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Attitudes and research skills towards artificial intelligence: Challenges for university teachers

Actitudes y capacidades investigativas frente a la inteligencia artificial: Desafíos de los docentes universitarios

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Abstract

This research investigated the prevalence and transformative capacity of Artificial Intelligence (AI) within the educational sphere, addressing both the challenges and opportunities it presents. The rapid evolution of AI necessitates continuous professional development for educators to acquire essential research and technological competencies. The study aimed to analyze the scientific evidence regarding university faculty members' attitudes and research competencies in response to the challenges posed by AI. A comprehensive literature review was conducted, primarily focusing on the Scopus database. The findings indicated that educators' attitudes toward AI varied significantly based on their level of training in digital platforms. While many acknowledged AI's potential, they also expressed resistance, largely attributed to insufficient training and concerns that AI might diminish personal interaction in the educational process.

Keywords: artificial intelligence, learning, technology, university teachers, research skills, education

Resumen

TXXXs.

Palabras clave: InXXXXng

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Introduction

Educational quality is a fundamental goal closely tied to the prosperity of nations, as it seeks to ensure economic growth and improve quality of life (Organisation for Economic Co-operation and Development [OECD], 2019). The emergence of new technologies, especially Artificial Intelligence (AI), is transforming various aspects of social, professional, political, and educational life. This shift is reshaping the global educational landscape and generating challenges and opportunities that require the educational community to adapt to an increasingly digital society. According to the United Nations Educational, Scientific and Cultural Organization [UNESCO] (2019), 40% of students in low-income countries lack access to AI, underscoring the need to personalize pedagogy through appropriate competencies to ensure quality educational practice.

AI is positioned as a key tool for enhancing knowledge, contributing to social development, and aligning the efforts of the educational community with the Sustainable Development Goals. Globally, UNESCO (2019) emphasizes that integrating AI into educational contexts depends on teacher training and the availability of adequate technological infrastructure. This technology enriches research competencies, allowing educators to carry out creative and relevant investigations (García Peñalvo, 2023). It is essential to address this challenge through university-level training that promotes the development of digital skills in students and technological competencies in teachers, enabling them to design effective learning strategies (Viñoles et al., 2022).

Based on the above, the following general research problem was posed: *What are the attitudes and research capabilities of university professors in the face of the challenge of AI?* The specific questions are: *What teaching competencies are evident in teaching and research activities? What is the attitude of university faculty toward AI and technological change? What opportunities does AI offer to improve teaching and research?*

The development of research competencies is essential for teaching work, as it involves not only professional experience but also the ability to explore, analyze, and design new learning strategies supported by AI, integrating digital skills for managing and processing information (Van Der Vlies, 2020). These competencies are crucial for educators to conduct quality scientific research, contributing to knowledge advancement and improving teaching practices. Despite progress over time, significant gaps persist between pedagogical proposals that promote scientific research and the actual research capabilities of educators in the classroom. Teaching and scientific research require innovative educators who are open to continuous learning (Soylu & Özkan, 2021).

In the Peruvian context, the implementation of educational policies is essential to guide the education system, integrating actions and decisions that foster educational quality and its impact on economic, cultural, and social development (Pita, 2020). These policies must adapt to global advancements and local needs to drive improvements in educational systems. However, the incorporation of AI faces structural and connectivity challenges in some universities, while others have begun integrating it into academic programs—despite the lack of digital skills among educators and limited access to technological resources, which restrict teaching and research activities (Torres et al., 2024).

The connection between policy and education is crucial to ensure the effectiveness and efficiency of implementing social models and policies. It is necessary to ensure the relevance of public governance, citizen participation, and transparency in management (Cotrado, 2020). Currently, many educators lack the skills to manage and adapt AI for teaching and research, and limited internet access restricts self-training, ultimately affecting educational quality (Ministry of Education of Peru [MINEDU], 2020). However, AI is not intended to replace teachers, but to transform education by optimizing classroom management and personalizing learning. Its success depends on an adaptive process that involves significant challenges and risks, which must be critically addressed by educational authorities.

In conclusion, the adoption of AI in the university context offers numerous opportunities to improve educational quality and advance scientific research, but also presents major challenges that must be addressed at structural, formative, and ethical levels. Universities have the responsibility to adapt through strategies that enable various educational stakeholders to leverage the benefits of AI and respond to the technological challenges of the 21st century. Therefore, the following general objective was formulated: *to analyze the attitudes and research capacities of university faculty in response to the challenge of AI.* Additionally, the specific objectives aimed to identify teaching competencies in teaching and research activities; evaluate university faculty attitudes toward AI and technological changes; and analyze the opportunities AI offers to improve teaching and research practices.

Methodology

An analytical-reflective literature review was conducted using a hermeneutic method to interpretively analyze the collected information. The research adopted an observational-descriptive approach, focusing on studies from the past five years and reviewing data from past events. Information was gathered from the Scopus database, and selected publications aligned with the evaluation of university professors' attitudes and research competencies in response to the challenge of AI. Specific keywords were used for the investigation, and articles not primarily written in Spanish or English were excluded.

Table 1

Search Equations – Criteria Database

Database	Search Terms	Boolean Operators
Scopus	TITLE-ABS-KEY ((qualities OR attitudes OR abilities OR competencies) AND (research OR inquire) AND (AI OR artificial AND intelligence) AND (teachers OR professors OR faculty))	AND – OR

Note: Results according to the Scopus database.

Table 1 shows the initial exploration carried out in the Scopus database, recognized for its global relevance and impact. Boolean operators and keywords were used to perform a more precise search of the publications.

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Table 2

Search Equations – Article Summary

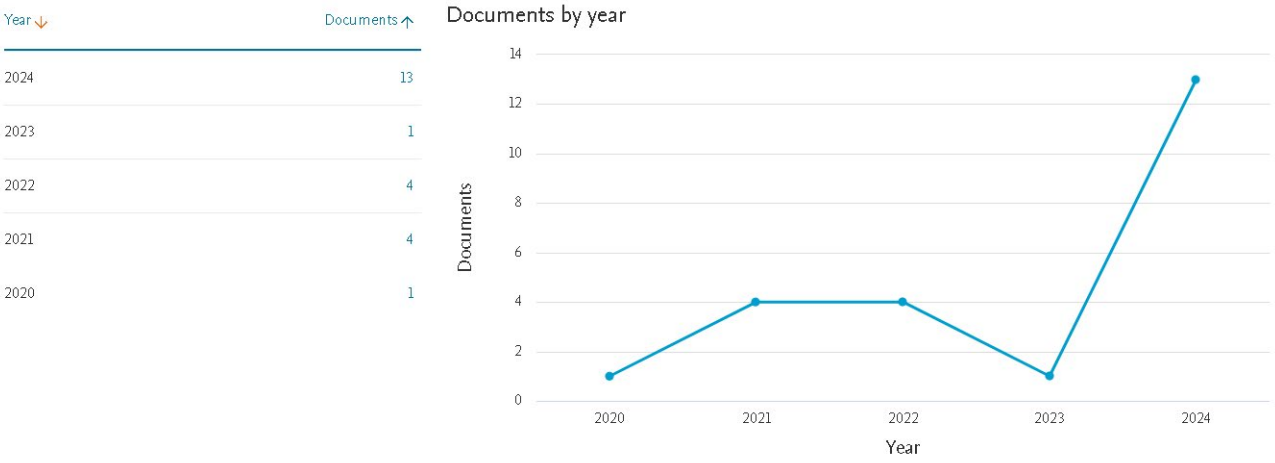
Database	Language	Results	Period	Open Access	Thematic	Analyzed
Scopus	Spanish					
		12	2020	–	–	–
		2	2021	–	–	–
		–	2022	–	–	–
		5	2023	2	–	–
		5	2024	5	2	2
	Total	12	2020–2024	7	2	2
	English					
		60	2020	27	1	1
		113	2021	42	5	4
		112	2022	58	5	4
		153	2023	54	2	1
		213	2024	98	17	13
	Total	651	2020–2024	279	30	23

Note: Compiled based on results from the Scopus database.

The adopted approach is based on a documentary analysis aligned with the objectives of the research. Articles were selected using keywords such as: artificial intelligence, learning, technology, teachers, and competencies, among other terms relevant to the study. The inclusion criteria established were: manuscripts published between 2020 and 2024, in English and Spanish, open access, and relevant to the topic.

The analysis made it possible to collect the most relevant scientific evidence to evaluate university professors' attitudes and research competencies in the face of the AI challenge. Articles were excluded if they were not written in Spanish or English, were not open access, were unrelated to the subject matter, or did not fall within the specified time frame (Table 2).

Figure 1
Publications according to Scopus Database



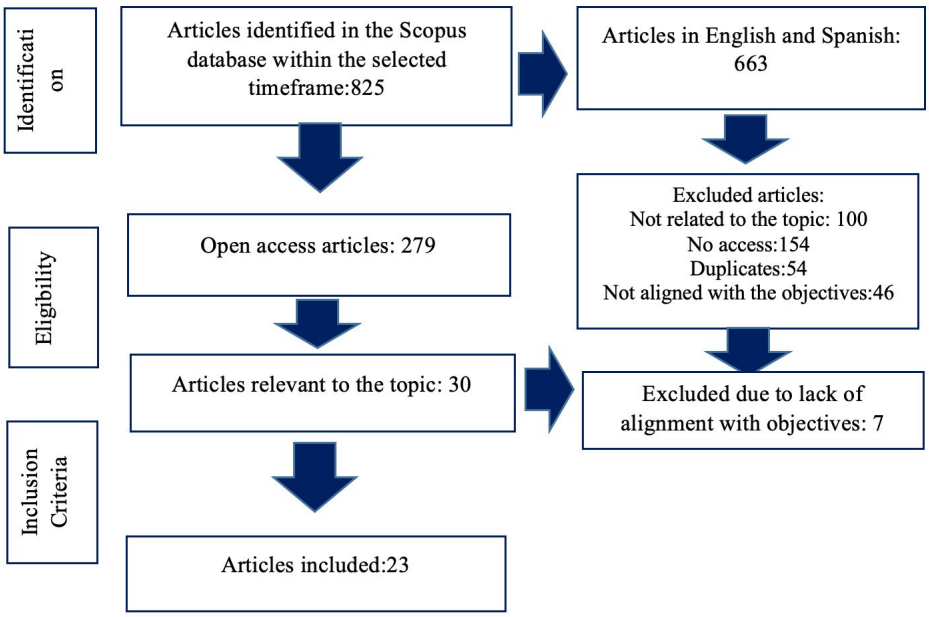
Year	Documents
2024	13
2023	1
2022	4
2021	4
2020	1

Note: Results according to Scopus

The findings from the years 2022 and 2023 revealed a notable decrease in the production of research focused on university professors' attitudes and research competencies in response to the challenge of AI, suggesting a resistance to change among educators despite technological advancements (Figure 1).

Figure 2

PRISMA Diagram



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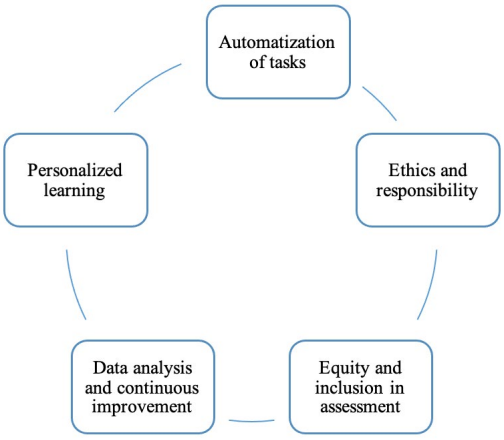
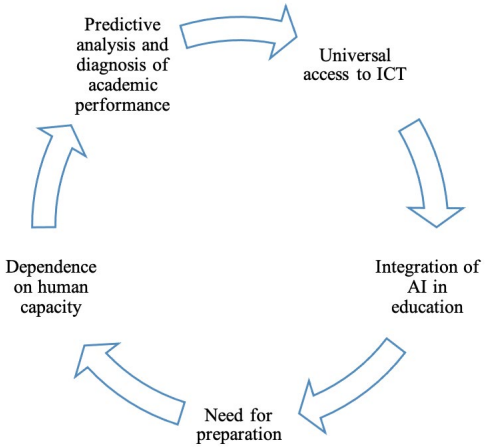
Based on the analysis conducted, the findings are as follows:

3.1. Contextualization and Evolution of Artificial Intelligence (AI)



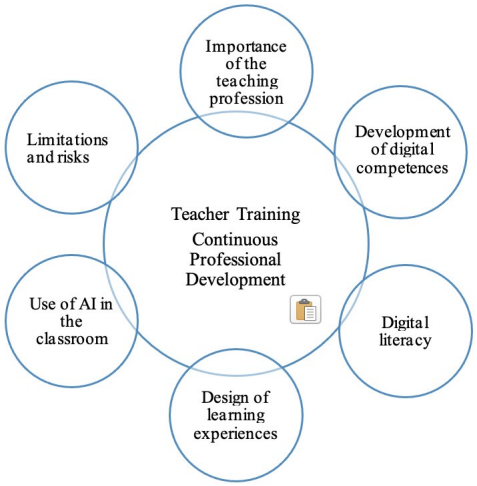
The implementation of AI involves the automation of tasks (Zielinski et al., 2023) and the need to maintain an ethical and responsible attitude (Vera, 2023), promoting student inclusion in academic assessments and global equity (Wang et al., 2024). Likewise, data analysis and continuous improvement are essential components for the personalization of meaningful learning (Zielinski et al., 2023).

3.2. Teachers' Attitudes and Perceptions Toward AI



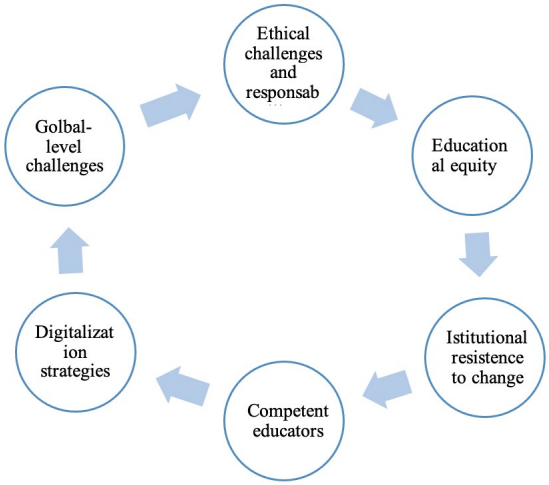
Digital infrastructure is essential to facilitate universal access to information and communication technologies (ICT) and the integration of AI in education, which requires openness and proper training (García Velázquez, 2023). The effectiveness of AI depends on human capacity, allowing teachers to carry out predictive analyses and diagnostics of academic performance, as well as to identify learning patterns and classroom issues (Aguirre et al., 2024).

3.3. Teacher Training and the Development of Research Competencies



Teacher training and continuous professional development are essential for building research capacities and digital skills, which are reflected in classroom practice (Kiryakova & Kozhuharova, 2024). Digital literacy facilitates the design of learning experiences through the use of AI, which -despite its risks and limitations- represents an opportunity to generate new knowledge (García Peñalvo, 2024).

3.4. Challenges, Inequalities, and the Digital Divide



The adaptation of education to AI presents various ethical challenges and demands responsibility from the educational community in its pursuit of educational equity, despite resistance to change in many institutions (International Telecommunication Union, 2021). Digitalization requires competent educators who can implement innovative strategies in the classroom (Viñoles et al., 2022), aligned with global technological challenges (Coronel de León, 2022).

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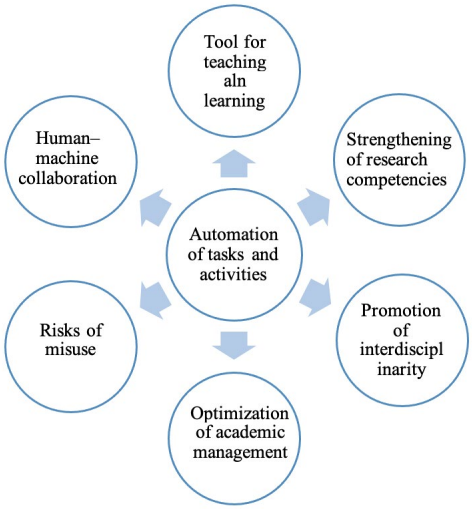
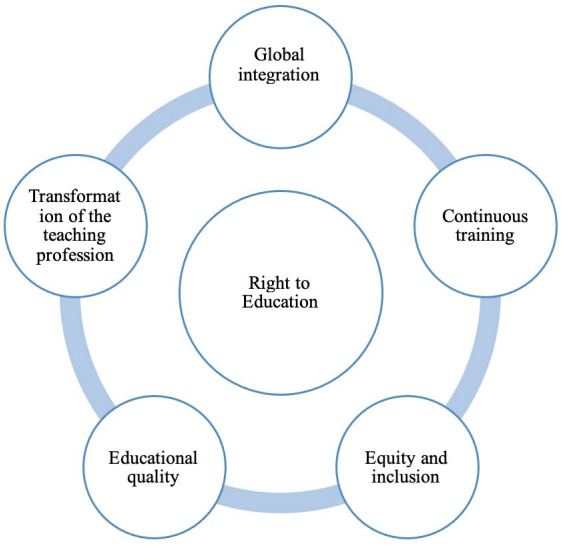
3.5. Opportunities of AI in Teacher Training and Research Development



AI is a valuable tool for teaching, enabling the automation of school-related tasks and activities (Joksimovic et al., 2023), which strengthens and fosters interdisciplinarity in research (González, 2023). However, its misuse can lead to risks, divisions, and the exacerbation of social inequalities (Lloret et al., 2022).

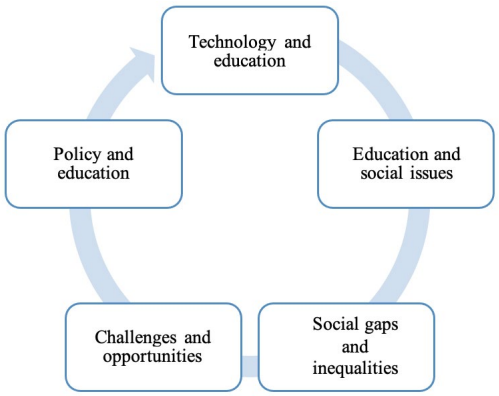
3.6. The Role of Educational Policies and Institutional Strategies



In Peru, education is a fundamental right (Roncal, 2024), and public policies focus on the continuous professional development of teachers and the global integration of AI in classrooms (García Peñalvo, 2024). The approach to addressing social issues is based on the principles of equity and inclusion, emphasizing the need to improve the curriculum (Martínez & Herrera, 2023). Educational quality implies innovation in infrastructure and resources to transform teaching practices and the educational system (Villegas et al., 2022). This approach promotes ongoing

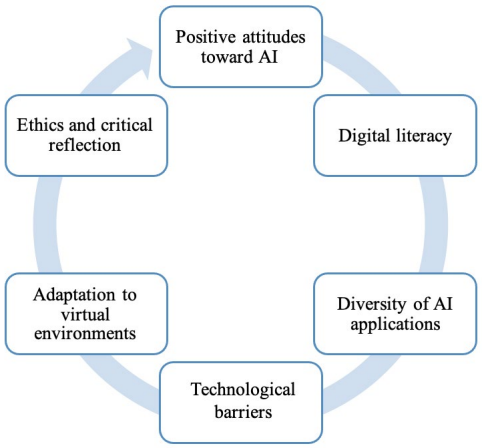
training, infrastructure improvement, educational management, and the updating of educational processes (Ccoto, 2023).

3.7. Impact and Challenges of AI in Educational Quality



Technology plays a key role in educational development by addressing social issues (García Velásquez, 2023). Educational policies focus on addressing social gaps to reduce inequalities that limit equitable access to education (Narcizo, 2021). AI in education presents both challenges and opportunities in terms of equity and digital access, integrating various educational components to strengthen learning resources (Baidoo & Owusu, 2023).

3.8. Future Perspectives and the Projection of the Teaching Profession



Teachers recognize the importance of AI in their professional work, academic content, and learning strategies (Baidoo & Owusu, 2023). Therefore, it is essential for them to develop digital skills to integrate AI into their pedagogical practices and achieve digital literacy (Ramazan & Gizem et al., 2023). Likewise, universities must understand the functionality of AI to overcome technological barriers (García Peñalvo, 2024), considering the need to adapt educational processes to virtual modalities. This highlights the importance of adjusting regulations and procedures within an academic context that prioritizes ethics and critical reflection (Tuesta et al., 2022).

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The development of research competencies is essential to respond to educational demands. This involves not only acquiring technical skills in AI but also fostering critical thinking and reflective teaching practice. AI facilitates access to large volumes of information, allowing teachers to conduct deeper, evidence-based research (Aguirre et al., 2024). Moreover, training in AI tools can stimulate intellectual curiosity and innovation in teaching, promoting a more active approach to educational research (González, 2023).

However, a common limitation in the reviewed articles is the lack of longitudinal studies that assess the long-term impact of AI on teaching practice and student learning. Some studies focus on specific contexts, which may limit the generalization of findings to other educational settings (Ccoto, 2023). Additionally, most works do not address how to effectively integrate AI tools into the curriculum, which is essential for maximizing their potential (Kiryakova & Kozhuharova, 2024). These limitations underline the need for broader studies that consider diverse contexts and pedagogical approaches.

Table 3

Reviewed Articles

Authors	Conclusions	Contributions
Vera (2023)	AI presents significant challenges but also opportunities to improve higher education	Promotes positive attitudes and enhances teachers' research competencies
Zielinski et al. (2023)	Chatbots facilitate efficient writing and revision of academic publications	Enhances research skills through AI tools in education
Shan et al. (2024)	AI is transforming education by improving teaching and learning	Highlights the importance of AI in developing teaching competencies
Aguirre-Aguilar et al. (2024)	AI strengthens research competencies in university education	Develops teachers' critical and analytical thinking skills
García-Velásquez (2023)	AI is crucial for the preservation and analysis of educational cultural heritage	Enriches teachers' research skills in digital communities
Kiryakova & Kozhuharova (2024)	Teachers need specific digital skills to integrate AI into teaching	Teachers must improve their attitudes toward AI in pedagogy
Viñoles-Cosentino et al. (2022)	Training in digital skills is essential in the university context	Training reinforces positive attitudes toward AI adoption
Coronel de León (2022)	Connectivism redefines education through emerging technologies	AI promotes collaborative research and connected learning
Joksimovic et al. (2023)	AI supports complex problem-solving in education	AI enhances research and methodological competencies in teachers
González-González (2023)	AI transforms teaching methodologies, requiring teacher adaptation	AI fosters improved research capabilities in educational practice
Lloret et al. (2022)	AI-based systems can assess and improve educational quality	AI provides tools that strengthen and energize teacher research
García et al. (2024)	Generative AI presents significant opportunities for educational improvement	Urgent need for teacher training in emerging technologies
Menacho et al. (2024)	AI supports autonomous learning for future university teachers	AI as an educational tool improves teacher research practices
Villegas et al. (2022)	Pedagogical support significantly improves teacher performance	Training fosters research and teacher adaptation to AI

Authors	Conclusions	Contributions
Ccoto (2023)	Teaching performance is directly related to educational quality	AI training enhances research skills and teaching performance
Socorro & Reche (2022)	Teachers' attitudes toward ICT influence effective educational training	Teacher training is key for managing educational technologies
Gallent et al. (2023)	Generative AI poses ethical challenges affecting academic integrity in higher education	Training promotes ethical reflection and integrity in teacher research
Narcizo (2021)	The digital divide is a major challenge in Peruvian education	Bridging the digital gap is essential for AI integration in education
Baidoo-Anu & Owusu (2023)	AI can improve teaching and learning in diverse educational settings	AI strengthens teachers' research and methodological skills
Ramazan & Gizem (2023)	The use of AI tools enhances skills, thinking, and motivation	AI positively impacts teachers' research competencies
Tuesta et al. (2022)	Educational responsibility must embrace technologies that improve virtual learning	AI enhances research capabilities to support virtual education
Velander et al. (2024)	Understanding AI is crucial for effective implementation in education	Continuous training enhances teachers' research capabilities
Cotrado (2020)	Educational policies affect teaching practice, promoting a culture of performance and efficiency	Teacher training in research competencies is essential in changing contexts

Conclusions

The reviewed articles offer varied findings on the implementation of AI in different educational contexts. For example, Gallent et al. (2023) addressed ethics and academic integrity, highlighting how AI can influence perceptions of learning in higher education. In contrast, Menacho et al. (2024) emphasized the use of AI as a tool for autonomous learning, presenting a more positive and proactive approach. To foster innovation in teaching and research, collaborative platforms between institutions could be established, enabling teachers to exchange resources and experiences in using AI. This would enrich teaching practices and encourage more active and collaborative research (González, 2023).

Moreover, AI is employed in various research activities. Teachers can use AI-based data analysis tools to work with student performance information, allowing them to identify trends, patterns, and areas for improvement (Ramazan & Gizem, 2023). Likewise, using AI platforms for literature review facilitates access to relevant studies, optimizing the development of academic publications (Zielinski et al., 2023). These applications not only improve the quality of teaching research but also promote a decision-making-oriented approach in education.

However, to overcome teachers' resistance to using AI, it is essential to implement specific training strategies that address both technical and pedagogical aspects. It is proposed to develop training programs that include practical workshops on using AI tools in the classroom and sessions discussing their benefits in the teaching and learning process. Additionally, fostering a culture of collaboration where teachers share experiences and best practices is essential (Aguirre et al., 2024). Training should be ongoing and adaptive, allowing educators to explore various AI

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applications in their educational contexts, thereby helping to reduce resistance and increase acceptance (Wang et al., 2024).

It is concluded that teachers' attitudes toward AI are heterogeneous, ranging from acceptance to resistance. While many recognize the potential of AI to enhance their pedagogical and research practices, they also express concerns about their ability to adapt to this new reality. Research competencies are conditioned by teachers' level of digital literacy, highlighting the need for specialized training to face the challenges that AI poses in academia.

It was also determined that the essential teaching competencies for instruction and research include skills in managing digital tools, data analysis, and integrating AI into the design of learning experiences. Furthermore, continuous professional development is essential to keep teachers updated in a dynamic technological environment. These competencies are fundamental to developing effective pedagogical strategies and conducting relevant, high-quality research.

Additionally, the evaluation of teachers' attitudes reveals a combination of enthusiasm and resistance. A significant number of educators show openness to adopting AI, recognizing its transformative potential in education. However, concerns persist regarding the lack of specific training and fears that AI might replace human interaction in the classroom. This context calls for training programs that address both technical skills and attitudes toward change.

AI offers multiple opportunities to improve teaching and research, with personalized learning standing out as a key benefit—allowing content to be tailored to individual needs—and the automation of administrative tasks freeing up time for teaching. Moreover, it facilitates the collection and analysis of large volumes of data, enhancing research quality and supporting educational decision-making. However, it is vital to implement these opportunities critically, considering associated risks and maintaining a student-centered approach.

Accordingly, it is proposed to implement specific programs on the use of AI in education, including practical workshops, seminars, and online courses. These programs should focus on developing digital and research skills, ensuring that teachers gain the confidence and capabilities to integrate AI into their teaching practices. Additionally, it is recommended to offer certifications to formally recognize these competencies.

Universities must establish regulatory frameworks that promote the integration of AI into curricula and academic practices, facilitating the adoption of emerging technologies and ensuring access to adequate technological resources. It is also essential to encourage cooperation across campuses, branches, and disciplines to develop multidisciplinary approaches in AI teaching and research, enhancing the exchange of knowledge and experiences. The need to encourage teachers' participation in AI-based projects is highlighted, allowing them to experiment with its benefits and challenges. Sharing success stories through conferences, seminars, and publications will serve as motivation to adopt new methodologies.

Universities should invest in improving technological infrastructure to ensure that teachers and students have the necessary tools for effective use of AI. Continuous assessment systems should

also be implemented to measure the impact of training and AI use on learning outcomes, along with psychological and emotional support mechanisms to address resistance to change and concerns related to technology adoption.

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