Trends and Challenges of Artificial Intelligence in Higher Education: A Systematic Review

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Abstract– This systematic review analyzes the impact, trends, and challenges of AI adoption in higher education, following the PRISMA framework with a mixed-methods approach. A comprehensive search of Scopus and Web of Science (2019-2024) identified key AI applications, including personalized learning, automation, and learning analytics. The results show a growing interest in AI-driven education, with intelligent tutoring systems, chatbots, and adaptive learning platforms improving teaching efficiency and student engagement. Regional differences highlight Asia's focus on data analytics and Latin America's emphasis on digital literacy. Despite the benefits of accessibility, personalization, and administrative efficiency, challenges remain, including algorithmic bias, transparency, and ethical concerns. The study concludes that AI is reshaping education but requires responsible implementation to maximize its benefits while ensuring equity and ethical integrity.

Keywords– Artificial Intelligence (AI), Higher Education, Personalized Learning, Ethical Challenges, Learning Analytics.

I. INTRODUCTION

Artificial Intelligence (AI) has revolutionized several sectors, including higher education. Its adoption in academic institutions has made it possible to streamline teaching and learning processes, transform faculty-student interactions, and improve the management, analysis, and processing of large amounts of educational data [1]. Over the past decade, the increasing accessibility of AI-based tools has enabled researchers to more effectively analyze student performance, personalize learning experiences, and streamline administrative tasks, reinforcing the strategic value of AI in education [2, 3]. However, despite these advances, significant methodological and ethical challenges remain, such as algorithmic bias and lack of transparency, which require thorough analysis to effectively mitigate.

AI applications in higher education include personalized learning, intelligent tutoring, and automated assessment that optimize the educational experience for students and educators. AI-based systems support adaptive learning and research and provide detailed analysis of academic performance to help educators make informed pedagogical decisions [5, 6]. In addition, AI encompasses a wide range of tools, such as intelligent tutoring systems, sentiment analysis in student assessments, and academic library management, that use machine learning, natural language processing, and neural networks to improve teaching effectiveness and student engagement [7].

Key areas of AI-driven education include learning analytics (LA), educational data mining (EDM), and intelligent tutoring systems (ITS), which use AI to identify learning patterns and tailor content to students' individual needs. These innovations enhance personalized learning approaches and contribute to improved academic performance [1]. AI also automates administrative processes and improves assessment systems, allowing educators to spend more time on innovative and effective pedagogical strategies [8].

An important development in the use of AI is the development of adaptive education, in which advanced algorithms adjust the pace and content of learning according to a student's progress. This enhances personalized learning, ensures that students receive specific support, and promotes their academic development. AI also promotes inclusive and flexible education and enables institutions to efficiently manage large amounts of data, improving academic services and institutional decision-making.

The development of AI in education has led to innovative technologies that are transforming both teaching and administrative management. Recent studies highlight the growing use of neural network models in academic applications, particularly in natural language processing and large-scale data analysis, and emphasize the need for interdisciplinary approaches to harness the full potential of AI [10, 11, 12]. However, studies also highlight the risks of algorithmic bias in AI-assisted evaluations and call for greater transparency and ethical oversight [13].

Several recent studies have examined the impact of AI on education from methodological and ethical perspectives. For example, [14] conducted a systematic review that identified both the benefits and challenges of AI in academic research, emphasizing the importance of human oversight to prevent problems such as plagiarism and the generation of inauthentic content. Similarly, [15] examined the risks of over-reliance on AI in education, particularly in assessment, and advocated for a re-evaluation of teaching methods to ensure ethical and authentic learning in a rapidly evolving technological landscape.

In addition to these challenges, AI plays a critical role in the development of intercultural and ethical competencies through online educational platforms. A study by [16] highlighted the need to train students and educators in AI literacy to ensure the responsible and ethical use of this technology in education. In addition, faculty perceptions of AI remain an important factor in its adoption; studies such as [5] have highlighted risk perceptions and performance expectations as key determinants of AI integration in higher education.

Despite these advances, there are still significant gaps in the optimization of AI tools to improve academic outcomes in

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an equitable and responsible manner. Many studies do not provide a comprehensive analysis of the ethical and methodological implications of AI or its long-term impact on the development of student and faculty competencies [17]. In addition, existing research lacks a comprehensive assessment of the adaptability of AI in diverse cultural and academic contexts [18, 19].

This study aims to address these gaps by conducting a systematic review of AI applications in higher education. Therefore, the goal is to determine the impact, trends, and challenges of AI adoption in higher education and to identify its benefits and variations across geographic and cultural contexts.

II. METHODOLOGY

This systematic review is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, which is widely used to conduct rigorous and structured analyses in academic research. This methodology ensures that the process of selecting and analyzing literature on the impact and applications of artificial intelligence (AI) in education is thorough, transparent, and reproducible. This approach allows for a detailed exploration of AI tools, their specific benefits for teachers and students, and the challenges posed by their implementation in educational contexts. The PRISMA methodology is widely accepted and provides a transparent structure for the collection, selection and analysis of literature [20].

The research follows a mixed design, integrating elements of qualitative and quantitative analysis with a descriptive approach that facilitates the understanding of trends in AI and its applications in education [21], [22]. This design is ideal for understanding not only trends in the adoption of AI in academic research, but also the perceptions and concrete benefits for educational stakeholders. This work will be developed in several stages, carefully organized to achieve the selection of articles that contribute quality and relevance to the researched topic [1], [21].

A. Formulation of research questions

The process began with the formulation of five key research questions to structure and guide systematic review. These questions focus on fundamental aspects of AI integration in education and are as follows

What are the trends in the number of publications on the use of AI in education between 2019 and 2024?

This question aims to analyze the frequency and growth of research on AI in education in recent years, reflecting the interest and evolution of the topic within the scientific community.

What are the main benefits perceived by teachers and students of integrating AI tools in education?

The aim is to identify the specific benefits that teachers and students perceive from using AI tools, such as personalization of learning and efficiency in educational management tasks.

Which AI tools have been used most by faculty and students for academic research in recent years?

This question examines which applications of artificial intelligence are most used in education, from intelligent tutoring systems to personalized learning platforms.

How does the use of AI in education vary by geographic and cultural context?

This question aims to identify differences in the implementation of AI by regional and cultural factors, helping to understand the context in which this technology is accepted.

What are the areas of greatest interest in AI research in education according to systematic review literature?

This question identifies the priority topics in current AI research in education, such as learning analytics, personalized instruction, and ethical implications.

B. Literature search strategy

A comprehensive search of the Scopus and Web of Science databases, selected for their global coverage and relevance to the field, was conducted to gather relevant literature. The search terms used were carefully chosen to ensure that the articles retrieved were relevant to the topic of the study. Boolean combinations of terms were used, such as:

— "Artificial intelligence" AND "academic research".
— "Artificial intelligence" AND "academic researchers" AND "tools" AND "benefits".
— "Artificial intelligence" AND "university" AND "faculty" AND "students" AND "research".

These Boolean combinations ensured a precise retrieval of relevant literature [10].

A publication period of five years, from 2019 to 2024, was set to reflect the recent upsurge of AI in academic research, in line with other recent systematic studies [12]. The search was restricted to peer-reviewed and open access articles to ensure inclusion of high quality, accessible studies.

C. Inclusion and exclusion criteria

Specific inclusion and exclusion criteria were defined to validate the relevance and quality of the selected studies. The inclusion criteria were

Type of study: Original articles and primary studies focusing on the use of AI in the educational context were selected.

Source: Publications indexed in Scopus and Web of Science to ensure a standard of quality.

Language: Only articles in English and Spanish with open access to the full text were included.

Thematic relevance: Studies that directly address the impact of AI on academic research, with applications for teachers and students, included [14], [21].

The exclusion criteria, on the other hand, allowed the exclusion of studies that did not directly contribute to the objectives of this review:

Articles outside the 2019-2024 publication period.

Studies that did not specifically address the use of AI in education.

Documents that were not available in full or required a subscription.

Other types of publications such as essays, monographs, dissertations, opinion pieces, etc.

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D. Article Selection

Figure 1 illustrates how advanced database filters were used to identify and organize articles that met the defined criteria. A preliminary analysis of titles and abstracts excluded studies that were not relevant to the objectives of this review. At this initial stage, 1,776 articles were identified, 968 from the Scopus database and 808 from the Web of Science. After applying the inclusion and exclusion criteria, a final selection of 43 articles was made: 21 from Scopus and 22 from Web of Science. The articles were organized and classified, duplicates were removed, and those that did not meet the objectives of the review were discarded.
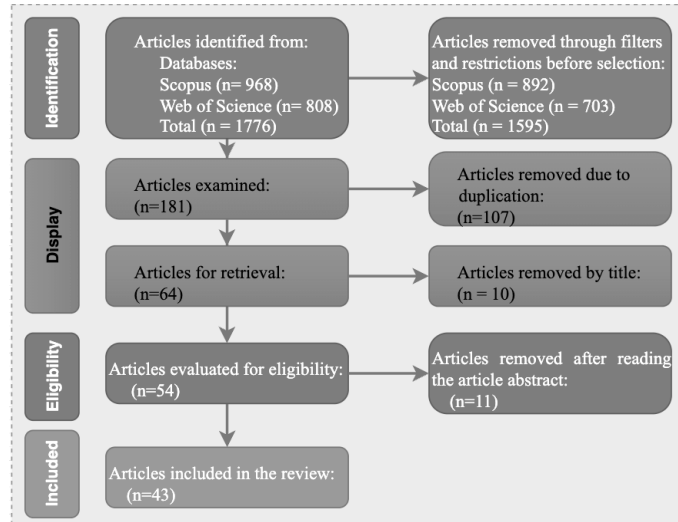

Fig. 1 PRISMA Flow Diagram for the Review.
Source: Own elaboration.

E. Coding and content analysis

The selected articles were organized and coded to facilitate comparative analysis. Coding criteria included: year of publication, author, title, language, country of origin, methodological design, sample, and key findings. Systematic coding allowed for the extraction of common patterns and facilitated comparison across studies, contributing to a better understanding of AI applications and their impact on education.

Specialized software tools for organizing qualitative and quantitative data were used to process and code the data, allowing for efficient and accurate analysis [2], [7], which facilitated the identification of recurring themes and patterns. This tool also made it possible to categorize the studies according to the benefits of AI in education, the most popular AI tools, and the challenges identified.

F. Study quality assessment

The included articles underwent a rigorous assessment based on the PRISMA principles, which ensure the methodological quality and relevance of each study. This process included a review of the research methods, the clarity of the presentation of results and the adherence to ethical standards in the reviewed studies [20]. The methodology used in each study was examined to confirm its robustness and appropriateness, which is crucial for the validity of the results in systematic reviews [23].

G. Synthesis and analysis of results

Finally, the data obtained from the literature were synthesized and organized according to the original research questions. The synthesis of results was presented in graphs and tables to facilitate visualization of trends and comparison of findings. Data visualization tools such as Excel were used to create graphical representations showing the evolution of publications, the perceived benefits of AI, the most used AI tools, and the variations in their use according to geographic and cultural context. The use of graphs helped to highlight trends in literature and the impact of AI on academic research from an innovative and visually accessible perspective [1], [24].

Several technological tools were used to facilitate the review process and ensure data integrity:

Reference managers such as Mendeley, where all citations and references were imported from databases such as Scopus and the Web of Science. Qualitative analysis software such as Python, using libraries such as Pandas for data organization and NLTK or spaCy for text analysis, including the identification of keywords or recurring phrases related to AI and education, is used for coding and content analysis. Data visualization tools such as Microsoft Excel are used to create graphs and comparison tables. In addition, Draw.io was used to create the PRISMA diagrams.

This study, based on a systematic literature review, involved the collection of primary data. Therefore, the ethical principles focused on ensuring a faithful and rigorous representation of the findings of other authors, respecting academic integrity, and properly citing each source used.

III. RESULTS AND DISCUSSIONS

The literature review suggests that the use of AI in education is in a phase of expansion and consolidation, driven by perceived benefits and interest in personalizing and optimizing learning. However, significant challenges are also identified, such as the need to address ethical and cultural issues to ensure equitable and effective use of these tools. While there are differences in AI adoption across geographic and cultural contexts, AI holds transformative potential for higher education.

In terms of the most used tools, the preference for tutoring systems and adaptive learning platforms reflects an interest in enhancing personalized educational experiences. However, both faculty and students still face barriers to fully integrating these technologies, such as lack of training and resistance to change in certain regions [12].

The discussion also highlights the importance of conducting additional studies to better understand the long-term implications of AI in education, as well as developing ethical approaches and inclusive methodologies that can adapt to different cultural contexts. This review provides a solid foundation for future research and highlights the importance of continuing to explore and optimize the use of AI in education to maximize its benefits and minimize its risks.

First, question P1 was addressed: What is the trend in the number of publications on the use of AI in education between 2019 and 2024? The frequency of publication of articles on the

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impact of AI in education between 2019 and 2024 was examined. The results show a notable increase in recent years, with a total of 43 articles published between 2019 and 2024. As shown in Figure 2, this upward trend demonstrates the growing interest of the academic community in exploring the potential of artificial intelligence in education.

Figure 2 illustrates the evolution of publications on artificial intelligence in academic research, showing an upward trend in both bibliographic indexes, Scopus and WoS, between 2019 and 2024. The results show a steady increase in the number of articles indexed in Scopus, peaking in 2024 with 12 publications. Similarly, WoS shows progressive growth, reaching a notable peak in 2024 with 11 publications. This trend highlights not only the consolidation of interest in Artificial Intelligence as a research topic, but also its adoption across different academic disciplines.

Moreover, the difference in the annual trends between the two databases suggests differences in the editorial focus and research areas prioritized by each index. This simultaneous and sustained growth can be attributed to the proliferation of disruptive applications of artificial intelligence in educational contexts, as well as its ability to personalize learning and improve administrative efficiency in academic institutions. In this sense, the convergence in the number of publications in 2024 reflects a growing global consensus on the importance of researching and adopting these technologies in higher education. As such, this trend represents fertile ground for future interdisciplinary investigations that explore both the benefits and the ethical and social challenges of artificial intelligence in academia.
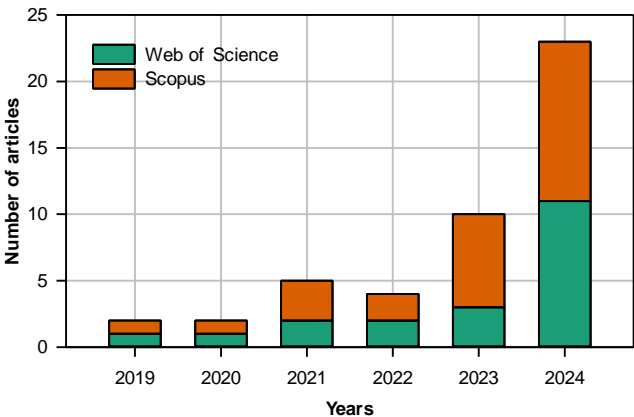

Fig. 2 PRISMA Flow Diagram for the Review.
Source: Own elaboration.

In response to research question P2, "What are the main benefits perceived by faculty and students of integrating artificial intelligence tools into education? The results indicate that emerging technologies, particularly artificial intelligence (AI), have positively transformed educational processes by enhancing both teaching and learning. This impact is particularly significant in an academic context where personalization and administrative efficiency are critical to meeting the needs of both students and educators.

Table 1 presents a synthesis of the benefits identified in the reviewed studies, highlighting the scope of AI tools in several key areas. For example, personalized learning emerges as a significant benefit, allowing content and pace to be tailored to the individual needs of students [10]. This personalized approach promotes an inclusive and flexible educational experience.

TABLE I
BENEFITS OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

Benefit	Concept	Authors
Personalization of Learning	Adaptation of content and learning pace according to individual needs.	[10]
Reduction of Administrative Burden	Decrease in time spent on administrative tasks, allowing more focus on teaching.	[2]
Improvement in Assessment and Feedback	Use of AI to provide personalized and timely feedback to students.	[25]
Accessibility to Educational Resources	It facilitates access to learning materials and online tools, eliminating geographical barriers. Digital literacy varied significantly across academic programs and gender.	[1], [26]
Support in Early Identification of At-Risk Students	Use of predictive analytics to identify and support students at higher risk of dropout.	[9]
Promotion of Digital Competencies	Development of technological and digital skills using AI tools.	[27]
Automation of Educational Processes	Automation of repetitive tasks and support processes in teaching.	[28]

Similarly, the reduction of administrative workload emerges as a key factor, as AI tools automate routine tasks, freeing up time for educators to focus on more meaningful pedagogical activities [2]. This benefit is complemented by improvements in assessment and feedback, as AI provides personalized and timely responses, contributing to continuous student learning [25].

In addition, improved accessibility to educational resources is another significant advance. AI removes geographical barriers by facilitating access to online learning materials and tools, thereby promoting equity in education [1]. In addition, early identification of at-risk students through predictive analytics enables educational institutions to implement timely intervention strategies to reduce dropout rates [9].

TABLE II
ARTIFICIAL INTELLIGENCE TOOLS AND THEIR APPLICATIONS IN HIGHER EDUCATION

AI Tool	Concept	Applications	Author
Generative AI (GenAI-ChatGPT)	Artificial intelligence that generates new content, such as text, images, or sounds, based on patterns learned from previous data.	Used in content development, personalized learning, and improving teaching.	[29], [30], [31]
AI Chatbots	Tools that simulate human conversations through language models.	Used for online assistance, personalized tutoring, and answering frequently asked questions in educational settings.	[31], [32], [33]
Generative Language Models (GPT)	AI models are designed to generate text based on given	Used in academic article review, automated tutoring,	[34]

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AI Tool	Concept	Applications	Author
	inputs, such as questions or topics.	and content creation in education.	
Intelligent Tutoring Systems (ITS)	Tools that provide personalized and adaptive feedback to students based on their progress and performance.	Used to facilitate personalized teaching, especially in language and math education.	[1]
Intelligent Automation	Integration of AI to automate cognitive and manual tasks to improve efficiency.	Applied in optimizing academic and administrative processes, such as improving the speed of information retrieval in university libraries.	[2]
AI Educational Chatbots	Tools that facilitate educational interaction through AI.	Used to enhance the learning experience by providing quick and personalized responses to students.	[35]
Automated Writing Evaluation Systems (AWE)	AI applied to evaluate texts written by students, comparing them to predefined standards.	Used to evaluate writing in language courses, providing quick and accurate feedback to students.	[36]
Generative AI for Academic Review	Tools that use AI to conduct academic reviews of scientific papers, comparing quality with human reviewers.	Used to support preliminary article review by generating observations related to format, writing quality, and references.	[14]
Big Data in University Libraries	Use of large volumes of data managed by AI to improve academic library services.	Used in optimizing information retrieval and improving the efficiency of university libraries.	[2]
Learning Analytics (LA)	Application of AI to analyze and improve teaching methods and outcomes based on student data.	Used to personalize curricula and improve academic performance through data collection and analysis.	[1]
Generative AI Tools in Higher Education	Generative AI tools are designed to assist faculty and students in higher education by creating content.	Used in creating educational materials, personalizing learning, and supporting university teaching.	[14], [28]
Automated Knowledge Work	AI applied to improve the efficiency and effectiveness of knowledge management tasks, facilitating complex cognitive tasks.	Used in automating administrative tasks, research, and strategic decision-making.	[37]
AI-Powered Library Systems	AI-powered library systems to enhance information management and user services.	Used in university libraries to automate resource management and optimize user services, improving access to information.	[1], [2], [34]
AI, VR, AR, and IoT	Technologies such as Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), and the Internet of	The analysis revealed that technologies like AI, VR, AR, and IoT have great potential to enhance teaching and learning methods.	[38]

AI Tool	Concept	Applications	Author
	Things (IoT) are transforming the educational environment.		
Backpropagation Neural Networks (BP)	Artificial intelligence model that uses feedback to optimize the nonlinear analysis of educational data.	Evaluation of teaching teams, improvement in teaching processes, optimization of educational quality, and promotion of entrepreneurship.	[39]
AI-Enabled Mobile Application	Mobile applications are integrated with artificial intelligence to enhance academic services and communication.	Facilitates student-professor communication, automates access to academic services, and supports academic advising.	[40]
Blackboard Ally	AI-powered tool integrated into Blackboard LMS that enhances accessibility and interactivity in online courses.	Facilitates the creation of accessible course content, improves student engagement, and supports adaptive learning for diverse needs.	[41]

Another notable aspect is the promotion of digital literacy, as the use of AI-based tools promotes the development of technological skills essential for academic and professional environments [27]. Finally, the automation of educational processes has optimized institutional management, ensuring that educational resources are used more efficiently [28].

In addition, the review of articles addressed Research Question P3: What disruptive AI tools are being used by faculty and students for academic research? AI tools such as Scite and Elicit stand out for their advanced capabilities in literature review and data analysis. These tools, described in Table 2, enable greater efficiency in the research process.

The results presented in Table 2 highlight a wide variety of tools that are significantly changing the educational landscape. These technologies not only streamline academic processes, but also improve the personalization, efficiency, and accessibility of education.

Among the identified tools, intelligent tutoring systems (ITS) and adaptive learning platforms emerge as key solutions, providing personalized feedback in real time and tailoring educational content to the individual needs of students [1]. On the other hand, tools such as generative AI and generative language models (GLMs) are redefining academic content creation, from the customization of materials to the pre-review of scientific articles [34].

In addition, educational chatbots and intelligent automation applications are improving student-teacher interactions, facilitating access to educational resources, and reducing administrative workload [2], [35]. Tools such as Automated Writing Evaluation (AWE) systems and Learning Analytics (LA) applications stand out for their ability to provide fast and accurate feedback, supporting both assessment and continuous improvement of academic performance [36].

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The results also underscore the relevance of specific knowledge management tools, such as AI-powered library systems, which optimize information retrieval and enhance user services in the university environment [2]. This suite of tools not only strengthens the academic infrastructure but also enables strategic decision-making based on data.

Table 2 shows how AI tools are redefining educational practices by integrating advanced capabilities in personalization, automation, and predictive analytics. These innovations offer promising prospects for addressing current challenges in higher education and fostering more inclusive and efficient teaching practices.
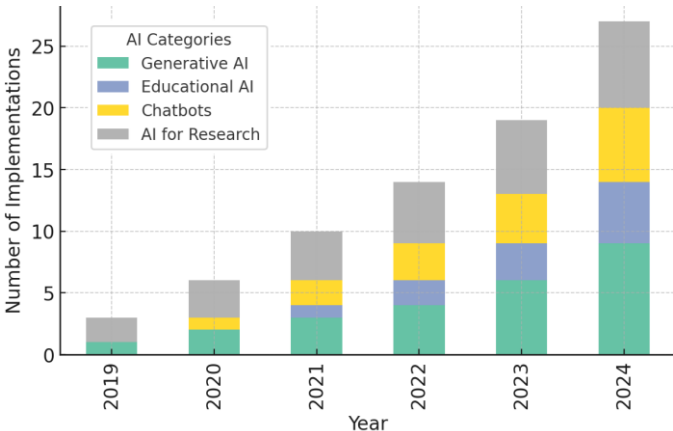

Fig. 3 Evolution of Artificial Intelligence Usage in Education (2019-2024).
Source: Own elaboration.

Figure 3 illustrates the distribution of 43 academic articles and the evolution of publications on artificial intelligence (AI) in education, categorized into seven areas: Generative AI, educational AI, chatbots, AI for research, AI for administration, mobile AI, and data analytics. Sustained growth is seen throughout the analysis period, with a significant increase in 2024.

Among the categories, Generative AI and Educational AI stand out for their notable growth, reflecting their disruptive impact on personalized learning and educational content development. Meanwhile, AI for Research shows an upward trend, underscoring its importance as a key tool in academic research. Although less represented, Mobile AI and AI for Administration have maintained consistent usage, highlighting their applicability in administrative and mobile areas of education.

Figure 3 highlights how AI is redefining educational practices, with a particular focus on generative and data analytics technologies, marking a turning point in the adoption of these tools in academic and educational contexts.

There are significant differences in the use and adoption of AI in education, depending on the geographical and cultural context. In Asian countries, particularly China, the adoption of AI in education is high, with a focus on managing large amounts of data and personalized learning [42]. In contrast, in Latin American countries, the use of AI in education is more focused on resource management and digital literacy [14]. This addresses Research Question P4: How does the use of AI in education vary by geographic and cultural context?
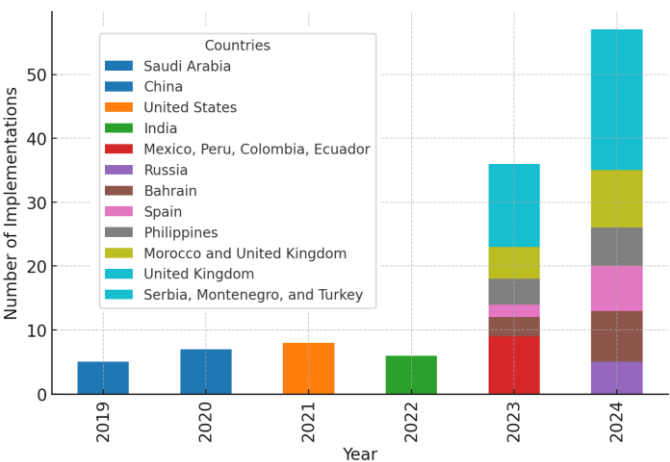

Fig. 4 Adoption of AI in Education by Country (2019-2024).
Source: Own elaboration.

Figure 4 shows that in the first years analyzed (2019-2021), countries such as Saudi Arabia and the United Kingdom dominate the publications, mainly focusing on the optimization of educational and administrative processes [43], [44]. However, starting in 2022, a significant increase in the number of publications is observed in Asian countries (such as China) [26], Latin America (Mexico, Peru, Colombia, Ecuador), and Europe (Spain), highlighting a global expansion of interest in AI in education [14].

In 2024, China leads in publications, with a focus on personalized learning and managing large amounts of data, in line with the national education strategy to integrate new technologies into the classroom [45]. Meanwhile, countries in Latin America, such as Mexico and Peru, show strong interest in using AI to teach digital skills and improve educational accessibility [14]. Spain stands out for its research on adaptive and accessible AI tools in different educational settings [1].

The data reflects a remarkable growth and diversification of AI research in education, adapting to specific contexts and addressing specific regional needs. AI has emerged as a key tool for personalizing learning, improving administrative efficiency, and promoting global educational inclusion [10], [46].

In addition, the most prominent areas of interest include adaptive learning, learning analytics, and the development of 21st century skills such as critical thinking and digital literacy. These areas stand out for their potential to improve teaching and learning in higher education environments [47]. In addition, issues such as ethics and bias in AI are gaining increasing attention due to the need to ensure the responsible use of these technologies in education.

Figure 5 summarizes the results of a systematic review that explores the most prominent areas of interest in AI research applied to education, addressing Research Question P5: What are the most prominent areas of interest in AI research applied to education according to the systematic review literature? This analysis reveals six fundamental sub-themes that highlight the broad scope and diverse applications of AI in education.

The greatest focus is on the integration of AI in education, with 11 articles reflecting a significant interest in adapting these

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technologies to different educational contexts and promoting their efficient use in teaching and learning [42]. Similarly, AI tools and specific applications in education, with 9 articles, emphasize the practical implementation of technologies such as chatbots and adaptive learning platforms that enhance the educational experience [1], [2].
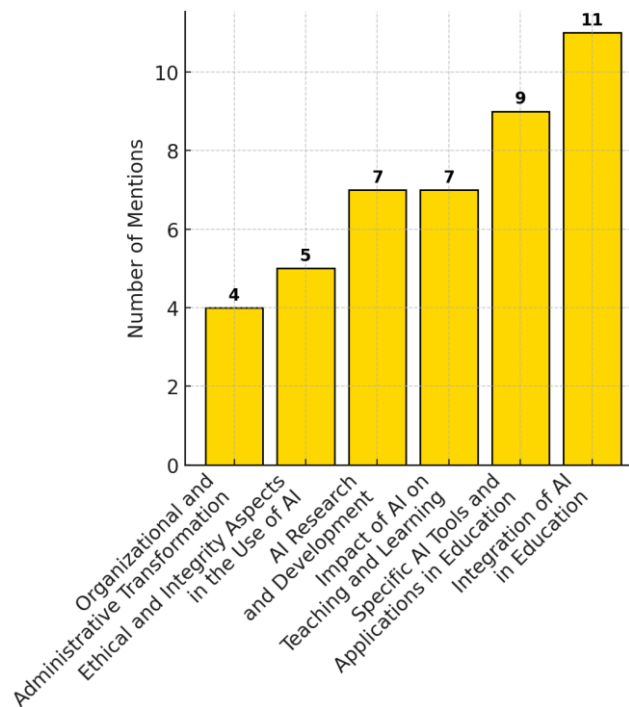

Fig. 5 Key AI Topics In Education.
Source: Own elaboration.

Areas such as the impact of AI on teaching and learning (7 articles) and advances in AI research and development (7 articles) underscore the importance of evaluating how these technologies are transforming pedagogical processes and fostering educational innovation [10], [14]. Ethics and integrity in AI use, with 5 articles, highlights the need to address concerns related to ethics, transparency, and responsible use of these tools [10]. Finally, organizational and administrative transformation, with 4 articles, highlights how AI can optimize administrative and structural processes within educational institutions.

Figure 5 shows that research on AI applied to education seeks not only to explore its practical implementation, but also to understand its ethical, pedagogical, and organizational implications. These findings provide a comprehensive and motivating perspective to guide future studies aimed at maximizing the positive impact of AI in academic contexts.

The results of this systematic review confirm and extend previous findings on the applications and benefits of artificial intelligence (AI) in education, providing a holistic perspective on how these technologies are transforming academic environments. Recent studies highlight that AI has optimized both pedagogical and administrative processes, enabling personalized learning, analyzing large amounts of educational data, and freeing up time for strategic activities [1], [2]. In our

analysis, these trends are evident in the predominance of research focused on the integration of AI in education and the development of specific AI tools, which were identified as major areas of interest.

A direct comparison with previous research, such as that conducted by [14], underscores the growing interest in technologies such as chatbots and intelligent tutoring platforms, which were also highlighted in our analysis. This reinforces the notion that AI not only facilitates personalized instruction but also has the potential to radically transform teacher-student interactions and assessment systems. In addition, studies such as [6] have highlighted the importance of learning analytics systems and educational data mining, which our review identifies as pillars for improving academic outcomes through personalization and continuous monitoring.

In terms of ethical and methodological challenges, our findings are consistent with the observations of [4], who warn of the inherent risks of AI use, such as algorithmic biases and lack of transparency. In this context, the discussion of AI ethics in education becomes particularly relevant, as we found a growing interest in this area, albeit insufficient compared to other research categories. This underscores the need for a robust ethical framework to guide the responsible implementation of these technologies.

Furthermore, our findings also resonate with the contributions of [5] regarding the adoption of AI by educators, who face barriers such as perceived risk and performance expectations. Our analysis highlights that teacher training and digital literacy development are critical to maximizing the positive impact of AI, which is consistent with [16]'s suggestions on the importance of educating both students and teachers on how to use these tools.

A notable departure from previous research is the focus on geographic and cultural diversity in AI adoption, an aspect that showed significant variation in our analysis. While countries such as China lead in areas such as personalized learning and large-scale data analysis, Latin American countries emphasize digital skills training and resource management, reflecting the adaptation of these technologies to local contexts [14], [42], [45]. This finding highlights the importance of considering regional specificities in the design and implementation of AI-based solutions.

Finally, our results support the conclusions of studies such as [10], [12], which have highlighted the rapid development of AI models such as neural networks and deep learning in academic applications. However, the lack of long-term research on the sustainable impact of these technologies on skill development and educational outcomes remains a gap that needs to be addressed in future studies.

This review not only validates previous findings but also provides an expanded and innovative perspective on emerging areas of AI in education. The findings highlight both the transformative potential of these technologies, and the challenges associated with their ethical and responsible implementation, providing a critical framework to guide future research and strategic interventions in global educational settings.

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IV. Conclusions

This systematic review study of the use of artificial intelligence (AI) in academic and educational research highlights the transformative role that AI tools can play in teaching and learning.

AI is reshaping the educational landscape, with a significant increase in the number of publications from 2019 to 2024, particularly in areas such as personalized learning, automation of educational processes, and analysis of large amounts of data. This surge reflects a global interest in integrating AI into academic research, tailored to the needs of educators and students.

The benefits perceived by educators and students are clear: AI personalizes learning, improves access to educational resources, and reduces administrative burdens. These tools not only facilitate autonomous learning but also optimize teaching by providing timely and accurate feedback, fostering a more inclusive educational environment that is responsive to individual needs.

Some of the most disruptive tools include intelligent tutoring systems, adaptive learning platforms, chatbots, and data analytics applications. These technologies enhance educational interactions, automate tasks, and drive pedagogical innovation.

Geographically, AI adoption varies widely. In Asia, initiatives focus on large-scale data analytics and adaptive learning, while in Latin America, attention is focused on resource management and digital literacy. This diversity reflects the adaptability of AI to specific cultural and educational contexts.

Finally, priority research areas include the integration of AI in education, the development of specific tools, and the evaluation of their impact on teaching. While progress has been notable, ethical and methodological challenges remain, requiring innovative solutions to ensure the transparent, inclusive, and ethical use of AI in educational settings.

This analysis encourages continued exploration of the potential of AI in education, emphasizing the need to promote its responsible implementation and its ability to transform learning into a globalized context.

Acknowledgment

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