



Artificial Intelligence in Educational Process Management: A Systematic Review of Approaches, Models, and Emerging Challenges in the Global Education System

Castro Huallpa Yovana^{1*}, Chauca Castro William Agnes², Martinez Casanova Inmaculada soledad Pamela³

¹Cesar Vallejo University, Lima, Peru <https://orcid.org/0009-0000-2458-3659> ccastrohu27@ucvvirtual.edu.pe

² Cesar Vallejo University, Lima, Peru <https://orcid.org/0000-0003-3798-3023> wchauca@ucvvirtual.edu.pe

³ Cesar Vallejo University, Lima, Peru <https://orcid.org/0000-0002-1358-7547> imartinezca@ucvvirtual.edu.pe

*Corresponding author: Email: ccastrohu27@ucvvirtual.edu.pe

Abstract

The objective of this study is to analyze the impact of artificial intelligence on the management of educational processes based on a systematic review of recent scientific literature. The research was conducted using a qualitative approach, specifically a systematic review with a non-experimental design, employing the PRISMA method for study selection. Databases such as Scopus, Web of Science, SciELO, Dialnet, and Google Scholar were consulted, initially identifying more than 300 articles, from which 30 studies published between 2022 and 2025 were selected based on inclusion criteria and scientific quality. The results show that artificial intelligence significantly contributes to the optimization of educational management by facilitating data-driven decision-making, improving institutional planning, and promoting personalized learning through tools such as learning analytics and intelligent tutoring systems. Additionally, benefits in institutional efficiency and educational inclusion are identified. However, challenges related to the digital divide, teacher training, and ethical issues such as data privacy are also acknowledged. It is concluded that artificial intelligence represents a strategic opportunity to strengthen educational quality, provided that its implementation is carried out in an ethical, context-specific manner and oriented toward the holistic development of students.

Keywords: Artificial intelligence, management, learning, analytics, education.

Introduction

The implementation of artificial intelligence (AI) in the educational context has led to a significant transformation in the way educational processes are conceptualized, managed, and evaluated globally. In recent times, AI has undergone a notable transition, evolving from an emerging technology to its consolidation as a strategic component for educational innovation, driving significant transformations in both teaching and institutional management. As various studies indicate, the integration of technology into the educational sphere enables the optimization of decision-making, the automation of administrative tasks, and the improvement of the efficiency of educational systems. This process shapes a new paradigm based on the intensive use of data and intelligent algorithms (Holmes et al., 2022; OECD, 2021).

From a pedagogical perspective, AI has demonstrated high potential for personalizing teaching and learning processes, adapting content, pacing, and strategies to students' individual needs (Fernández, 2023). Based on recent research, it has been shown that systems grounded in Artificial Intelligence (AI) have the capacity to generate personalized recommendations, intelligent tutoring, and real-time feedback. This aspect contributes significantly to meaningful learning and the development of competencies (Nazaretsky et al., 2022; Zawacki-Richter et al., 2019). In this regard, the implementation of artificial intelligence (AI) not only leads to improved academic performance but also fosters the creation of more inclusive and student-centered educational experiences.

In the context of educational process management, AI emerges as an essential component for the modernization of educational systems, as it facilitates the automation of administrative processes, the optimization of resources, and

improvements in academic management. According to Luckin et al. (2022), the use of intelligent systems empowers educational managers to anticipate problems, examine vast amounts of data, and make evidence-based decisions, thereby strengthening strategic planning and the quality of educational services.

In this regard, learning analytics has established itself as one of the most significant contributions of AI in the field of educational management. This phenomenon enables the collection, processing, and analysis of data related to student behavior, with the aim of optimizing teaching and learning processes. According to Siemens and Baker (2012), the implementation of this tool facilitates the early identification of learning difficulties, allowing for timely and personalized interventions. Recent research has highlighted its contribution to optimizing student retention and reducing school dropout rates (Ifenthaler & Yau, 2020).

However, the integration of AI into educational systems poses significant challenges in both structural and pedagogical terms. Among the identified factors are the digital divide, limited technological infrastructure in vulnerable contexts, and insufficient teacher training in advanced digital skills. According to UNESCO (2021), these limitations have the potential to exacerbate educational inequalities if they are not addressed through inclusive public policies that guarantee equitable access to technology and ongoing teacher training.

From an ethical perspective, the implementation of AI in education has sparked extensive debate around issues such as data privacy, algorithm transparency, and potential biases inherent in automated systems. Holmes et al. (2022) note that AI systems can reproduce inequalities if trained with biased data, which could have a negative impact on educational equity. In this regard, there is an urgent need to establish clear regulatory frameworks that guide the responsible use of these technologies, ensuring the unrestricted protection of students' rights.

Recent systematic reviews reveal a growing interest in analyzing AI approaches, models, and applications in the educational context. In this regard, trends such as adaptive learning, intelligent tutoring systems, and generative artificial intelligence stand out. Studies have shown that AI not only acts as a technological tool but also serves as a transformative agent that redefines educational dynamics and fosters the emergence of new models of teaching and management (Zawacki-Richter et al., 2019; Holmes et al., 2022).

In this context, the purpose of this systematic review article is to analyze the emerging approaches, models, and challenges of artificial intelligence in the management of educational processes globally. By reviewing recent scientific literature, we aim to identify the main trends, contributions, and limitations of AI, contributing to the generation of knowledge that guides educational decision-making and the design of public policies focused on innovation, equity, and educational quality in the 21st century.

Theoretical framework

Fundamentals of artificial intelligence in education

Artificial intelligence (AI) is defined as an interdisciplinary field focused on developing systems capable of simulating human cognitive processes—such as learning, decision-making, and problem-solving—through advanced algorithms and computational models. In the educational context, its integration has led to a significant transformation in teaching methods and institutional management by facilitating big data analysis and the automation of complex tasks (Chen et al., 2020). In this regard, Holmes et al. (2022) argue that AI represents not only a technological innovation but also a strategic tool that redefines contemporary educational dynamics, promoting more efficient and adaptive learning environments.

From a closer look at the reality of education, the incorporation of AI involves not only the use of new digital tools but also a shift in how learning and teaching are conceived. Today, teachers have systems that allow them to better understand their students, identify their difficulties, and offer more timely support. This fosters a more personalized education, in which each student can progress at their own pace and according to their needs, which helps create more meaningful and motivating learning experiences (Zawacki-Richter et al., 2019).

Likewise, AI has begun to influence educational management, streamlining tasks that previously demanded significant time and effort, such as assessment, tracking academic performance, or institutional planning. However, beyond the efficiency it provides, its true value lies in the potential to improve educational quality through a more human-centered approach, where technology does not replace the teacher but rather supports them in their pedagogical work. In this scenario, the main challenge is not only to incorporate AI but to do so in a thoughtful and

responsible manner, ensuring that its use contributes to students' holistic development and the strengthening of a more equitable and inclusive education (Holmes et al., 2022).

Management of Educational Processes in Digital Contexts

The management of educational processes encompasses the set of systematic actions aimed at the planning, organization, implementation, and evaluation of teaching-learning processes within educational institutions. In the contemporary context, characterized by digitalization, this management is oriented toward evidence-based models, where decision-making is grounded in data and continuous improvement (OECD, 2021). According to Miao et al. (2021), the integration of emerging technologies, such as artificial intelligence (AI), strengthens educational management by optimizing resource allocation, improving academic planning, and promoting transparency in institutional processes.

From a more practical perspective, modern educational management is shifting away from a focus solely on compliance with administrative procedures and toward the continuous improvement of learning. In this context, the use of data enables administrators and teachers to better understand what is happening in the classroom, identify challenges, and make timely decisions that address students' actual needs. This implies a more dynamic, flexible, and results-oriented approach to management, where information becomes a key resource for improving educational quality.

Likewise, the incorporation of artificial intelligence into educational management opens new possibilities for simplifying processes and optimizing teachers' and institutions' time. Tools such as academic tracking systems, data analytics, and intelligent platforms make it possible to anticipate risks, improve planning, and strengthen pedagogical support. However, their implementation requires a critical and responsible approach, ensuring that these technologies are used as a support for educational improvement and not as an end in themselves, always promoting management centered on the holistic development of students (Miao et al., 2021).

Applications of Artificial Intelligence in Education

The implementation of artificial intelligence (AI) in education has fostered new opportunities for personalizing the learning process and optimizing academic outcomes. In particular, intelligent tutoring systems allow educational content to be adapted to students' individual needs, providing immediate feedback and promoting self-directed learning (Nazaretsky et al., 2022). Furthermore, Zawacki-Richter et al. (2019) note that AI contributes to the development of more flexible and inclusive learning environments, in which students' active participation is encouraged and their digital skills are strengthened.

From a perspective closer to the classroom, these tools allow learning to move away from a one-size-fits-all approach and become a more personalized experience. Each student can progress at their own pace, reinforce content they find most challenging, and receive specific support based on their needs. This not only improves academic performance but also increases motivation and commitment to learning, as students feel supported throughout their educational journey.

Likewise, artificial intelligence expands the possibilities for interaction in educational settings by integrating digital resources that foster active participation and the development of 21st-century skills. However, its incorporation does not replace the teacher's role but rather complements it, allowing teachers to focus on the more human aspects of the educational process, such as guidance, support, and students' socio-emotional development. In this sense, the true value of AI lies in its ability to strengthen teaching and enrich learning experiences, provided its use is relevant and contextualized (Nazaretsky et al., 2022).

Artificial Intelligence Models in Educational Management

Currently, various artificial intelligence (AI) models have been implemented in the management of educational processes, notably intelligent tutoring systems, learning analytics, and educational recommendation systems. These models enable the processing of large volumes of information to identify behavioral patterns, anticipate learning difficulties, and improve institutional decision-making (Zhang & Aslan, 2021). In this sense, the implementation of AI in the educational sphere serves as a facilitator of more efficient, predictive, and student-centered management, contributing to the enhancement of educational service quality.

From a more applied perspective, these models enable educational institutions not only to react to problems but also to anticipate them. For example, through data analysis, it is possible to detect the risk of underperformance or dropout early on, which facilitates the implementation of timely support strategies. In this way, educational

management becomes more strategic and results-oriented, as decisions are based on concrete information and not solely on intuition or prior experience.

Likewise, the incorporation of these systems helps strengthen an institutional culture based on continuous improvement, where the information generated by AI becomes a key input for educational innovation. However, their use requires adequate training for educational stakeholders and a critical understanding of their scope and limitations, in order to ensure that these tools are used ethically and appropriately, always for the benefit of students' learning and holistic development (Zhang & Aslan, 2021).

Theoretical Basis for the Integration of AI in Education

The integration of artificial intelligence (AI) into educational processes is grounded in multiple learning theories that explain the interaction between the learner and the digital environment. From a constructivist perspective, learning is conceived as a dynamic process of knowledge construction, in which technology plays a mediating role that facilitates interaction, reflection, and the development of new skills (Vygotsky, 1978). For its part, connectivism proposes that learning takes place within digital networks, where access to information, the ability to establish connections, and the use of technological tools are fundamental; in this scenario, artificial intelligence helps organize, filter, and enhance available knowledge (Siemens, 2005). These perspectives help us understand the transformative role of AI in contemporary education (Holmes et al., 2022).

From a perspective closer to educational practice, these theories make sense when we observe how students interact with digital environments that allow them to explore, experiment, and construct their own learning. In this context, AI acts as a mediator that guides, suggests, and accompanies the learning process, facilitating more dynamic and meaningful experiences. This reinforces the idea that learning is not a passive process, but an active one, in which the student consciously participates in the construction of their knowledge.

Likewise, these theoretical foundations help us understand that the incorporation of AI involves not only a technological shift but also a pedagogical one. The teacher assumes a more guiding and facilitating role, while the student takes on a greater leading role in their learning. In this sense, AI is integrated as a resource that strengthens interaction, promotes critical thinking, and fosters autonomous learning, provided its use is aligned with sound pedagogical principles and contextualized to the educational reality (Holmes et al., 2022).

Emerging Challenges of Artificial Intelligence in Education

Despite the obvious benefits, the implementation of artificial intelligence (AI) in education faces significant challenges. Among the factors contributing to this situation are the digital divide, insufficient teacher training in digital skills, and limitations in technological infrastructure, especially in vulnerable contexts (UNESCO, 2021). These conditions create inequalities in access to and use of technology, which can limit the positive impact of AI on educational processes. Furthermore, not all institutions have the resources or the necessary support to effectively integrate these tools into their teaching practices.

From a perspective closer to the reality of education, these challenges are reflected in the difficulty many teachers face in incorporating AI into their classes—not due to a lack of interest, but because of the absence of ongoing, context-specific training. This demonstrates that technological innovation, on its own, does not guarantee improvements in education; rather, it must be accompanied by training processes that strengthen teachers' digital and pedagogical competencies. In this sense, teacher training becomes a key element in achieving a relevant and meaningful integration of AI in the classroom.

In the realm of technology ethics, concerns arise regarding data privacy, algorithm transparency, and potential biases in automated systems. These concerns highlight the need to establish clear regulatory frameworks that guide the responsible use of AI in education, ensuring the protection of information and respect for students' rights. According to Porayska-Pomsta et al. (2024), it is essential to promote an ethical and mindful implementation of these technologies, where the focus is not solely on efficiency but also on the well-being and holistic development of users.

Global Trends in Artificial Intelligence Applied to Education

In the current global context, artificial intelligence (AI) is geared toward developing innovative approaches that seek to improve quality and equity in education. Key trends include adaptive learning, generative artificial intelligence, and predictive analytics—tools that are transforming how educational processes are designed, managed, and implemented (OECD, 2021). These technologies enable a more precise response to students' needs, optimizing teaching processes and fostering a more flexible, personalized, and learner-centered education.

From a broader perspective, international organizations such as UNESCO have emphasized the importance of integrating AI into education systems in an ethical and sustainable manner, promoting public policies that guide its responsible use (UNESCO, 2021). In this regard, the challenge lies not only in incorporating these technologies but also in ensuring that their application helps reduce educational gaps, strengthen inclusion, and ensure that all students have access to quality learning opportunities in an increasingly complex digital environment.

Summary of the Theoretical Framework

In summary, artificial intelligence is establishing itself as a key element in the transformation of educational process management by offering tools that enhance decision-making, optimize institutional efficiency, and promote personalized learning. Its impact is evident not only in improved academic outcomes but also in institutions' ability to adapt to the demands of an increasingly dynamic and digitized educational environment.

However, its implementation requires a comprehensive vision that coherently integrates pedagogical, technological, and ethical dimensions, with the aim of ensuring an inclusive, equitable, and quality-oriented education in the contemporary global context. In this regard, the challenge lies not only in incorporating AI, but in ensuring that its use adheres to sound educational principles and contributes to students' holistic development (Holmes et al., 2022; OECD, 2021).

Methodology

This research adopts a qualitative approach aimed at understanding and interpreting the scholarly literature on artificial intelligence in the management of educational processes. This approach allows for an in-depth analysis of theoretical contributions, current trends, and emerging challenges from an interpretive perspective, prioritizing the meaning and contextualization of findings over their quantification (Creswell & Poth, 2018). In this regard, the research seeks to understand how artificial intelligence is transforming educational management based on available scientific evidence.

The study is a systematic literature review, which is characterized by rigorously and systematically identifying, analyzing, and synthesizing scientific studies on a specific topic. This type of research allows for the construction of an up-to-date state of the art, as well as the identification of knowledge gaps and new lines of research regarding artificial intelligence applied to education (Kitchenham & Charters, 2007). To this end, a non-experimental, documentary design was adopted, as the study relied exclusively on secondary sources without manipulation of variables.

The information search was conducted in internationally recognized academic databases, such as Scopus, Web of Science, SciELO, Dialnet, and Google Scholar, with the aim of ensuring the quality and reliability of the sources. Search queries were formulated using Boolean operators, combining keywords such as "artificial intelligence," "education," "educational management," and "learning analytics." This process identified a broad set of documents related to the study topic, ensuring adequate coverage of the research field.

Regarding the selection criteria, scientific articles published between 2020 and 2025 were included, indexed in recognized databases, in Spanish and English, and with access to full text. Likewise, duplicate studies, non-peer-reviewed documents, publications with limited thematic relevance, and those lacking sufficient information for analysis were excluded. This process allowed for the refinement of the information and the selection of only those studies that were relevant and of high quality for the research.

The article selection process was conducted following the phases of the PRISMA model, which includes the identification, screening, eligibility, and inclusion of studies. In the first stage, approximately 320 documents were identified, which were then subjected to a review and filtering process. After eliminating duplicates and applying the established criteria, 40 articles were finally selected for detailed analysis, ensuring the rigor and transparency of the process (Page et al., 2021).

The technique used for data collection was documentary analysis, which allowed for the examination, classification, and systematization of the information contained in the selected studies. To this end, a documentary matrix was used as a recording tool, in which relevant data such as author, year, objective, methodology, main results, and conclusions were recorded. This procedure facilitated the organization of the information and allowed for a structured review of the scientific evidence.

The analysis of the information was carried out through a process of thematic categorization, which allowed for the identification of patterns, trends, and relationships among the reviewed studies. Categories such as artificial intelligence approaches in education, applied models, benefits, and emerging challenges were established, allowing for a coherent interpretation of the results. Additionally, scientific rigor criteria such as credibility, transferability, dispensability, and confirmability were considered, ensuring the validity and consistency of the findings (Flick, 2018).

Table 1 Categorization Matrix

Category	Subcategory	Indicators	Technique	Tool
Artificial Intelligence in Education	Conceptualization of AI	Definitions, theoretical approaches, evolution of AI	Literature review	Literature matrix
	Types of Applied AI	Generative AI, machine learning, intelligent systems	Document analysis	Record form
	Role of AI in education	Technological mediation, pedagogical support, innovation	Literature review	Categorical matrix
Management of educational processes	Educational planning	Use of AI in curriculum planning	Document analysis	Document matrix
	Process execution	Implementation of AI tools in the classroom	Document analysis	Analysis sheet
	Educational assessment	Automated assessment, learning analytics	Document analysis	Categorical matrix
AI Models in Education	Intelligent tutoring systems (ITS)	Personalized learning, feedback	Literature review	Record form
	Learning Analytics	Data analysis, performance prediction	Document analysis	Document matrix
	Recommendation systems	Content suggestions, learning paths	Document analysis	Categorical matrix
Benefits of AI in education	Improved learning	Personalized learning, academic performance	Literature review	Analysis sheet
	Institutional efficiency	Process optimization, decision-making	Document analysis	Document matrix
	Educational Inclusion	Attention to diversity, accessibility	Document analysis	Categorical matrix
Challenges of AI in education	Digital divide	Unequal access to technology	Literature review	Record form
	Teacher training	Digital skills, training	Document analysis	Document matrix
	Technology infrastructure	Technological resources, connectivity	Document analysis	Categorical matrix

Ethical dimension of AI	Data privacy	Protection of student information	Literature review	Analysis sheet
	Algorithmic biases	Discrimination, Inequality	Documentary analysis	Document matrix
	Regulation and policies	Regulations, responsible use	Documentary analysis	Categorical matrix
Emerging trends	Generative AI	Production of educational content	Document analysis	Registration form
	Adaptive learning	Automated personalization	Document analysis	Document matrix
	Digital education	Educational transformation, innovation	Document analysis	Categorical matrix

The categorization of the analysis was structured based on a systematic review of the scientific literature, allowing for the identification of six main categories: artificial intelligence in education, management of educational processes, artificial intelligence models, benefits, challenges, and ethical dimensions. Each of these categories was broken down into subcategories and indicators that facilitated the organization, interpretation, and analysis of the collected information.

In this process, the technique employed was document analysis, which allowed for a detailed examination of the contents of the selected articles. Document matrices, record sheets, and categorical matrices were used as tools, enabling the information to be systematized in an orderly and coherent manner. Likewise, this categorization allowed us to identify patterns, trends, and relationships among the analyzed studies, contributing to a comprehensive understanding of the impact of artificial intelligence on the management of educational processes.

Table 2. Author, year, title, category, contribution of the study, and URL of the selected research

No.	Author(s)	Year	Article title	Database	DOI / Link
1	Ayala Sánchez, W.	2025	Use of Artificial Intelligence in Education: Systematic Review	Scopus/Dialnet	https://doi.org/10.70747/cr.v4i4.564 (cienciayreflexion.org)
2	Dextre Pimentel, E. et al.	2025	The Contribution of AI to Educational Competencies	WoS/Scopus	https://doi.org/10.59659/revistatribunal.v5i11.183 (Tribunal Journal)
3	Trujillo, B.	2025	Challenges of Artificial Intelligence in Education	Scopus	https://revistahorizontes.org/index.php/revistahorizontes/article/view/2226 (Horizontes)
4	Córdova Bernuy, V. et al.	2025	Integration of AI into university policies	Scopus	https://doi.org/10.59659/impulso.v5i11.147 (Impulso Journal)
5	Santana, M. et al.	2025	Implementation of AI in higher education	Scopus	https://doi.org/10.56712/latam.v5i6.3249 (ojs.docentes20.com)
6	Cepeda, E. et al.	2025	Uses and Perspectives of AI in Teaching	Dialnet	https://doi.org/10.37785/nw.v9n1.a9 (ojs.docentes20.com)

7	Martínez-Márquez, M.	2025	Artificial Intelligence and Education	SciELO	https://ve.scielo.org/scielo.php?pid=S2665-02662025000100245 (SciELO)
8	Estévez, B. & Sánchez, F.	2024	AI in higher education with a gender focus	Scopus	https://doi.org/10.52712/issn.1850-0013-557 (ojs.docentes20.com)
9	Martín Gómez, S.	2024	Efficient Use of AI in Higher Education	Scopus	https://doi.org/10.31637/epsir-2024-728 (ojs.docentes20.com)
10	Rondon, R. et al.	2024	Impact of AI on Teacher Education	Scopus	https://doi.org/10.37843/rted.v17i2.566 (ojs.docentes20.com)
11	Delgado, N. et al.	2024	Benefits and Limitations of AI in Education	Scopus	https://doi.org/10.6018/reifop.577211 (cienciayreflexion.org)
12	García-Peñalvo, F. et al.	2024	Generative AI in education	Scopus	https://doi.org/10.5944/ried.27.1.37716 (cienciayreflexion.org)
13	Morales, L.	2024	Use of AI in education as a strategy	Scopus	https://doi.org/10.56712/latam.v5i5.2750 (cienciayreflexion.org)
14	Prince-Torres, A.	2024	AI and the right to education	Scopus	https://doi.org/10.32541/recie.2024.v8i1.pp1-20 (cienciayreflexion.org)
15	Salas, M. & Porras, J.	2024	Ethical Use of AI in Education	Scopus	https://doi.org/10.22458/ie.v26i41.4952 (cienciayreflexion.org)
16	Sánchez-Vera, M.	2024	AI as a teaching resource	Scopus	https://doi.org/10.5565/rev/educar.1810 (cienciayreflexion.org)
17	Arango Pérez, R. et al.	2024	Ethical Implications of AI in Education	Scopus	https://doi.org/10.1344/der.2024.45.29-36 (cienciayreflexion.org)
18	Azambuja, C. & Ferreira, G.	2024	Challenges of AI in Education	Scopus	https://doi.org/10.4013/fsu.2024.251.07 (cienciayreflexion.org)
19	Tapullima-Mori, C. et al.	2024	AI in higher education: bibliometric review	Scopus/WoS	https://doi.org/10.15359/ree.28-S.18489 (ResearchGate)
20	Flores-Vivar, J. & García-Peñalvo	2023	Ethics of AI in education	Scopus	https://doi.org/10.3916/C74-2023-03 (cienciayreflexion.org)
21	Kehoe, F.	2023	Generative AI in instructional planning	Scopus	https://doi.org/10.22554/ijtel.v7i2.124 (cienciayreflexion.org)
22	Montiel-Ruiz, F.	2023	AI as a teaching resource in rural schools	Dialnet	https://doi.org/10.6018/riite.592031 (cienciayreflexion.org)
23	Vera, F.	2023	AI in higher education: challenges	Scopus	https://n9.cl/z65af (ojs.docentes20.com)
24	Vera, P. et al.	2023	AI in Higher Education: A Transformative Approach	Scopus	https://doi.org/10.23857/pc.v8i11.6193 (ojs.docentes20.com)
25	Ortega, M. et al.	2023	AI and academic performance	Scopus	https://doi.org/10.53287/mzkv9068uw14f (ojs.docentes20.com)
26	Siemens, G.	2022	Connectivism and Digital Learning	Scopus	http://www.itdl.org/Journal/Jan_05/article01.htm
27	Celik, I. et al.	2022	Promises and Challenges of AI for Educators	WoS	https://doi.org/10.1007/s11528-022-00715-y (cienciayreflexion.org)

28	Area, M. et al.	2022	Digital Transformation of Teaching	Scopus	https://revistaseug.ugr.es/index.php/profesorado/article/view/25560 (Impulso Journal)
29	Herrera, M.	2022	Public Policies and AI in Education	Scopus	https://journals.openedition.org/ctd/6611 (Impulso Journal)
30	Maksimova, A.	2022	AI and tutoring systems in education	Scopus	https://arxiv.org/abs/2208.13630

Discussion

The results of this systematic review show that artificial intelligence (AI) is establishing itself as a transformative force in the management of educational processes by promoting data-driven decision-making and the optimization of institutional resources. In this vein, Chen et al. (2020) note that AI enables the analysis of large volumes of educational data, facilitating more efficient and accurate processes. Likewise, Holmes et al. (2022) argue that its incorporation redefines contemporary educational dynamics, promoting more adaptive and student-centered environments, which aligns with the findings of this study.

With regard to personalized learning, the studies reviewed highlight the role of intelligent tutoring systems and learning analytics as key tools for addressing students' individual needs. Nazaretsky et al. (2022) demonstrate that these systems enable the provision of immediate and adaptive feedback, significantly improving academic performance. Similarly, Zawacki-Richter et al. (2019) emphasize that AI helps create more flexible and inclusive educational environments, reinforcing the importance of its implementation in diverse educational contexts. On the other hand, artificial intelligence models applied to educational management, such as predictive analytics and recommendation systems, have proven to be effective tools for anticipating learning difficulties and reducing school dropout rates. Zhang and Aslan (2021) indicate that these models enable the identification of student behavior patterns and improve institutional decision-making. Similarly, Ifenthaler and Yau (2020) highlight that the use of learning analytics helps strengthen student retention and optimize pedagogical support processes.

However, the literature also highlights significant challenges in implementing AI in education. Among these, the digital divide and limited teacher training in digital skills remain significant barriers. UNESCO (2021) warns that these inequalities may deepen if inclusive policies are not developed to ensure equitable access to technology. In this regard, Celik et al. (2022) note that teacher preparation is a determining factor for the effective use of AI in the classroom.

In the ethical realm, the reviewed studies agree on the need to address issues related to data privacy, algorithm transparency, and potential biases in automated systems. Porayska-Pomsta et al. (2024) emphasize that the use of AI must be guided by ethical principles that ensure equity and the protection of students' rights. Similarly, Flores-Vivar and García-Peñalvo (2023) highlight the importance of developing regulatory frameworks to guide the responsible use of these technologies in education.

Current trends indicate that artificial intelligence will continue to play a key role in the transformation of education systems globally. The OECD (2021) notes that the development of technologies such as generative AI and adaptive learning is redefining traditional educational models. In line with this, Miao et al. (2021) argue that the integration of AI, when carried out in an ethical and planned manner, can significantly contribute to improving educational quality and promoting more inclusive and sustainable systems.

Conclusions

First, the systematic review shows that artificial intelligence is establishing itself as a key element in the transformation of educational process management by facilitating data-driven decision-making, optimizing institutional resources, and improving the efficiency of educational organizations (Chen et al., 2020; Holmes et al., 2022). Its incorporation enables progress toward more dynamic, strategic management models focused on achieving meaningful learning, in line with the demands of the contemporary educational context (OECD, 2021).

Second, it is concluded that artificial intelligence significantly promotes the personalization of learning, allowing for the adaptation of content, pacing, and pedagogical strategies to students' individual characteristics. Tools such as intelligent tutoring systems and learning analytics contribute to improving academic performance and strengthening student autonomy (Nazaretsky et al., 2022). Likewise, these approaches promote more inclusive and flexible educational environments centered on student needs (Zawacki-Richter et al., 2019).

Third, artificial intelligence models applied to educational management have demonstrated their ability to anticipate learning difficulties and improve pedagogical support processes. Predictive analytics and recommendation systems enable the identification of behavioral patterns and facilitate evidence-based institutional decision-making (Zhang & Aslan, 2021). Along these same lines, the use of educational data helps strengthen student retention and optimize academic planning (Ifenthaler & Yau, 2020).

Fourth, significant challenges have been identified in the implementation of artificial intelligence in education, notably the digital divide, limitations in technological infrastructure, and insufficient teacher training in digital skills. These factors limit the effective use of AI and require the implementation of public policies that guarantee equitable access to technology (UNESCO, 2021). Likewise, teacher training is positioned as a fundamental element for achieving the effective integration of these tools (Celik et al., 2022).

Fifth, the importance of addressing the ethical dimension of AI use is recognized, considering aspects such as data privacy, algorithm transparency, and bias mitigation. Various studies highlight the need to establish regulatory frameworks that guide the responsible use of AI in education (Porayska-Pomsta et al., 2024). In this regard, the ethical approach becomes an essential component for ensuring equity and the protection of students' rights (Flores-Vivar & García-Peñalvo, 2023).

It is concluded that artificial intelligence represents a strategic opportunity for educational innovation, provided that its integration is carried out in a planned, contextualized manner and with a humanistic approach. International organizations emphasize that the appropriate use of AI can significantly contribute to improving educational quality and promoting more inclusive and sustainable systems (OECD, 2021; Miao et al., 2021). In this regard, its implementation should be geared toward strengthening learning and the holistic development of students within the framework of 21st-century education.

References

1. Arango Pérez, R., García, L., & López, M. (2024). Ethical implications of artificial intelligence in contemporary education. *Law and Reality*, 45, 29–36. <https://doi.org/10.1344/der.2024.45.29-36>
2. Area, M., Bethencourt-Aguilar, A., & Martín-Gómez, S. (2022). The digital transformation of university teaching: A systematic review. *Profesorado. Journal of Curriculum and Teacher Education*, 26(3), 13–35. <https://revistaseug.ugr.es/index.php/profesorado/article/view/25560>
3. <https://revistaseug.ugr.es/index.php/profesorado/article/view/25560>
4. Artificial Intelligence in Education: Challenges and Opportunities. *Comunicar*, 31(74), 25–34. <https://doi.org/10.3916/C74-2023-03>
5. Ayala Sánchez, W. (2025). The use of artificial intelligence in education: A systematic review. *Science and Reflection*, 4(4). <https://doi.org/10.70747/cr.v4i4.564>
6. Azambuja, C., & Ferreira, G. (2024). Challenges of artificial intelligence in the educational field. *Fronteiras: Journal of Social, Technological and Environmental Science*, 25(1). <https://doi.org/10.4013/fsu.2024.251.07>
7. Celik, I., Dindar, M., Muukkonen, H., & Järvelä, S. (2022). The promises and challenges of artificial intelligence for teachers: A systematic review. *TechTrends*, 66, 616–630. <https://doi.org/10.1007/s11528-022-00715-y>
8. 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>
9. Córdova Bernuy, V., Rojas, P., & Medina, J. (2025). Integrating artificial intelligence into university education policies. *Revista Impulso*, 5(11). <https://revistaimpulso.org/index.php/impulso/article/view/637>
10. Delgado, N., Torres, F., & Ramírez, J. (2024). Benefits and limitations of artificial intelligence in education. *Interuniversity Electronic Journal of Teacher Education*, 27(2). <https://doi.org/10.6018/reifop.577211>
11. Dextre Pimentel, E., Quispe, A., & Salazar, M. (2025). The contribution of artificial intelligence to the development of educational competencies. *Tribunal Journal*, 5(11). <https://revistatribunal.org/index.php/tribunal/article/view/514>
12. Estévez, B., & Sánchez, F. (2024). Artificial intelligence in higher education with a gender perspective. *Revista Educativa*, 18(2). <https://doi.org/10.52712/issn.1850-0013-557>
13. García-Peñalvo, F. J., Corell, A., Abella-García, V., & Grande, M. (2024). Generative artificial intelligence in education: Challenges and opportunities. *RIED. Ibero-American Journal of Distance Education*, 27(1), 9–28. <https://doi.org/10.5944/ried.27.1.37716>
14. Herrera, M. (2022). Public policies and artificial intelligence in education. *Communication and Digital Technologies*. <https://journals.openedition.org/ctd/6611>

15. Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542–570. <https://doi.org/10.1111/ejed.12533>
16. Holmes, W., Bialik, M., & Fadel, C. (2023). *Artificial intelligence in education*. Globethics Publications.
17. https://www.researchgate.net/publication/369288544_Artificial_intelligence_in_education
18. Kehoe, F. (2023). Artificial intelligence and lesson planning: Transforming teaching practices. *International Journal of Technology in Education and Learning*, 7(2). <https://doi.org/10.22554/ijtel.v7i2.124>
19. Maksimova, A. (2022). Artificial intelligence and intelligent tutoring systems in education. arXiv. <https://arxiv.org/abs/2208.13630>
20. Martín Gómez, S. (2024). Efficient use of artificial intelligence in higher education. *European Public & Social Innovation Review*. <https://doi.org/10.31637/epsir-2024-728>
21. Martínez-Márquez, M. (2025). Artificial intelligence and education: New learning scenarios. *Latin American Journal of Education*. <https://ve.scielo.org/scielo.php?pid=S2665-02662025000100245>
22. Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI and education: Guidance for policymakers*. UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
23. Montiel-Ruiz, F. (2023). Artificial intelligence as a teaching resource in rural contexts. *Interuniversity Journal of Educational Technology Research*. <https://doi.org/10.6018/riite.592031>
24. Morales, L. (2024). The use of artificial intelligence as a strategy in education. *LATAM Latin American Journal of Social Sciences*. <https://doi.org/10.56712/latam.v5i5.2750>
25. Nazaretsky, T., Ariely, M., Cukurova, M., & Alexandron, G. (2022). Teachers' trust in AI-powered educational technology and a professional development program to improve it. *British Journal of Educational Technology*, 53(4), 914–931. <https://doi.org/10.1111/bjet.13232>
26. OECD. (2021). *OECD Digital Education Outlook 2021*. OECD Publishing. <https://doi.org/10.1787/589b283f-en>
27. Organisation for Economic Co-operation and Development (OECD). (2021). *OECD Digital Education Outlook 2021: Pushing the Frontiers with Artificial Intelligence, Blockchain, and Robots*. OECD Publishing. <https://doi.org/10.1787/589b283f-en>
28. Ortega, M., Pérez, J., & Ríos, A. (2023). Artificial Intelligence and Academic Performance in University Students. *Polo del Conocimiento*, 8(11). <https://doi.org/10.23857/pc.v8i11.6193>
29. Porayska-Pomsta, K., Holmes, W., & Nemorin, S. (2024). The ethics of AI in education. <https://arxiv.org/abs/2406.11842>
30. Prince-Torres, A. (2024). Artificial Intelligence and the Right to Education. *Scientific Journal of Education*. <https://doi.org/10.32541/recie.2024.v8i1.pp1-20>
31. Rondon, R., Salinas, E., & Cruz, D. (2024). Impact of artificial intelligence on teacher training. *Educational Technology Journal*, 17(2). <https://doi.org/10.37843/rted.v17i2.566>
32. Salas, M., & Porras, J. (2024). Ethical use of artificial intelligence in education. *Educational Innovations*, 26(41). <https://doi.org/10.22458/ie.v26i41.4952>
33. Sánchez-Vera, M. (2024). Artificial intelligence as a teaching resource in education. *Educar*, 60(1). <https://doi.org/10.5565/rev/educar.1810>
34. Santana, M., López, R., & Díaz, C. (2025). Implementation of artificial intelligence in higher education. *Revista Docentes 2.0*. <https://ojs.docentes20.com/index.php/revista-docentes20/article/view/721>
35. Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3–10. http://www.itdl.org/Journal/Jan_05/article01.htm
36. Tapullima-Mori, C., García, J., & Pérez, L. (2024). Artificial intelligence in higher education: A bibliometric review in Scopus and WoS. *Revista Educación*, 28(S). <https://doi.org/10.15359/ree.28-S.18489>
37. Tiefenthaler, D., & Yau, J. Y.-K. (2020). Utilizing learning analytics for study success: Reflections on current empirical findings. *Research and Practice in Technology Enhanced Learning*, 15(1), 1–17. <https://doi.org/10.1186/s41039-020-00126-8>
38. Trujillo, B. (2025). Challenges of artificial intelligence in education. *Horizontes Educativos*. <https://revistahorizontes.org/index.php/revistahorizontes/article/view/2226>
39. UNESCO. (2021). *Artificial intelligence in education*. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
40. Vera, F. (2023). Artificial Intelligence in Higher Education: New Challenges. *Multidisciplinary Scientific Journal*. <https://n9.cl/z65af>
41. Vera, P., Gómez, A., & Ruiz, M. (2023). Artificial intelligence in higher education: A transformative approach. *Knowledge Hub*, 8(11). <https://doi.org/10.23857/pc.v8i11.6193>
42. Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>
43. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16(39). <https://dialnet.unirioja.es/servlet/articulo?codigo=7288782>

44. Zhang, K., & Aslan, A. B. (2021). AI technologies for education. *Computers and Education: Artificial Intelligence*, 2, 100025. <https://doi.org/10.1016/j.caeai.2021.100025>
45. Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research and future directions. *Computers and Education: Artificial Intelligence*, 2, 100025. <https://www.mundoia.com.ar/wp-content/uploads/2025/02/2021-AI-technologies-for-education-Recent-research-future-directions-.pdf>
46. Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research and future directions. *Computers and Education: Artificial Intelligence*, 2, 100025. <https://doi.org/10.1016/j.caeai.2021.100025>