

A pedagogical, ethical and contextual model for artificial intelligence integration in education: a systematic review of challenges, opportunities, and teacher roles

Un modelo pedagógico, ético y contextual para la integración de la inteligencia artificial en la educación: una revisión sistemática de los retos, las oportunidades y las funciones del profesorado

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ABSTRACT

Artificial Intelligence (AI) is currently transforming educational spaces around the world through its development of personalized learning systems and AI-based tutoring systems and understand student emotions. The educational system currently lacks essential components for proper implementation because there are remaining deficiencies in teaching methods and ethical oversight and the establishment of teacher responsibilities and the execution of equitable educational practices especially in areas with limited resources. This study evaluates AI effects on education through a review of existing research that explores AI-based educational opportunities and challenges and their various contextual aspects and it creates a comprehensive framework for responsible AI implementation across different educational environments. The research performed a qualitative systematic literature review and conducted thematic content analysis to review peer-reviewed articles which they collected from Google Scholar through purposive sampling; eight research gaps were identified and mapped to corresponding hypotheses, with validity ensured through source triangulation and transparent inclusion criteria. The analysis showed that AI systems focus on technical abilities instead of developing instructional materials and that organizations lack sufficient ethical standards for data protection and security frameworks and the educational system requires teachers who can assist students through their studies while providing instructional support and students from developing countries face significant obstacles that stop them from using AI technologies. The educational system currently lacks standardized evaluation methods while educational institutions face challenges because educators and students lack basic understanding of AI concepts and AI systems are unable to provide human-level emotional assistance and organizations depend on their operational regulations and organizational systems for sustainable development. The research results back the proposed Pedagogical-Ethical-Contextual Model which shows how AI should be integrated into educational environments through its three connected dimensions. The educational system needs artificial intelligence to support teaching activities because it delivers essential human connection skills which machines cannot replace.

Keywords: Artificial Intelligence in Education (AIED); Pedagogical Framework; Ethical Governance; Teacher Roles; AI Literacy; Smart Classrooms; Educational Sustainability.

RESUMEN

La Inteligencia Artificial (IA) está transformando actualmente los espacios educativos en todo el mundo mediante el desarrollo de sistemas de aprendizaje personalizados, sistemas de tutoría basados en IA y tecnologías capaces de comprender las emociones de los estudiantes. El sistema educativo carece actualmente de componentes esenciales para una implementación adecuada, debido a deficiencias en los métodos de enseñanza, la supervisión ética, la definición de las responsabilidades del profesorado y la aplicación de prácticas educativas equitativas, especialmente en áreas con recursos limitados. Este estudio evalúa los efectos de la IA en la educación mediante una revisión de investigaciones existentes que exploran las oportunidades y los desafíos educativos basados en IA y sus diversos aspectos contextuales, y propone un marco integral para la implementación responsable de la IA en diferentes entornos educativos. La investigación realizó una revisión sistemática cualitativa de la literatura y llevó a cabo un análisis temático de contenido para examinar artículos revisados por pares recopilados de Google Scholar mediante muestreo intencional; se identificaron ocho vacíos de investigación que se vincularon con hipótesis correspondientes, con la validez asegurada mediante triangulación de fuentes y criterios de inclusión transparentes. El análisis mostró que los sistemas de IA se centran en las capacidades técnicas en lugar de desarrollar materiales instruccionales, que las organizaciones carecen de estándares éticos suficientes para la protección de datos y los marcos de seguridad, y que el sistema educativo requiere docentes capaces de asistir a los estudiantes en su aprendizaje mientras brindan apoyo pedagógico, mientras que los estudiantes de países en desarrollo enfrentan obstáculos significativos que les impiden utilizar tecnologías de IA. El sistema educativo también carece de métodos de evaluación estandarizados, mientras que las instituciones educativas enfrentan desafíos debido a que tanto educadores como estudiantes carecen de una comprensión básica de los conceptos de IA, y los sistemas de IA no pueden proporcionar asistencia emocional a nivel humano. Además, las organizaciones dependen de sus regulaciones operativas y sistemas organizacionales para lograr un desarrollo sostenible. Los resultados de la investigación respaldan el Modelo Pedagógico-Ético-Contextual propuesto, que muestra cómo la IA debe integrarse en los entornos educativos a través de sus tres dimensiones interconectadas. El sistema educativo necesita la inteligencia artificial para apoyar las actividades de enseñanza, ya que proporciona habilidades esenciales de conexión humana que las máquinas no pueden reemplazar.

Palabras clave: Inteligencia artificial en la educación (IAED); marco pedagógico; gobernanza ética; roles del profesorado; alfabetización en IA; aulas inteligentes; sostenibilidad educativa.

INTRODUCTION

The 21st century experiences its most significant transformation through Artificial Intelligence (AI) which educational institutions use to create personalized learning environments through adaptive systems and data-based learning methods. The field of Artificial Intelligence in Education (AIED) introduces intelligent algorithms combined with virtual teaching agents and chatbots which use emotion recognition technology to replicate human cognitive processes and social behavior. The studies conducted by Dimitriadou and Lanitis in 2023 and Zhai et al. in 2021 document the development of intelligent tutoring systems which began in the 1970s and evolved into modern smart classrooms which use digital technology and sensors and communication tools to create interactive learning environments. The integration of AI in education demonstrates progress according to Indra Saputra et al, Humble and Mozelius yet current implementation shows critical challenges which exist in the fields of teaching and research and practical educational use. Educational institutions use AI technologies for content delivery and assessment and management but these technologies do not fully support the achievement of curriculum objectives in their teaching methods. The absence of standardized governance frameworks creates ongoing ethical issues which involve data privacy and algorithmic transparency and accountability. The differences in AI readiness between developed and developing countries create more serious problems because these countries rely on limited resources and their educational systems lack necessary infrastructure and proper teacher training (1).

The main research theme studies how teachers adapt their work activities within educational settings that use AI technology. Teachers now function as facilitators and mentors who guide students through AI-generated feedback to develop their emotional and moral learning which machines cannot teach according to Fitria 2021 and Humble and Mozelius 2022. The requirement for AI literacy among teachers and students has become critical because educational institutions need to develop ethical AI tool usage skills which will enable them to use technology for human-centered teaching purposes. The research study investigates how educational systems change through AI technologies by studying their teaching methods and ethical standards and their situation in real life. The project aims to create an all-inclusive framework for AI implementation which combines automation processes with human values and creative capacity and empathetic understanding. The study investigates essential research gaps which researchers have discovered in previous studies which include pedagogical integration gaps and ethical governance issues and teacher role definition problems and contextual differences and evaluation criteria and AI literacy and socio-emotional restrictions and sustainability issues. The research investigates how AI technology can be effectively integrated into various educational settings to improve learning results and educational fairness and environmental responsibility. The origins of modern AI technology emerged when ancient philosophers tried to explain human thought processes through symbolic systems.

The development reached its peak when scientists created the first programmable digital computer during the 1940s which operated on mathematical reasoning concepts. Scientists started to discuss the creation of an electronic brain after this device and its underlying concepts showed them the power of the technology. The concept existed for multiple decades with unsteady development because all technological advancements faced restrictions from both computer performance and financial support which led to an AI funding crisis. The first two decades of the 21st century witnessed a surge in AI funding and interest because machine learning achieved successful results in academic and industrial applications through the use of new methodologies. The development of technologies and programs that fully support pedagogical ventures should become an imperative, because this will lead to general improvements in education (2). Researching Artificial Intelligence applications in education started in the late 1970s. The field of Artificial Intelligence used its methods through two different implementation approaches. First one is designing and facilitating interactive learning environments that would support for learning by doing. The second way involves creating tutoring systems which evolve their teaching methods based on students' knowledge progress. The applications of AI technology in education today represent only its initial stage of development.

Currently Most countries use AI technology for educational purposes which includes learning and teaching activities that take place in schools. The educational system will experience major changes because data and computation technologies combine with educational methods to create a new educational framework which affects both content delivery and teaching practices. The field of AI in school education focuses on enhancing educational outcomes through improved instructional methods. The last fifteen years have brought major advancements in educational AI technologies. Teachers need to interact with students because schools need their presence but AI technology will make education better for all students. Recent technological advancements have transformed education by creating new methods for teaching and learning which develop into new possibilities for educational institutions. The program offers fresh resources and techniques which educators can utilize to create better learning results and enact new teaching and learning methods. AI technology has emerged as the fastest expanding sector within the worldwide educational technology industry today. According to HolonIQ market research firm analysis the global educational sector spent close to one billion dollars on AI technology in 2018 which included school education expenditures. The number of expected to grow over 6\$ billion US Dollars by 2015.

Figure 1 illustrates five core areas in which artificial intelligence is developed and applied in education: Vision, Voice, Natural Language Processing, Algorithms, and Hardware. The system begins with Vision, which monitors student engagement through emotion and confusion detection, while Voice technologies, such as text-to-speech, support language learning and related activities. Natural Language Processing enables automated student assessment, feedback generation, and plagiarism detection, and the Hardware component includes physical tools used in modern classrooms, such as robotics, smart devices, and laboratory instruments. Together, these domains create an interactive, data-driven educational environment that supports personalized learning experiences. The visualization highlights the integration of input modalities, computational processes, and technological infrastructure, effectively linking theoretical concepts with practical implementation, enhancing interdisciplinary understanding, and reinforcing the central argument of the paper on adaptive and data-driven learning systems; therefore, the inclusion of this figure is essential, as its absence would weaken both the conceptual clarity and practical relevance of the proposed framework.

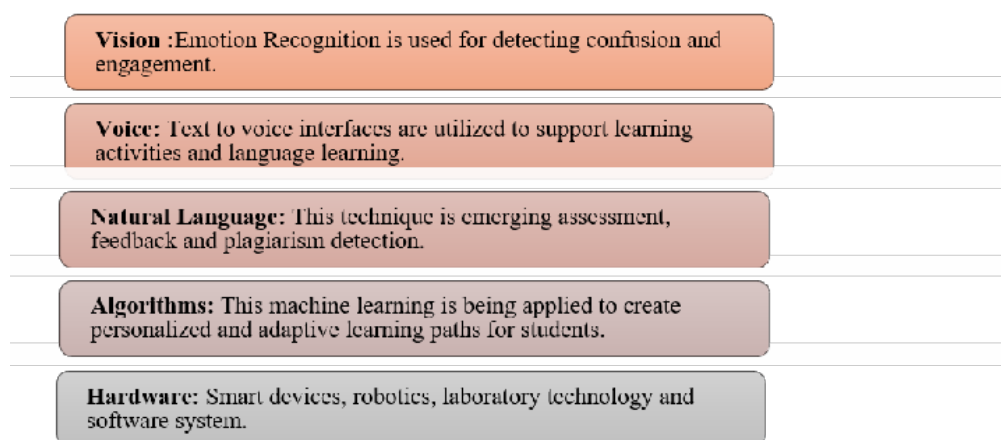


Figure 1. Five core areas where AI is been developed

Developed countries like the USA, England, China, Japan, Korea, etc those are in a higher position regarding technological advancement are using AI concept through the above-mentioned areas for creating value in school education. But still, school systems in developing countries like Sri Lanka have been slow in adopting AI technologies primarily since the lack of funds and lack of solid evidence that they help students achieving learning objectives. Therefore very few AI-based learning systems are certainly used in classrooms or homes of students.(3)

Figure 2 Shows that students can use to study the entire universe through Artificial Intelligence and modern technological advancements from their desks. The space around her contains bookshelves and computer displays which demonstrate the learning evolution from traditional studying methods to current interactive educational techniques. The figure demonstrates how artificial intelligence technology enables students to explore new educational territories. Technology presents challenging scientific and space-related concepts through interactive educational materials which make learning accessible to students.



Figure 2. Conceptual illustration represents the process of knowledge integration and multi-source information synthesis in a digital research environment. Sources from (4)

Various definitions of AI:

AI is...

"The use of algorithms. The term 'algorithm' refers to a specific instruction for solving a problem or performing a calculation."

"The imitation of all human intellectual abilities by computers."

"The imitation of various complex human skills by machines."

"Technology that can function appropriately and with foresight in its environment."

"Systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals."(5)

Innovation and Research through Smart Education

The integration of technology in education encourages innovation and research in the field of education. This leads to the development of new pedagogical approaches and educational tools, further improving the education system's sustainability. In addition, the integration of technology also allows for the collection and analysis of data, which can be used to inform evidence-based decision making and improve educational outcomes. This data-driven approach to education fosters continuous improvement and ensures that resources are allocated effectively (6).

RESEARCH OBJECTIVES:

The objective or the purpose of this study was to assess the impact of AI on education and analyze the existing state of the art in AI technology in education by investigating the challenges, opportunities, and benefits of adopting AI in education (7) A qualitative research study, leveraging literature review as a research design and method was used. Journal articles, professional publications, and professional conference reports were identified and used in an analysis that facilitated the realization of the study purpose. The development and use of computers and computer related technologies harbingered research and innovations that have led to the development and use of AI in different sectors.(8) The integration of Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) in education is reshaping the learning landscape by providing immersive and personalized learning experiences (9). In recent years, artificial intelligence (AI) has increasingly attracted academic attention due to its disruptive impact on business and management practices (10). The following specific objectives have been taken into consideration for the study:

The study investigates how AI technologies transform educational environments starting from traditional classrooms and progressing toward intelligent educational systems which adapt to students and respond to their emotional states.

The research assesses the pedagogical approaches and ethical considerations and socio-technical difficulties which arise when schools attempt to implement AI technology across various educational settings which include K-12 schools and universities and libraries.

The research study aims to create a framework which will help educational institutions handle three essential challenges related to AI-driven educational tools that include emotion analysis and chatbots and other technologies.

The research investigates how AI-based educational systems change the functions of teachers and students through their work together and independent study and their capacity to use digital tools. (11)

REVIEW OF RELATED LITERATURE

The study presents an extensive examination of earlier studies which investigated how Artificial Intelligence (AI) and new technologies merge into educational settings. The smart classroom concept evolved from its initial form as a technology-based learning space into an advanced system which utilizes digital tools and sensors and communication technologies to enhance educational processes. The authors trace the origins of Artificial Intelligence in Education (AIED) back to the 1970s, highlighting its goal of creating adaptive and personalized learning experiences through intelligent tutoring systems and automated feedback mechanisms. The research shows that deep learning improvements have led to more frequent usage of educational AI tools which include virtual teaching agents and chatbots and humanoid robots that assess student emotions and skills.(12)

The fast progress of Artificial Intelligence (AI) technology brings major changes to different educational fields which create both extensive possibilities and serious difficulties and potential risks and challenges. The educational sector utilizes AI through its Artificial Intelligence in Education (AIED) system which improves learning material distribution and assessment methods and educational management systems and educational decision-making processes. AI delivers personalized learning experiences through its intelligent tutoring systems and adaptive systems while it enables automated student assessments and develops interactive learning management systems. The existing opportunities create problems because they require teachers and students to develop their ethical understanding and teaching practices and their ability to recognize AI technology. The threat landscape includes multiple dangers which protect personal information and permit unauthorized data access and restrict teacher job functions and raise the frequency of academic dishonesty when students use AI applications such as ChatGPT. The successful use of AI technology has been stopped by three main hurdles which include expensive system implementation requirements and insufficient teacher AI training programs and lengthy process delays for curriculum changes. The research shows that educational institutions should use AI technology to improve their systems because they need to create research-based methods which match their existing educational requirements.(13)

The concept of developing machines which can be used at human intelligence levels has existed for more than three hundred years, but modern artificial intelligence systems brought new energy to this concept during the current century. Artificial Intelligence in Education (AIED) appeared as a new educational technology which creates both positive and negative feelings about its ability to transform educational methods. Researchers have examined the problem of excessive trust which people place in present-day AI studies, yet they have not investigated how AIED will transform educational systems. The field offers major benefits which help reduce costs and boost operational efficiency, but it creates essential obstacles which affect educational quality and define teacher responsibilities. The study used the SWOT framework to assess AI educational research by reviewing existing literature to identify strengths, weaknesses, and opportunities, and threats which educational institutions face when implementing AI systems. The research identifies several essential inquiries which need further investigation through future studies, including how teachers will use AI technology in their instructional methods and how educational institutions will use AI to achieve their learning objectives and how organizations will protect user information that they collect through AIED system development.(14)

The literature review in the paper "A Review of Artificial Intelligence (AI) in Education from 2010 to 2020" provides a comprehensive analysis of how AI has been applied in education over the decade. The research includes three main dimensions which identify development through its various components of classification and matching and recommendation and deep learning and extraction through its components of feedback and reasoning and adaptive learning and application through its various elements of affection computing and role-playing and immersive learning and gamification. The review shows that AI technology has reached actual educational usage after starting as theoretical research but two critical components which include teaching methods and human behavior patterns have not yet caught up with technological progress. The study found that main trends include Internet of Things and swarm intelligence and deep learning and neuroscience while the research identified multiple difficulties which included ethical issues and transforming teacher-student connections and requirements for improved assessment methods. The review emphasizes that educators must work with AI developers to achieve successful integration of technical components and teaching methods while it provides research pathways to enhance AI implementation in educational environments.(15)

The research work required for this project depends on existing academic research which studies how Artificial Intelligence (AI) operates within educational systems. The definition of AI involves creating machines which replicate human cognitive functions through human thought modeling because this enables computers to simulate human behavior in educational environments (Fitria, 2021a). Previous studies showcase how educational technology platforms use AI technology which enables Virtual Mentors who operate on Blackboard to deliver interactive personalized learning experiences (Zhang, 2016). Voice Assistants, the Google Assistant and Siri enable natural language interactions through their voice recognition technology (Terzopoulos & Satratzemi, 2019). Smart Content systems like Cram101 and Netex Learning which deliver customized digital learning materials (Jain & Alam, 2020). The Presentation Translators tool which uses AI technology to create Accessible content while Global Courses platforms such as Coursera and edX and Personalized Learning systems like Ruangguru provide customized learning experiences for their users. The research shows that Artificial Intelligence operates through Automatic Assessment systems and Educational Games and Intelligent Tutoring Systems (ITS) which provide students with customized educational experiences through continuous feedback (Abu Ghali et al., 2018; Alhabbash et al., 2016). Scholars demonstrate that AI systems serve as teaching assistants for educators because they lack the ability to generate emotional connections and moral guidance and motivational teaching content (Fitria, 2021b). The literature shows that AI technology improves administrative and teaching activities, but teachers remain essential for developing student character and delivering valuable educational experiences.

The research demonstrates that artificial intelligence (AI) acts as a revolutionary technological advancement which can completely change how academic libraries function throughout Africa. The review synthesizes definitions and key features of AI-such as machine learning, natural language processing, pattern recognition, and expert systems-and explores their specific applications within library functions, including cataloging, classification, reference services, and collection development. The study presents actual examples from Sub-Saharan Africa which showcase how universities implement AI technology through service robots at the University of Lagos and the University of Pretoria. These technologies enable organizations to achieve higher efficiency through their ability to conduct routine tasks automatically while delivering better information access and enabling the development of innovative service systems. The literature identifies multiple obstacles which prevent organizations from fully implementing their systems because they face budget limitations, lack proper facilities, their employees have insufficient abilities, and staff members resist changes while fearing a loss of social contact. AI gives African libraries great potential to enhance their services according to existing research, but organizations need to invest in their training resources along with developing infrastructure and establishing effective policies to achieve this goal.

Table 1. A comprehensive overview of the eight specific Identified Gaps in existing literature to corresponding Research Questions intended to address them.

Identified Gap	Research Question
Pedagogical Integration Gap: Most studies focus on technology rather than instructional design.	How can AI tools be pedagogically aligned with curriculum goals to ensure meaningful learning rather than mere automation?
Ethical and Privacy Gap: While privacy and ethics are discussed, few frameworks for real-world implementation exist.	What ethical governance models can ensure data security and responsible AI use in educational settings?
Teacher Role Re-definition Gap: The human-AI partnership in classrooms remains conceptually underdeveloped.	How does AI reshape teachers' roles as facilitators, mentors, and co-learners in intelligent classrooms?
Contextual Disparity Gap: Literature from developing regions (e.g., Sub-Saharan Africa, Southeast Asia) is still limited.	What context-specific factors influence the success or failure of AI adoption in resource-constrained educational environments?
Evaluation Metrics Gap: Lack of standardized evaluation criteria for AI-based educational outcomes.	How can we measure the educational effectiveness, equity, and engagement of AI-driven learning interventions?
AI Literacy Gap: Teachers' and students' competencies to effectively use AI tools are underexplored.	What training frameworks or capacity-building programs are needed to enhance AI literacy among educators and learners?
Socio-emotional Learning Gap: AI's capacity to replicate empathy and emotional support remains questionable.	To what extent can AI systems meaningfully contribute to students' socio-emotional and moral development?
Sustainability Gap: Long-term sustainability and scalability of AI systems in education are seldom assessed.	What factors determine the sustainability and scalability of AI integration in diverse educational contexts?

Some key Takeaways of this table 1.

Human-Centric Focus: Several gaps (III, VI, VII) emphasize that the “human element”- teachers, emotional intelligence, and literacy - is just as critical as the software itself.

Global Equity: The “Contextual Disparity Gap” highlights a need to look beyond Western-centric research and address how AI functions in the Global South.

Actionable Governance: The shift from theoretical ethics to “real-world implementation frameworks” suggests the field is moving toward practical application and policy-making.

HYPOTHESIS OF THE STUDY

Table 2 provides outlines a comprehensive research framework which aims to connect eight vital research gaps that exist in educational Artificial Intelligence (AI) implementation. The framework establishes Pedagogical Integration as the essential requirement which enables AI to achieve its maximum effectiveness because it requires educational institutions to connect AI learning system designs with their actual educational results. The Teacher Role requires teachers to change their function from educational content experts to their new role as mentors and learning facilitators. The framework shows two major obstacles which include the Contextual Disparity Gap which demonstrates that developing regions specific needs and limitations determine AI performance and the Sustainability Gap which states that successful operations require both solid infrastructure and backing from governmental policies. In addition, Table 2 demonstrates that how technology brings forward both human needs and ethical obligations. The study establishes that users need both technical skills and moral assurance to achieve total acceptance of these tools. The Socio-emotional Learning focus area presents its most controversial hypothesis which shows that AI technology can boost cognitive function and measurement precision through standardized testing, but it does not provide automatic assistance to emotional learning development in students. The eight focus areas create a research path that scientists can use to study responsible AI deployment across educational systems in fair and effective ways.

Here is the eight Hypothesis Development Based on Reviewed Literature.

Table 2. Mapping Research Hypotheses to Identified Gaps in AI Education Literature

No.	Focus Area	Hypothesis Statement (H ₁)	Corresponding Gap
1	Pedagogical Integration	AI-integrated pedagogical designs enhance learning outcomes.	Pedagogical Integration Gap
2	Ethics & Privacy	Ethical frameworks increase trust and acceptance of AI.	Ethical & Privacy Gap
3	Teacher Role	AI redefines teachers as facilitators/mentors.	Teacher Role Gap
4	Contextual Factors	Context moderates AI effectiveness in developing regions.	Contextual Disparity Gap
5	Evaluation Metrics	Standardized metrics improve measurement accuracy.	Evaluation Metrics Gap
6	AI Literacy	Higher AI literacy enhances ethical and effective use.	AI Literacy Gap
7	Socio-emotional Learning	AI enhances cognition but not emotional development.	Socio-emotional Gap
8	Sustainability	Infrastructure and policy support predict AI scalability.	Sustainability Gap

1. Pedagogical Integration Hypothesis

Rationale: Dimitriadou and Lanitis and Zhai et al show that educational institutions must establish connections between their artificial intelligence systems and their academic curricula because this connection will help them prevent operational tasks from becoming automated.

H_{1a}: The implementation of AI-based educational programs will result in better student engagement and improved academic results when compared to classrooms that use technology without AI.

H_{0a}: There is no significant difference in engagement and learning outcomes between AI-integrated pedagogical designs and non-AI classrooms.

2. Ethical and Privacy Governance Hypothesis

Rationale: Indra Saputra and Humble et al found that ethical principles and privacy regulations together with data management procedures present major obstacles which organizations need to overcome before they can implement responsible artificial intelligence systems.

H_{1b}: The implementation of ethical standards together with data management regulations will result in increased institutional trust which leads to higher acceptance of artificial intelligence educational tools.

H_{0b}: Ethical and data governance frameworks have no significant effect on institutional trust or AI tool acceptance.

3. Teacher Role Redefinition Hypothesis

Rationale: Fitria (2021) and Humble et al. (2022) argue that AI redefines teachers' roles from content deliverers to facilitators and mentors.

H_{1c}: The integration of AI-based instructional tools leads to a significant shift in teachers' roles toward facilitation and mentorship.

H_{0c}: AI-based instructional tools do not significantly change teachers' traditional roles.

4. Contextual Disparity Hypothesis

Rationale: Echedom and Okuonghae 2021 explain that developed countries show higher AI adoption rates than developing countries because of their superior infrastructure and funding and skilled personnel availability.

H_{1d}: Contextual factors e.g. infrastructure funding and digital literacy significantly moderate the relationship between AI implementation and educational effectiveness in developing regions.

H_{0d}: Contextual factors do not significantly moderate the relationship between AI implementation and educational effectiveness.

5. Evaluation Metrics and Effectiveness Hypothesis

Rationale: Zhai et al 2021 and Dimitriadou and Lanitis 2023 establish that researchers must find ways to measure AI-powered educational results through scientific testing.

H_{1e}: The application of standardized AI evaluation metrics which include learning analytics dashboards and adaptive performance scores will lead to better assessment results of student learning achievements.

H_{0e}: The use of standardized AI evaluation metrics does not result in better assessment results of student learning achievements.

6 AI Literacy and Competence Hypothesis

Rationale: Indra Saputra et al 2023 and Fitria 2021 establish that teachers and students must acquire AI literacy skills.

H_{1f}: The presence of higher AI literacy skills among educators and students leads to better AI usage in educational settings which also demonstrates ethical behavior.

H_{0f}: The usage of AI in learning environments shows no connection to AI literacy levels.

7. Socio-Emotional Learning Hypothesis

Rationale: Dimitriadou and Lanitis 2023 show that AI systems can recognize human emotions, but these systems lack the capability to assist with empathy development and moral growth.

H_{1g}: states that AI-based emotion recognition systems improve cognitive learning, but they do not impact social emotional development or moral growth.

H_{0g}: states that AI-based emotion recognition systems do not impact cognitive development or social emotional learning progress.

8. Sustainability and Scalability Hypothesis

Rationale: Echedom and Okuonghae 2021 and Indra Saputra et al 2023 identify cost infrastructure and policy challenges as limiting long term AI adoption.

H_{1h}: Sustainable funding and institutional policy support and infrastructure readiness work together to determine how well educational institutions can adopt AI technologies.

H_{0h}: states that funding infrastructure and policy sustainability factors do not determine how educational institutions adopt AI technologies.

METHODS

Figure 3 illustrates the systematic article selection process used in this study, following a structured multi-stage screening approach. The process begins with keyword-based data collection, which initially identified 120 articles meeting the broad thematic criteria. Articles were then progressively filtered through three successive screening stages: title screening reduced the pool to 80 articles, followed by full-content evaluation, which narrowed it further to 48 articles. A final assessment based on research quality criteria yielded 25 articles that met all inclusion standards. These 25, along with additional results, culminated in the analysis of 35 research findings that met the overall selection criteria. The research employs a qualitative, descriptive, and interpretive approach based on secondary data sources and synthesizes peer-reviewed journal articles on the integration of AI tools (16). The study combines systematic literature review SLR and thematic content analysis to extract and analyze results from peer-reviewed research articles that studied artificial intelligence AI in education between. The data includes scholarly articles and reports and reviews which authors Dimitriadou and Lanitis 2023 and Saputra et al 2023 and Fitria 2021 and Humble and Mozelius 2022 and Echedom and Okuonghae 2021 and Zhai et al 2021 created. The study uses purposive sampling to choose research studies which investigate essential educational themes including AI integration and pedagogy and ethics and teacher responsibilities and contextual factors. The data collection process required researchers to search through Google Scholar databases while only selecting peer-reviewed educational publications about AI from 2021 to 2023. The data analysis method uses thematic analysis to discover common patterns which create conceptual categories that lead to content synthesis which shows research gaps and challenges and best practices. The research establishes validity and reliability through three methods which include using multiple sources for triangulation and researcher reflexivity and maintaining complete documentation of all eligibility criteria for study inclusion.

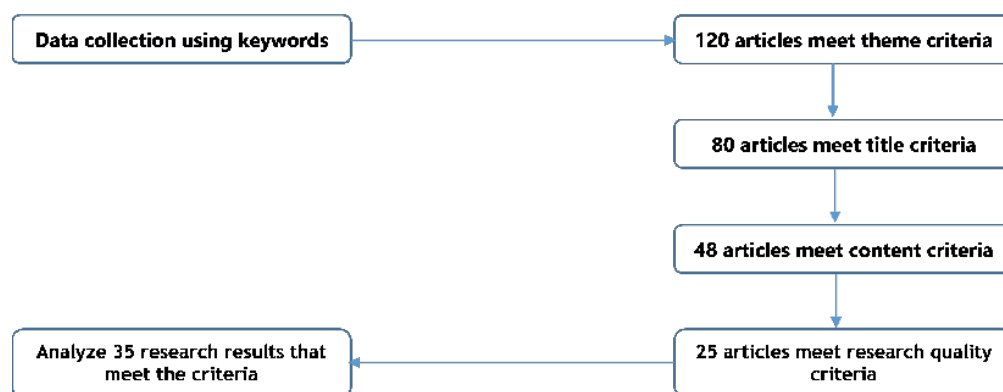


Figure 3. The technical stages of article selection

A multi-dimensional framework can be developed around three core constructs:

AI Integration Drivers: Pedagogical design, ethical governance, teacher readiness, and contextual enablers.

Mediating Variables: AI literacy, infrastructure, and data governance.

Outcome Variables: Learning effectiveness, engagement, ethical compliance, and sustainability.

Inclusion and Exclusion Criteria

Table 3 presents the inclusion and exclusion criteria applied in the systematic literature review to ensure the selection of relevant and high-quality studies. Regarding publication type, only peer-reviewed journal articles were considered eligible, while book chapters, grey literature, and opinion pieces were excluded to maintain academic rigor. The review was further restricted to English-language publications only, eliminating non-English sources. In terms of publication years, studies published between 2018 and 2023 were included, ensuring the review reflects recent developments in the field, while any research published before 2018 was excluded. Concerning educational context, the review focused exclusively on K-12 and higher education settings, excluding corporate training and informal learning environments that fall outside the scope of formal education. With respect to topic focus, studies addressing AI integration in teaching, learning, assessment, or ethics were included, whereas research focusing on AI in purely technical or engineering disciplines was excluded. Finally, in terms of study design, empirical, review, and conceptual studies were all considered appropriate, while editorials and letters were excluded due to their limited scientific contribution. Collectively, these criteria ensured that the reviewed literature was current, methodologically sound, and directly relevant to the role of artificial intelligence in formal educational contexts. The paper mentions “peer-reviewed educational publications about AI from 2018 to 2023” and “purposive sampling.” This is vague and methodologically inconsistent — purposive sampling is a qualitative concept, not an SLR selection procedure.

Table 3. Inclusion and exclusion criteria should be formally listed

Criterion	Inclusion	Exclusion
Publication type	Peer-reviewed journal articles	Book chapters, grey literature, opinion pieces
Language	English only	Non-English
Publication years	2018–2023	Before 2018
Educational context	K-12 and higher education	Corporate training, informal learning
Topic focus	AI integration in teaching, learning, assessment, or ethics	AI in purely technical/engineering education
Study design	Empirical, review, conceptual	Editorials, letters

RESULTS & DISCUSSION

The thematic content analysis of the reviewed literature revealed eight key themes that align closely with the identified research gaps and hypotheses. First, many studies focus heavily on the technological capabilities of AI which they study at present time while they need to develop pedagogical frameworks that use AI technologies to meet curriculum objectives and to support student-centric educational approaches. Second, ethical considerations and data privacy safeguards remain insufficient, particularly in less developed regions, with ongoing concerns about surveillance, bias, and transparency in AI-driven decisions. Third, educators perceive AI as transforming their role from teaching traditional content to guiding students who need assistance, but they fear that AI will take away human elements from education and lead to their job loss. Fourth, both socio-economic status and infrastructure availability create major obstacles for AI implementation because low-resource environments encounter multiple difficulties which include insufficient funding and training resources and poor internet access, which ultimately restrict their ability to implement AI solutions. Fifth, there is a lack of standardized metrics for evaluating AI educational effectiveness because most assessments measure user engagement instead of cognitive or ethical educational outcomes. Sixth, AI integration suffers from low AI literacy among teachers and students, which creates an urgent requirement for professional development programs that need to teach AI ethics and operational details and instructional use. Seventh, while AI can recognize student emotions through facial or behavioral cues, it lacks the ability to provide authentic empathy or emotional support, which demonstrates how human teachers are essential for teaching students about their emotions. Eighth, the ongoing doubts about AI educational systems sustainability and their ability to scale up operations stem from pilot programs which face obstacles when trying to expand because of their existing infrastructure deficiencies and funding shortages and insufficient policy backing.

The findings demonstrate that educational institutions face multiple complex challenges, which present them with opportunities to use artificial intelligence for their educational improvement efforts. The research investigates how artificial intelligence technology can create customized learning experiences while solving various obstacles that exist in this field. It emphasizes the importance of academic institutions in promoting academic integrity and transparency to prevent plagiarism. Additionally, the study stresses the need for technology advancement and exploration of new approaches to further improve personalized learning with AI (17). This section discusses the thematic analysis conducted to explore the challenges and opportunities associated with the implementation of artificial intelligence in education (18).

The thematic analysis of secondary data and existing literature reveals several overarching conclusions regarding the current landscape of Artificial Intelligence (AI) in education. The educational system experiences multiple transformations because Artificial Intelligence technologies enable substantial improvements but their current development exists at different stages also quasi-experimental design was employed with elementary students who participated in lessons supported by teacher modelling and AI scaffolding (19). The results indicate that student have a perception that AI can be effectively used in teaching learning process, academic administration processes (20). In educational contexts, AI systems can occupy a range of pedagogical roles such as tutor, feedback agent, or scaffolded conversational partner, and the ways in which students interact with these systems critically shape both learning outcomes and ethical considerations (21).

AI development in education maintains two separate development tracks which show advanced technology but lack effective teaching methods.

The reviewed literature demonstrates that while AI tools-such intelligent tutoring systems and learning analytics dashboards and virtual teaching agents-are becoming increasingly sophisticated their integration often lacks pedagogical depth. Most educational institutions adopt AI as a technological enhancement rather than as a deliberate instructional design. The absence of pedagogical alignment leads to superficial automation which enables AI tools to enhance administrative work but prevents them from delivering authentic learning experiences that involve critical thinking and scientific inquiry. Future research needs to develop pedagogical frameworks which connect AI functions with designated learning objectives and educational standards throughout the curriculum.

The current state of AI in education encounters ongoing ethical and privacy challenges because responsible AI standards lack international consensus.

Across studies, a consistent theme emerges around the ethical dilemmas and data privacy risks posed by AI technologies. Institutions often struggle to establish robust governance mechanisms to protect learner data, ensure algorithmic transparency, and prevent bias. The lack of universal ethical standards or global regulatory frameworks contributes to uneven implementation and potential misuse of data. Literature strongly recommends the development of ethical governance models which will establish definite accountability standards combined with privacy protection measures and responsible usage guidelines for AI-driven educational systems.

Teachers function as essential educational components who connect machine intelligence with human emotional understanding.

AI technology can create personalized learning experiences and handle assessment processes, yet it falls short of duplicating the crucial human aspects of education which teachers use to build emotional and moral and motivational connections with students. Teachers have transitioned from their previous role of delivering content to their current position as teachers who guide students through learning while using AI-based assessment tools to understand student progress. AI technology does not replace teachers but instead works with them to enhance their ability to teach students through empathetic and creative and socio-emotional support methods.

Successful AI implementation depends on both technological availability and the social and economic status of the organization.

The research results reveal important differences which exist between educational systems that operate in developed countries and those that function in developing nations. To achieve successful AI deployment educational institutions, need to establish their technological systems together with financial resources and their institutional capabilities. The implementation of AI technology in resource-limited areas like parts of Africa and Southeast Asia faces challenges because of insufficient digital infrastructure and teacher training deficiencies and weak policy backing. The development of AI strategies requires context-specific approaches which need to reflect local educational requirements and actual circumstances of the area instead of using established advanced technology patterns from developed countries.

AI literacy acts as a fundamental requirement which enables organizations to implement ethical and effective AI systems.

Both educators and learners require AI literacy to interact responsibly and effectively with AI tools. The research literature which was examined shows that numerous teachers do not have sufficient knowledge to understand AI system functioning and AI data analysis and its application in their educational methods. The development of specific capacity-building programs functions as a vital requirement which needs to provide educators with essential technical skills and ethical knowledge and teaching methods to develop their ability to work with AI technology.

AI systems need human emotional understanding to train students because AI cannot duplicate human emotional understanding.

AI systems can detect facial expressions and vocal tones and engagement levels, but they fail to achieve authentic human emotional comprehension and moral judgment. The educational process requires emotional understanding because it needs contextual information and the ability to feel compassion and make moral decisions which only humans possess. The literature suggests that AI can support socio-emotional learning by identifying patterns of disengagement or distress, but the teacher remains central in nurturing student's emotional well-being and ethical development.

The three elements of institutional policies and budget allocations and ongoing educator development programs determine the sustainable operation of AI systems.

AI systems need permanent financial backing from educational institutions, and they require development plans to achieve their long-term operational goals and their capacity to expand. The initial success of temporary testing programs encounters obstacles because they depend on funding which leads to technical difficulties and changes in organizational policies. Educational systems need a comprehensive strategy which incorporates artificial intelligence into their existing policies while securing constant financial support and establishing regular assessments and teacher training initiatives.

The analysis leads to the development of a multi-dimensional conceptual framework the Pedagogical-Ethical-Contextual Model of AI Integration in Education which shows that successful AI adoption requires three interconnected dimensions to be properly aligned.

The first dimension Pedagogical Alignment requires AI tools to receive intentional design and usage because they need to support the achievement of curricular objectives and foster active personalized critical learning.

The second dimension Ethical Governance mandates organizations to develop robust ethical and data governance systems which will protect fairness and privacy while ensuring transparent operations and accountable actions.

The third dimension Contextual Adaptation demands that AI policies and practices match the actual economic conditions and digital resources and teacher abilities of each location.

Our process focused framework draws on three key theoretical perspectives:

1. Assessment for learning: The processual dimension prioritizes formative functions of assessment, emphasizing how evaluation data can guide instruction and support student learning (Black & Wiliam, 2018; Schellekens et al., 2021). AI amplifies this approach by providing more detailed, timely, relevant and actionable information to support the dynamic features of learning. This perspective goes beyond the common understanding that assessments carry mainly a specific "stake" or consequence for students, offering educators an opportunity to exert influence and control through attainment pressure (Elmore, 2019)

2. Constructive alignment: Following Biggs' (2014) principles, the framework ensures that assessment methods are aligned from the curriculum perspective in relation with the learning outcomes foreseen and instructional learning activities recommended. AI tools enhance this alignment by offering sophisticated means to assess complex learning outcomes, ensure a comprehensive assessment and avoid gaps in coverage.

3. Sociocultural dimension of assessment: The framework recognizes assessment as a culturally situated practice (Gipps, 1999) and emphasizes the importance of considering diverse learner backgrounds and needs. AI applications must be designed and implemented with cultural responsiveness in mind, for example by controlling the questions difficulty in relation to diverse students cultural backgrounds. In this way we could better acknowledge how current assessment systems have a deep embedded social and cultural purpose and not always serve as useful information about the development of learners capabilities (Elmore, 2019)(22).

SOWT Analysis in Education

Figure 3 describes that the SWOT analysis is a tool that can help Higher Education Institutions (HEI) identify their strengths, weaknesses, opportunities, and threats. To prepare this guide we reviewed the literature and examined practices around e-learning. SWOT analysis is used to identify factors that can affect the quality of education.(23) SWOT is an acronym for strengths, weaknesses, opportunities, and threats. A SWOT analysis is a simple tool to assist faculty to initiate meaningful change in a program and to use the data for program improvement. After spending a considerable amount of time with undergraduate students in advising sessions, it was evident that these same students could assess the existing program and could vision how a restructured program should look. A SWOT analysis was conducted at the undergraduate and graduate levels with students who were admitted to the teacher education program. A SWOT analysis is a strategic planning tool that helps identify an individual or Organization's internal strengths and weaknesses, as well as external opportunities and threats.(24) SWOT analysis is widely used in educational management, its application often remains superficial, episodic, and detached from continuous improvement processes.(25)

Strengths

The strengths refer to the things the organization does well. To identify the strengths, we consider the areas that others view the organization or program as doing well. Strengths may be the curriculum, leadership, school relationships, faculty, and/or reputation. Other questions to ask are "What do you do better than anyone else?"; "What unique resources do you have access to?"; "What do your stakeholders see as your strengths?"; and "What are the indicators of success at your school?".

Strengths (internal capabilities of AI in education, as evidenced by the reviewed literature)	Personalized learning through intelligent tutoring systems; automated feedback and assessment; scalability of content delivery; real-time engagement monitoring through emotion-recognition tools
Weaknesses (internal limitations identified in the literature)	Lack of pedagogical alignment between AI tools and curriculum goals; low AI literacy among teachers and students; inability of AI to replicate empathy, moral reasoning, or socio-emotional support
Opportunities (external conditions favoring AI integration)	Growing investment in EdTech globally; potential for AI to reduce educational inequality through adaptive platforms; policy momentum for digital transformation in education
Threats (external risks and barriers identified in the literature)	Data privacy vulnerabilities and absence of international ethical governance frameworks; deepening contextual disparity between developed and developing nations; risk of teacher role displacement and erosion of human-centered pedagogy

Weaknesses

Weaknesses refer to the things the organization needs to improve. Weaknesses in resources or capabilities hinder the organization from achieving a desired goal or mission. Consider what people in your area are likely to see as weaknesses. By understanding your weaknesses, you can focus on specific areas you need to improve. Questions to address are "What could you improve?"; "What should you avoid?"; "What are people in your area likely to see as weaknesses?"; and "What factors hurt you in recruitment?".

Opportunities

Opportunities are trends that your organization could take advantage of. These are outside factors or situations that exist that may affect your organization in a positive way in achieving a desired goal or mission. Examining the trends is helpful in identifying opportunities.

Threats

What obstacles do you face in your organization? This is the time to look at what others are doing. What are they doing better? Threats are outside factors that current exist that affect your organization in a negative way.

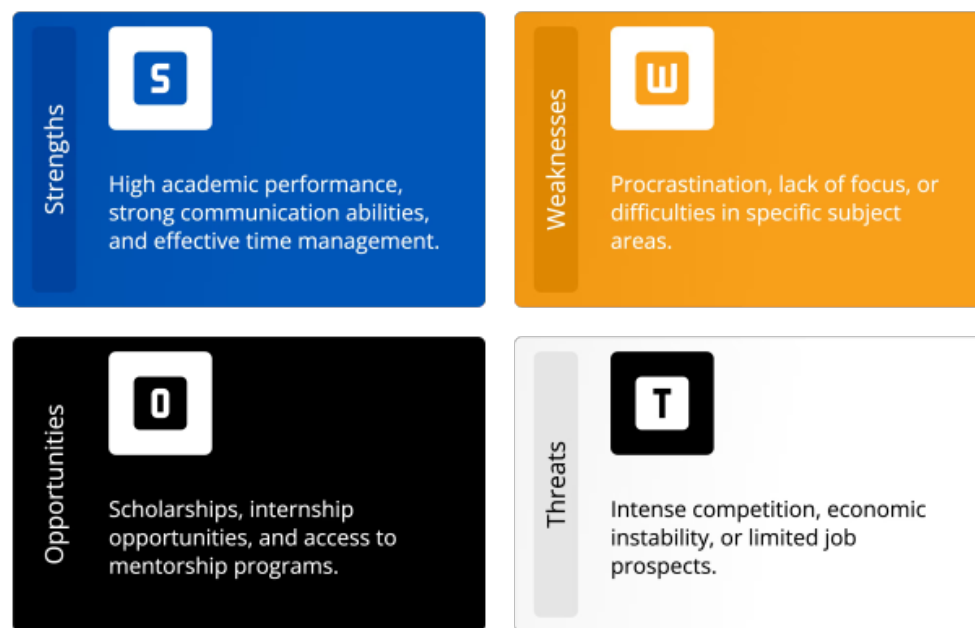


Figure 3. SOWT Analysis in Education

Sources from (26)

Relevance

A SWOT analysis is a high-level and critical thinking exercise for students. The practice can be duplicated in any education setting. Teachers can conduct a SWOT analysis of their particular classes, teacher preparation program, or internship experience. Frequently, educators have a vague idea of their SWOT. Discussion of these areas takes place in meetings with students, other faculty, or mentor teachers. However, action is usually never taken on the ideas for program improvement. The implementation of a SWOT analysis should be considered as just one input to strategic planning. It should never be used alone.

Procedures for Conducting a SWOT Analysis

Figure 3 also shows that the procedures for conducting a SWOT analysis are simple and straight forward. However, in most cases, the procedures are determined by the person conducting the SWOT analysis:

1. Identify the group you will work with: for example, one particular class, all students enrolled in a particular program, a subset of advisees;
2. Explain the purpose and goal of the activity;
3. Choose a recorder: This should not be the facilitator;
4. Use a flip chart or some other method, in round-robin fashion, each participant will identify strength. The recorder will record the responses on the flip chart. If a participant chooses to pass, he/she will say "Pass" and the next person will continue. Example strengths may be high quality students, strong support staff, current technology, accreditations, locations, and curriculum;
5. A different sheet of paper will be used for weaknesses. Examples of weaknesses are lack of diversity in faculty, outdated buildings, morale, limited budget, outdated curriculum, scheduling of when courses are offered, and out of date software;
6. A different sheet of paper will be used for opportunities. Examples of opportunities are changes in technology, changes in population profiles, industry trends, and geographic area;
7. A different sheet of paper will be used for threats. Examples of threats are competition from other universities, national decline in teaching, legislative effects, economy, and geographic area.

In developing the list of SWOT, the institution and organization goals and missions should be considered. The SWOT analysis should illustrate where you are now and where you want to go.

Implication for Action

A SWOT analysis of a teacher education program or any program can be the driving force for implementing change. It is one tool to use in a strategic planning process. Strengths and weaknesses are revealed and adjustments to curriculum, internships, learning activities, education policies, etc., are justifiable if based on a SWOT analysis of a program. The SWOT provides a focused measure on how your students perceive the program.

Contextual factors, such as students, subject and societal influences may cause a SWOT analysis to be misled. For example, if students in a particular class had negative impressions of the instructor, the SWOT analysis could show that the curriculum was weak, if the students participating in the SWOT identified the curriculum as a weakness.(27) The developed AIED policy should be measurable in terms of its impact so that its significance can be assessed later on. It is therefore important that when developing an AI policy to be realistic and in line with the feature of the given context (as discussed in the contextual feature) where the AI will be developed instead of proposing something fancy and unreasonable, hence undoable in reality.(28) AI has enormous potential to revolutionize curriculum development, strategic approaches and policies are required to overcome the identified issues and improve AI integration in varied educational settings.(29) The growing integration of AI into educational contexts requires a critical exploration of its pedagogical effects. The initial question surpasses a mere assessment of its efficacy in conveying content; it concerns how it affects the pedagogical relationship between teachers and students. In RE, with its inherently relational, dialogical, and formative pedagogy, this question takes on especially added import. Is AI used as a supplement to human teaching, or will it create an overdependence threatening critical reflection, religious judgment, and communal learning processes? The following analyzes the educational role of AI, examining its fine balance between augmentation and overdependence.(30)

CONCLUSION & RECOMMENDATIONS

The study concludes that Artificial Intelligence (AI) has become a transformative educational force because it changes how instructors deliver lessons and how students learn and how assessments are conducted yet its educational and ethical and environmental implementation remains partial. This article also provides an extensive overview of using artificial intelligence technology in education.(31) Your training data includes information up to the month of October in the year 2023. The research results demonstrate that educational institutions tend to select AI technologies based on their technical capabilities rather than their potential to improve teaching methods which creates an educational gap between automated systems and actual learning experiences. Educational institutions still need to establish full AI implementation according to their curriculum goals and human-centric teaching methods despite the development of intelligent tutoring systems and adaptive platforms and emotion-aware technologies. The ongoing ethical and data privacy issues remain major threats because organizations lack common rules to protect data which result in inconsistent data management practices that lead to potential misuse of student information. Teachers maintain their essential functions because they enable emotional connections with students while supporting their educational progress and acting as educational mentors who make the learning process both human-centered and ethical. Educational artificial intelligence applications face major challenges because existing educational systems need better infrastructure and funding methods and digital literacy training programs. The Pedagogical-Ethical-Contextual Model of AI Integration in Education serves as the study's integrated framework which shows that successful AI implementation needs to connect teaching methods with governance systems and particular situations. AI functions as a partner who works together with humans to enhance their creative abilities and moral understanding and emotional skills in the educational process. The system enables instructors and students to work together easily within classroom environments and outside of school spaces and It has the capability of providing real-time data and algorithm of any kinds depending on the request of the user.(32) We argue that the future development of the AIED field must lead to the of the learner-centered, data-driven, personalized learning in the current knowledge age.(33) This review article may lead to a better understanding of AI adoption in the education sector. As a result, the implications could be applied to school administrators, teachers, and students to understand better and implement appropriate strategies to improve educational performance through AI in education.(34) The continuous improvement of AI technology has been widely used in all walks of life, and the education field is no exception.(35)

The educational institutions need to create AI-based learning systems which should function according to their curriculum objectives through teaching methods which enable students to learn through personal exploration and active participation in educational activities. The establishment of universal ethical standards which focus on transparency and accountability and fairness and privacy needs to occur before educational institutions can use AI technology in a responsible manner. The implementation of AI tools in classrooms needs to undergo ethical assessments which should occur on a regular basis according to requirements established by governments and accreditation organizations. Professional development programs need to deliver special training which helps educators understand AI technology so teachers can use it safely and effectively in their classroom instruction. The process of integrating AI technology needs to assess local conditions which include existing infrastructure and institutional policies and teacher preparedness while developing solutions which match specific cultural and social economic conditions to achieve sustainable success. Educational institutions need to use standardized educational assessment tools which include adaptive learning analytics and engagement monitoring to evaluate how AI technology affects student learning across cognitive and ethical and emotional domains. The sustainable use of AI technologies requires educational institutions to establish permanent policies which ensure perpetual financial resources and infrastructure upkeep and ongoing technical assistance for teaching staff and school leaders. Importantly, AI should complement, not replace, human educators by enhancing their ability to provide social-emotional support and moral guidance rather than undermining these critical roles. Clear pedagogical and ethical guidelines should be developed to shape responsible AI utilization in teacher preparation (36).

Future research should focus on deepening pedagogical approaches by designing and empirically testing models that effectively integrate AI with curriculum design, critical thinking, focus on establishing discussions around the uses, possibilities and risks of AI in education for sustainable development (37) and creativity. Research also needs to scale up to examine AIED on the institutional, regional and national levels, and for longer time durations.(38) Researchers need to develop and test governance frameworks for different cultural and institutional environments to confirm the validity of ethical frameworks. Research studies which rely on evidence need to show how artificial intelligence transforms educational roles together with its ability to create shared learning experiences and develop human-machine teaching relationships. The existing research on AI usage in developed countries and developing countries needs to be expanded because contextual elements determine both technology uptake and results. The absence of a globally recognized methodology to evaluate artificial intelligence performance requires the creation of established assessment standards which will measure student involvement and academic progress and ethical compliance. The research should develop educational frameworks which integrate artificial intelligence competencies into teacher development programs and all school instructional materials. The study of social-emotional artificial intelligence systems which include affective computing and emotion-recognition technologies needs to determine how these systems can enhance human empathetic abilities together with their ability to develop ethical understanding. The research needs to use longitudinal studies to evaluate both the permanent effects and the wide-reaching effects of artificial intelligence educational systems while specifically studying the elements which determine their success during extended periods in areas which have limited resources. Artificial intelligence in education should lead to the iterative development of student-centered learning, with data-based and personalized learning.(39)

REFERENCES

1. Echedom AU, Okuonghae O. Transforming academic library operations in Africa with artificial intelligence: Opportunities and challenges: A review paper. *New Rev Acad Librariansh*. 2021;27(2):243–55. DOI: 10.1080/13614533.2021.1906715
2. Guilherme A. AI and education: the importance of teacher and student relations. *AI Soc*. 2019;34(1):47–54. DOI: 10.1007/s00146-017-0693-8
3. BACKGROUND OF ARTIFICIAL INTELLIGENCE. Available from: <https://www.linkedin.com/pulse/background-artificial-intelligence-imalsha-kandamby>
4. College of Education. AI in Schools: Pros and Cons. Available from: <https://education.illinois.edu/about/news-events/news/2024/10/24/ai-in-schools--pros-and-cons>
5. Sheikh H, Prins C, Schrijvers E. Artificial Intelligence: Definition and Background. In: Sheikh H, Prins C, Schrijvers E. *Mission AI*. Cham: Springer International Publishing; 2023. (Research for Policy). DOI: 10.1007/978-3-031-21448-6_2
6. Aggarwal D, Sharma D, Saxena AB. Adoption of Artificial Intelligence (AI) For Development of Smart Education as the Future of a Sustainable Education System. *J Artif Intell Mach Learn Neural Netw*. 2023;(36):23–8. DOI: 10.55529/jaiml.36.23.28
7. Tahiru F. AI in Education: A Systematic Literature Review. *J Cases Inf Technol JCIT*. IGI Global Scientific Publishing; 2021;23(1):1–20. DOI: 10.4018/JCIT.2021010101
8. Chen L, Chen P, Lin Z. Artificial Intelligence in Education: A Review. *IEEE Access*. 2020;8:75264–78. DOI: 10.1109/ACCESS.2020.2988510
9. Yadav S. Leveraging AI to Enhance Teaching and Learning in Education: The Role of Artificial Intelligence in Modernizing Classroom Practices. In: *Optimizing Research Techniques and Learning Strategies With Digital Technologies*. IGI Global Scientific Publishing; 2025. DOI: 10.4018/979-8-3693-7863-2.ch008
10. Wu Q, Chen L, Chen M, Huang Y. Exploring the impact of artificial intelligence on business talent development in higher education: A systematic literature review and research agenda. *Int J Manag Educ*. 2026;24(1):101287. DOI: 10.1016/j.ijme.2025.101287
11. Dimitriadou E, Lanitis A. A critical evaluation, challenges, and future perspectives of using artificial intelligence and emerging technologies in smart classrooms. *Smart Learn Environ*. 2023;10(1):12. DOI: 10.1186/s40561-023-00231-3
12. Saputra I, Astuti M, Sayuti M, Kusumastuti D. Integration of Artificial Intelligence in Education: Opportunities, Challenges, Threats and Obstacles. A Literature Review.
13. Humble N. The threat, hype, and promise of artificial intelligence in education.
14. Zhai X, Chu X, Chai CS, Jong MSY, Istenic A, Spector M, et al. Cai N, editor. A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*. 2021;2021(1):8812542. DOI: 10.1155/2021/8812542
15. Fitria TN. ARTIFICIAL INTELLIGENCE (AI) IN EDUCATION: USING AI TOOLS FOR TEACHING AND LEARNING PROCESS.
16. Luo Y, Xia Y, Lu X. A Systematic Review of the Role of Artificial Intelligence in Second Language Writing Education. *Digit Stud Lang Lit*. De Gruyter; 2025;2(2):302–25. DOI: 10.1515/dsll-2025-0001
17. Tamanna M, Sinha B. A conceptual analysis of artificial intelligence (AI) on academic opportunities and challenges: a case study based on higher educational institutions in Bangladesh. *Qual Assur Educ*. 2024;33(2):218–36. DOI: 10.1108/QAE-03-2024-0050
18. Salha S, Mousa A, Khayat S. Artificial Intelligence in Education (AIED) Policies in School Context: A Mixed Approach Research. *Leadersh Policy Sch*. Routledge; 2025;24(1):27–45. DOI: 10.1080/15700763.2024.2443675
19. Nurjain A, Nurjain LR, Fajriah YN, Nurjain AK, Ahmad H. Integrating Generative Artificial Intelligence (AI)-Based Multimodal Learning in Education to Enhance Literacy Aligned with Sustainable Development Goals (SDGs).
20. Ravi Kumar VV, Raman R. Student Perceptions on Artificial Intelligence (AI) in higher education. In: 2022 IEEE Integrated STEM Education Conference (ISEC). 2022. p. 450–4.
21. Allison J. RAISE the Standard: A Framework for Transparent Reporting of Artificial Intelligence Studies in Education. *J Educ Comput Res*. 2026;64(1):3–15. DOI: 10.1177/07356331251377430
22. (PDF) Beyond Automation: A Conceptual Framework for AI in Educational Assessment. ResearchGate. 2025; DOI: 10.61071/JDP.2555
23. Anwar S, Sulaeman I. SWOT Analysis as a Strategic Approach in Improving Education Quality. *Shibyan J Pendidikan Guru Madrasah Ibtidaiyah*. 2025;3:1–13. DOI: 10.30999/shibyan.v3i1.3786
24. Education O, Jordan J. How to Conduct a SWOT Analysis for Students? [Internet]. *One Education* 2024 [cited 2026 Jan 4].
25. Keravnos N, Orphanos S. Utilisation of SWOT Analysis for Decision-Making in Educational Contexts. *Eur J Educ Manag*. RHAPSODE; 2025;8(4):219–34. DOI: 10.12973/eujem.8.4.219
26. [Internet]. Unlocking Potential: The Benefits of SWOT Analysis in Education for Teachers and Students [cited 2025 Dec 31]. Available from: <https://www.linkedin.com/pulse/unlocking-potential-benefits-swot-analysis-education-teachers-xjlsc>
27. Orr B. Conducting a SWOT Analysis for Program Improvement.
28. Endris A, Tilili A, Huang R, Xu L, Chang T, Mishra S. Features, Components and Processes of Developing Policy for Artificial Intelligence in Education (AIED): Toward a Sustainable AIED Development and Adoption. *Leadersh Policy Sch*. Routledge; 2025;24(1):233–41. DOI: 10.1080/15700763.2024.2312999

29. Abbasi BN, Wu Y, Luo Z. Exploring the impact of artificial intelligence on curriculum development in global higher education institutions. *Educ Inf Technol*. 2025;30(1):547–81. DOI: 10.1007/s10639-024-13113-z
30. Papakostas C. Artificial Intelligence in Religious Education: Ethical, Pedagogical, and Theological Perspectives. *Religions*. Multidisciplinary Digital Publishing Institute; 2025;16(5):563. DOI: 10.3390/rel16050563
31. Matos T, Santos W, Zdravevski E, Coelho PJ, Pires IM, Madeira F. A systematic review of artificial intelligence applications in education: Emerging trends and challenges. *Decis Anal J*. 2025;15:100571. DOI: 10.1016/j.dajour.2025.100571
32. Mafara R, Abdullahi S. Adopting Artificial Intelligence (AI) in Education: Challenges & Possibilities. *Asian J Adv Res Rep*. 2024;18(2):106–11. DOI: 10.9734/ajarr/2024/v18i2608
33. Ouyang F, Jiao P. Artificial intelligence in education: The three paradigms. *Comput Educ Artif Intell*. 2021;2:100020. DOI: 10.1016/j.caeai.2021.100020
34. Limna P, Jakwatanatham S, Siripattanakul S, Kaewpuang P, Sriboonruang P. A Review of Artificial Intelligence (AI) in Education during the Digital Era. 2022;
35. Huang J, Saleh S, Liu Y. A Review on Artificial Intelligence in Education. *Acad J Interdiscip Stud*. 2021;10(3):206. DOI: 10.36941/ajis-2021-0077
36. Antonio RP, Sison LRC. Can Artificial Intelligence (AI) Shape the Future of Teacher Education? Drawing Evidence-Based Insights for Teacher Preparation. *Int J Instr*. 2026;19(1):257–80. DOI: 10.29333/iji.2026.19113a
37. Artificial Intelligence in Higher Education: Challenges and Opportunities. *Bord Crossing*. Transnational Press London; 2022;12(1):1–15.
38. Zhang K, Aslan AB. AI technologies for education: Recent research & future directions. *Comput Educ Artif Intell*. 2021;2:100025. DOI: 10.1016/j.caeai.2021.100025
39. Pesek I, Nosovic N, Krasna M. The Role of AI in the Education and for the Education. In: 2022 11th Mediterranean Conference on Embedded Computing (MECO). Budva, Montenegro: IEEE; 2022. p. 1–4.

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