicates that personalization does not reduce the importance of teachers but instead requires higher levels of professional competence. The teacher becomes a mediator between technological intelligence and human learning experiences, ensuring that personalization remains aligned with educational values.

The reviewed literature demonstrates that adaptive learning systems provide considerable advantages in improving instructional efficiency, yet these systems remain limited in understanding complex human learning processes. Nikitina and Ishchenko (2024) explain that AI can support teachers through analytical functions and automated assistance, but it cannot fully comprehend emotional conditions, cultural backgrounds, and personal circumstances influencing student learning. Personalized education requires more than accurate prediction of academic performance because effective teaching also involves motivation, encouragement, and relationship-building. These limitations illustrate that AI-driven personalization should be positioned as an augmentation strategy rather than a replacement mechanism.

The integration of AI into personalized learning further highlights the emergence of hybrid intelligence models within educational systems. Molenaar's concept of hybrid intelligence, discussed in relation to AI-supported education, emphasizes that optimal learning environments emerge when human cognitive abilities and artificial computational capabilities operate collaboratively rather than competitively (Declercq et al., 2024). AI contributes speed, scalability, and analytical precision, while teachers contribute creativity, ethical reasoning, and emotional understanding. This theoretical

perspective provides a stronger explanation of why personalized learning requires both technological innovation and sustained human involvement.

The findings from this thematic analysis demonstrate that artificial intelligence significantly expands the possibilities of personalized education by enabling adaptive, data-informed, and responsive learning environments. Nevertheless, the reviewed literature confirms that personalization achieved through AI remains dependent on teacher involvement because educational decisions cannot be reduced solely to computational analysis (Fitria, 2023). AI enhances the capacity of teachers to recognize student diversity, but it does not eliminate the professional judgment required to transform information into meaningful learning experiences. The evidence supports the conclusion that AI-driven personalized learning represents a process of educational enhancement where technology amplifies human pedagogical capability rather than replacing the teacher's fundamental role.

The Human Dimension of Teaching and the Limits of Artificial Intelligence: Rethinking Teacher Replacement in the AI Era

The thematic analysis of the selected literature demonstrates that the possibility of artificial intelligence replacing teachers remains constrained by fundamental differences between computational intelligence and human educational capacities. Although AI has achieved significant progress in information processing, automated feedback, and instructional assistance, teaching remains a complex social practice involving emotional engagement, ethical reasoning, cultural understanding, and interpersonal relationships. The reviewed studies indicate that educational effectiveness cannot be measured solely through the efficiency of knowledge delivery because meaningful learning requires the development of trust, motivation, and human connection between teachers and learners (Pila, 2023). This analytical perspective challenges the assumption that technological advancement will inevitably result in the disappearance of teachers by emphasizing the multidimensional nature of educational practices.

The literature reveals that the primary limitation of AI in education lies in its inability to fully replicate the affective and relational dimensions of teaching. Teachers do not merely provide information but interpret students' emotional conditions, recognize individual struggles, and provide encouragement based on contextual understanding that exceeds algorithmic prediction. Fitria (2023) argues that although AI-based educational systems can perform several instructional functions, the teacher's role extends into moral guidance, character development, and emotional support, which remain deeply dependent on human interaction. These findings indicate that the educational process involves forms of knowledge and judgment that cannot be entirely translated into computational procedures.

The distinction between artificial intelligence and human teaching capacity becomes more evident when examining the concept of pedagogical presence. AI systems may simulate conversational interaction and provide immediate responses, yet such interaction remains fundamentally different from authentic human relationships developed through empathy and social awareness. Declercq et al. (2024) demonstrate that virtual humans designed as co-teachers can support online education, but their effectiveness depends significantly on teachers' perceptions regarding credibility, authenticity, and educational appropriateness. The findings suggest that technological resemblance to human communication does not necessarily produce equivalent educational relationships because learners continue to evaluate trust and emotional connection through human experiences.

The reviewed literature also identifies ethical and epistemological limitations associated with the increasing dependence on AI in educational environments. Generative AI systems may produce inaccurate information, demonstrate algorithmic bias, and generate responses without genuine understanding of contextual meaning, creating risks when educators rely on automated outputs without critical evaluation (Baidoo-Anu & Ansah, 2023). These limitations are particularly significant in education because teachers are responsible not only for delivering information but also for ensuring intellectual accuracy, ethical awareness, and responsible knowledge formation. The following table presents the analytical comparison between AI capabilities and human teacher competencies identified from the literature.

Table 3. Comparative Analysis of Artificial Intelligence and Human Teacher Competencies in Educational Processes

Educational Dimension	Artificial Capability	Intelligence Human Capability	Teacher Analytical Implication
Knowledge processing	Rapid retrieval and generation	information and content interpretation	AI supports knowledge access, and while teachers ensure meaningful understanding
Feedback provision	Automated responses	and immediate Personalized emotionally responsive guidance	Human judgment remains essential for developmental feedback
Student interaction	Simulated engagement	conversational Authentic empathy and relationship building	AI interaction cannot fully replace human connection
Ethical decision-making	Pattern-based recommendations	Moral reasoning and contextual judgment	Teachers remain responsible for educational values

Table 3 demonstrates that AI and teachers possess different forms of intelligence that should not be evaluated through a simple replacement framework. The analytical comparison indicates that AI demonstrates strength in computational efficiency, whereas teachers maintain advantages in relational and ethical dimensions of education. Pila (2023) emphasizes that educational activities involve more than content transmission because teachers contribute to students’ social and personal development through interactions that require emotional intelligence. These findings support the argument that the future of education requires complementary collaboration rather than technological substitution.

The concern regarding teacher replacement is also influenced by broader debates surrounding automation and professional transformation in education. Some scholars argue that AI could potentially address educational challenges such as teacher shortages by providing scalable instructional assistance and intelligent tutoring systems (Edwards & Cheok, 2018). However, the availability of AI-based instructional support does not necessarily eliminate the necessity of human educators because educational institutions perform social and cultural functions beyond academic instruction. Alam (2021) highlights that the implementation of AI in education must consider ethical implications, human oversight, and institutional responsibilities to prevent excessive reliance on automated systems.

The literature further suggests that AI adoption may redefine teacher professionalism rather than diminish the importance of educators. Future teachers are expected to develop competencies that integrate technological understanding with pedagogical expertise, enabling them to critically evaluate and utilize AI-generated information (Ismail et al., 2024). This transformation indicates that teachers may move away from traditional roles centered exclusively on information delivery toward positions emphasizing mentorship, learning facilitation, and ethical guidance. The emergence of AI therefore represents a professional evolution rather than an occupational decline.

The possibility of AI replacing teachers is also questioned by studies examining educators’ perceptions and professional adaptation in AI-integrated learning environments. Research indicates that teachers generally perceive AI as a supportive technology when its implementation strengthens instructional practices rather than undermines professional autonomy (Melweth et al., 2024). Similarly, Day (2026) highlights that future teachers’ perspectives toward AI are shaped by technological knowledge, pedagogical beliefs, and confidence in integrating AI into educational contexts. These findings demonstrate that the relationship between AI and teachers depends significantly on how educational communities conceptualize technological roles.

The development of human-AI collaboration models provides a theoretical alternative to the replacement perspective by emphasizing distributed intelligence within educational systems. Hadi et al. (2025) argue that effective AI integration requires collaboration strategies where teachers understand AI capabilities while maintaining responsibility for pedagogical decisions and student development. This approach corresponds with the hybrid intelligence framework, which views human and artificial intelligence as interconnected resources rather than competing entities (Declercq et al., 2024). The

educational significance of AI therefore lies not in replacing human educators but in expanding the collective capacity of teaching systems.

The analytical findings from this thematic examination demonstrate that the limitations of artificial intelligence are not merely technical constraints but reflect fundamental differences between machine-based computation and human educational experience. AI can improve efficiency, support personalization, and enhance instructional decision-making, yet the teacher's role remains indispensable because education involves emotional connection, ethical responsibility, and social meaning-making (Louis & ElAzab, 2023). The reviewed literature supports the conclusion that AI should be positioned as a complementary educational partner rather than a substitute for teachers. The future trajectory of education is more accurately represented through a human-AI collaborative model where technological innovation strengthens, rather than replaces, the essential human foundations of teaching.

CONCLUSION

The comprehensive literature analysis demonstrates that artificial intelligence represents a transformative force in education, yet its contribution is more accurately understood as an enhancement mechanism for teacher performance rather than a replacement for human educators. The findings reveal that AI provides significant advantages through instructional automation, personalized learning support, classroom management optimization, and data-driven decision-making, enabling teachers to perform their professional responsibilities more effectively. However, the analysis also confirms that education extends beyond knowledge transmission and technological efficiency because teaching fundamentally involves empathy, ethical judgment, emotional support, and meaningful interpersonal relationships that remain beyond the full capacity of current AI systems. The integration of AI within educational environments therefore requires a collaborative framework in which artificial intelligence functions as a supportive partner that expands human pedagogical capabilities while teachers maintain responsibility for educational values and student development. This study contributes to the theoretical understanding of human-AI collaboration in education by emphasizing the emergence of hybrid intelligence models and provides methodological insight through a literature-based synthesis of technological, pedagogical, and humanistic perspectives. The future of education is consequently shaped not by technological substitution, but by strategic cooperation between artificial intelligence and human expertise.

REFERENCES

- Alam, A. (2021, December). Should robots replace teachers? Mobilisation of AI and learning analytics in education. In *2021 international conference on advances in computing, communication, and control (ICAC3)* (pp. 1-12). IEEE. <https://doi.org/10.1109/ICAC353642.2021.9697300>.
- Alam, A. (2021, November). Possibilities and apprehensions in the landscape of artificial intelligence in education. In *2021 International conference on computational intelligence and computing applications (ICCICA)* (pp. 1-8). Ieee. <https://doi.org/10.1109/ICCICA52458.2021.9697272>.
- Albdarani, R. N., & Al-Shargabi, A. A. (2023). Investigating the Effectiveness of ChatGPT for Providing Personalized Learning Experience: A Case Study. *International journal of advanced computer science & applications*, 14(11). <https://doi.org/10.14569/IJACSA.2023.01411122>.
- Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52-62. <https://doi.org/10.61969/jai.1337500>.
- Chan, C. K. Y., & Tsi, L. H. (2023). The AI revolution in education: will AI replace or assist teachers in higher education?. *arXiv preprint arXiv:2305.01185*. <https://doi.org/10.48550/arXiv.2305.01185>.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE access*, 8, 75264-75278. <https://doi.org/10.1109/ACCESS.2020.2988510>.
- Day, M. J. (2026, December). Can artificial intelligence replace human teachers? Preservice teachers' perspectives on AI in education through the TPACK framework. In *Artificial Intelligence in Education* (Vol. 2, No. 1, pp. 147-168). Emerald Publishing Limited. <https://doi.org/10.1108/AIIE-08-2025-0216>.

- Declercq, L., De Wever, B., & Tuytens, M. (2024, May). Perceptions of collaboration between virtual and human teachers in online education. In *Proceedings of the International Conference on Networked Learning* (Vol. 14). <https://doi.org/10.54337/nlc.v14i1.8158>.
- Edwards, B. I., & Cheok, A. D. (2018). Why not robot teachers: artificial intelligence for addressing teacher shortage. *Applied Artificial Intelligence*, 32(4), 345-360. <https://doi.org/10.1080/08839514.2018.1464286>.
- Fitria, T. N. (2023). The use of artificial intelligence in education (AIED): Can AI replace the teacher's role?. *Epigram*, 20(2), 165-187. <https://doi.org/10.32722/epi.v20i2.5711>.
- Hadi, J. K., Latifah, H., Fuadi, D. A., Fauzan, F., Christiana, Y., Hidayat, T., & Rifa'i, R. I. (2025). Kolaborasi Manusia-Mesin Dalam Pendidikan: Strategi Guru Beradaptasi Dengan Teknologi AI. *RIGGS: Journal of Artificial Intelligence and Digital Business*, 4(2), 6329-6333. <https://doi.org/10.31004/riggs.v4i2.1583>.
- Ismail, A., Aliu, A., Ibrahim, M., & Sulaiman, A. (2024). Preparing teachers of the future in the era of artificial intelligence. *Journal of Artificial Intelligence, Machine Learning and Neural Network*, 44, 31-41. <https://doi.org/10.55529/jaimlenn.44.31.41>.
- Joshi, S., Rambola, R. K., & Churi, P. (2021, January). Evaluating artificial intelligence in education for next generation. In *Journal of Physics: Conference Series* (Vol. 1714, No. 1, p. 012039). IOP Publishing. <https://doi.org/10.1088/1742-6596/1714/1/012039>.
- Kolchenko, V. (2018). Can modern AI replace teachers? Not so fast! Artificial intelligence and adaptive learning: Personalized education in the AI age. *HAPS educator*, 22(3), 249-252. <https://doi.org/10.21692/haps.2018.032>.
- Louis, M., & ElAzab, M. (2023). Will AI replace teacher?. *International Journal of Internet Education*, 22(2), 9-21. <https://doi.org/10.21608/ijie.2023.312491>.
- Melweth, H. M. A., Alkahtani, A. S., & Al Mdawi, A. M. M. (2024). The impact of artificial intelligence on improving the quality of education and reducing future anxiety among a sample of teachers in Saudi Arabia. *Kurdish Studies*, 12(2), 5741-5758. <https://doi.org/10.58262/ks.v12i2.426>.
- Mounkoro¹, I., Uberas, A. D., Cadelina, F. A., Saleem, M. U., Maryam, S., Almagharbeh, W. T., ... & Hidayatallah, Z. (2024). Integrating AI in classroom management: improving educational efficiency and teacher workflows. <https://doi.org/10.52783/jisem.v10i45s.9033>.
- Nikitina, I., & Ishchenko, T. (2024). The impact of ai on teachers: support or replacement?. *Scientific Journal of Polonia University*, 65(4), 93-99. <https://doi.org/10.23856/6511>.
- Okulicz-Kozaryn, W., Artyukhov, A., & Artyukhova, N. (2026). Will AI Replace Us? Changing the University Teacher Role. *Societies*, 16(1), 32. <https://doi.org/10.3390/soc16010032>.
- Pahi, K., Hawlader, S., Hicks, E., Zaman, A., & Phan, V. (2024). Enhancing active learning through collaboration between human teachers and generative AI. *Computers and Education Open*, 6, 100183. <https://doi.org/10.1016/j.caeo.2024.100183>.
- Parab, A. K. (2020). Artificial intelligence in education: teacher and teacher assistant improve learning process. *International Journal for Research in Applied Science and Engineering Technology*, 8(11), 608-612. <https://doi.org/10.22214/ijraset.2020.32237>.
- Pila, A. (2023). Will artificial intelligence overcome teachers that just addresses content? A inteligência artificial vai superar os professores que apenas abordam o conteúdo?. *Concilium*, 23(14), 393-405. <https://doi.org/10.53660/CLM-1590-23J20>.