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Artificial intelligence and pedagogy: challenges for higher education in Peru

Inteligencia artificial y pedagogía: retos para la educación superior en el Perú

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Abstract

This article analyzes the relationship between artificial intelligence and pedagogy at a private university, with the aim of identifying the challenges facing university education today. Given the growing influence of artificial intelligence in the academic field, it is essential that pedagogical methodologies adapt to this new reality, thus ensuring an efficient and relevant teaching-learning process. The research adopted a quantitative approach, with a non-experimental design and a descriptive correlational level. The sample consisted of 100 university professors, and a questionnaire was used to assess, from a perceptual perspective, the degree of integration of artificial intelligence into pedagogical practices. The results indicate a positive relationship between artificial intelligence and pedagogy; indeed, its correct application contributes to strengthening pedagogical work, which translates into a significant improvement in the educational process. This interaction represents a valuable opportunity to innovate and transform higher education, allowing it to successfully address the challenges of the contemporary context.

Keywords: artificial intelligence, pedagogy, university.

Resumen

El presente artículo analiza la relación entre la inteligencia artificial y la pedagogía en una universidad privada, con el propósito de identificar los retos y desafíos que enfrenta la educación universitaria en la actualidad. Ante la creciente influencia de la inteligencia artificial en el ámbito académico, es fundamental que las metodologías pedagógicas se adapten a esta nueva realidad, garantizando así un proceso de enseñanza-aprendizaje eficiente y pertinente. La investigación adoptó un enfoque cuantitativo, con un diseño no experimental y un nivel descriptivo correlacional. La muestra consistió en 100 docentes universitarios, y se utilizó un cuestionario para evaluar, desde una perspectiva perceptiva, el grado de integración de la inteligencia artificial en las prácticas pedagógicas. Los resultados indican una relación positiva entre la inteligencia artificial y la pedagogía; en efecto, su aplicación correcta contribuye al fortalecimiento de la labor pedagógica, lo que se traduce en una mejora significativa del proceso educativo. Esta interacción representa una oportunidad valiosa para innovar y transformar la educación superior, permitiendo afrontar con éxito los desafíos del contexto contemporáneo.

Palabras clave: inteligencia artificial, pedagogía, universidad.

Introduction

In the current global context, understanding the functioning of artificial intelligence (AI) and its relationship with pedagogy is crucial for all universities, both public and private. Indeed, higher education institutions worldwide are increasingly concerned about the widespread use of AI among students, although this concern is somewhat less pronounced among university faculty, many of whom still hesitate to fully adopt it, primarily due to fears of providing biased information.

On the other hand, in Europe, AI is revolutionizing university education, offering benefits such as improved teaching, task automation, and data analysis. Additionally, several universities have begun to offer master's programs in artificial intelligence, enabling students to develop skills in machine learning, deep learning, computer vision, and natural language processing—knowledge that can then be effectively applied in training undergraduate and graduate students (Carvajal, 2024).

In Latin America, AI has driven notable educational innovations, such as AI-based mentors and tutors, technology-assisted lesson plans, automated feedback, and early warning systems—tools with immense transformative potential, provided their use is framed within solid ethical principles (Ricra et al., 2025).

In Peru, artificial intelligence also promises to revolutionize and enhance higher education, with applications in data analysis, task automation, and personalized learning. Tools such as Gemini, Microsoft Copilot, Blackboard Ultra, Adobe Firefly, and ChatGPT are prominent examples. However, we face significant challenges, including privacy and security concerns, the digital divide, and especially faculty training—essential elements to ensure appropriate use and a positive impact on students (Bernilla, 2024).

Regarding previous studies, in Spain, Vera (2023) identified that AI improves student engagement and participation, offers immediate feedback, streamlines tasks, and fosters innovative approaches, while emphasizing the need to implement these processes ethically and responsibly, paying attention to the safety and privacy of students.

Similarly, Martínez-Márquez (2025) in Mexico concluded the importance of steering studies on AI in education towards the development of ethical proposals for its use, as well as teacher training to bridge gaps in its effective utilization.

In Latin America, Uzcátegui and Ríos (2024) highlighted the relevance of continuing to explore the educational possibilities of AI, always with a firm ethical commitment to human education. Addressing these challenges consciously and collaboratively ensures that AI not only improves education but also promotes a better future for all.

In Peru, Ocaña-Fernández et al. (2019) emphasized that AI-based models can facilitate substantial progress in higher education by adapting learning to the specific needs of each student. The main challenge for universities in the new millennium lies in planning, designing, developing, and implementing digital competencies that prepare professionals to understand and adapt the technological environment to their requirements, in addition to promoting a universal digital language based on AI programs.

From a theoretical perspective, Troncoso et al. (2023) asserted that AI optimizes teaching efficiency and enhances the educational experience by providing personalized learning according to students' needs, demonstrating its significant impact on contemporary education.

In pedagogical terms, Aguado et al. (2024) argue that ongoing training for university faculty is essential to address educational changes and new forms of learning demanded by contemporary societies. They thus emphasize the need to strengthen the pedagogical training of educators, focused on transformative strategies that enhance their knowledge and educational practices.

For these reasons, it is pertinent to study how artificial intelligence relates to and contributes to effective tools for improving pedagogical performance. In this regard, the objective is to determine the relationship between artificial intelligence and pedagogy at a private university, with the aim of identifying the challenges and obstacles in higher education.

Methodology

This study is classified as basic-level research, as its primary objective was to understand the existing relationship between artificial intelligence and pedagogical teaching. Additionally, it adopted a quantitative approach, employing numerical data and statistical techniques to determine whether there is a connection between the analyzed variables.

The study design was non-experimental and cross-sectional; therefore, the variables were observed as they exist in reality, without intervention or modification. Data collection was conducted at a single point in time, without subsequent follow-up, since the aim was not to analyze the evolution of the variables over time. Moreover, the research combined a descriptive and correlational approach, focused on detailing the characteristics of the variables and investigating the possible relationship between AI and pedagogy within a university institution.

The population consisted of 460 university faculty members, from which a sample of 100 was selected through non-probabilistic convenience sampling. Inclusion criteria considered only faculty members between the ages of 30 and 50, as this group shows greater openness to using AI in their academic activities, excluding professionals outside this age range. It is important to clarify that non-probabilistic sampling may limit the generalizability of the results to the entire population with a defined margin of certainty.

For data collection, the survey technique was employed, using two questionnaires—one focused on artificial intelligence and the other on pedagogy—both containing 20 questions each. The validity of the instruments was assessed through expert judgment, and reliability was verified using Cronbach's alpha coefficient, ensuring the coherence and consistency of the questions with the studied dimensions and variables.

The collected data were processed using SPSS version 26, applying descriptive and inferential statistical techniques to analyze the behavior and relationship between the variables. The results were presented in tables specifically prepared for the study.

Finally, regarding ethical principles, fundamental norms such as integrity in scientific research, fairness and truthfulness in the communication of results, transparency in the process without conflicts of interest, and the full autonomy of participants to decide about their participation were respected

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Results

Descriptive results

Table 1

Results by dimensions of the artificial intelligence variable

	Low		Medium		High	
	n	%	n	%	n	%
D1. Machine learning	58	58,00 %	34	34,00 %	8	8,00 %
D2. Deep learning	64	64,00 %	32	32,00 %	4	4,00 %
D3. Natural language	68	68,00 %	30	30,00 %	2	2,00 %
D4. Computer vision	50	50,00 %	48	48,00 %	2	2,00 %
V1. Artificial intelligence	60	60,00 %	36	36,00 %	4	4,00 %

According to Table 1, in the dimension of machine learning, 58.00% of cases were rated at a low level, 34.00% at a medium level, and 8.00% at a high level. Regarding deep learning, 64.00% considered it low, 32.00% medium, and 4.00% high. In natural language processing, 68.00% rated the level as low, 30.00% as medium, and 2.00% as high. For computer vision, 50.00% estimated it as low, 48.00% medium, and 2.00% high. Finally, in the overall variable of artificial intelligence, 60.00% perceived it as low, 36.00% as medium, and only 4.00% as high.

Table 2

Results by dimensions of the pedagogy variable

	Low		Medium		High	
	n	%	n	%	n	%
D1. Data-driven learning	60	60,00 %	37	37,00 %	3	3,00 %
D2. Collaborative learning	40	40,00 %	59	59,00 %	1	1,00 %
D3. Individualized learning	22	22,00 %	53	53,00 %	25	25,00 %
V2. Pedagogy	41	41,00 %	50	50,00 %	9	9,00 %

According to Table 2, the dimension of data-driven learning was rated as low by 60.00% of respondents, medium by 37.00%, and high by 3.00%. In collaborative learning, 40.00% considered it low, 59.00% medium, and 1.00% high. The dimension of individualized learning was rated as low by 22.00%, medium by 53.00%, and high by 25.00%. Regarding the overall variable of pedagogy, 41.00% perceived it at a low level, 50.00% medium, and 9.00% high.

Inferential results

Table 3
Kolmogorov-Smirnov normality test

	Kolmogorov-Smirnov		
	Statistic	**df**	**Sig.**
Artificial intelligence	,087	100	,200
Pedagogy	,083	100	,200

The Kolmogorov-Smirnov normality test showed a significance level greater than 0.05, indicating that the variables exhibit a normal distribution. Therefore, Pearson's correlation coefficient was used to test the hypotheses.

Table 4
Correlation between the variables of artificial intelligence and pedagogy

			Pedagogy
Pearson's Rho	Artificial intelligence	Correlation coefficient	,859
		Sig. (two-tailed)	,000
		N	100

In the correlation table, a Pearson coefficient of 0.859 is observed, with a bilateral significance of 0.000, based on 100 cases. This reveals a strong and significant relationship between the variables of artificial intelligence and pedagogy.

Discussion

Regarding the study's objective, the existence of a strong and significant relationship between artificial intelligence (AI) and pedagogy in a private university in Peru was confirmed. The statistical results revealed a correlation coefficient of 0.859 with a significance of 0.000, evidencing a highly relevant association between both variables. Furthermore, differences were observed in respondents' perceptions of these variables: 60.00% considered the level of artificial intelligence to be low, 36.00% rated it as medium, and only 4% perceived it as high; concerning pedagogy, 41.00% judged it low, 50.00% medium, and 9.00% high.

Although the results reflect a medium-low use of AI in university pedagogy, the direct relationship between both variables aligns with the findings of Parra-Sánchez (2022), who analyzed the potentials of AI in higher education. This author noted that many models do not adequately consider their impact or standardize processes, revealing certain educational deficiencies despite technological advances. Areas such as programming and computer engineering stand out due to the capabilities of their faculty. He also emphasized the flexibility in the applied AI techniques, lacking a single standard approach and undergoing frequent testing in small groups without incorporating these models into institutional guidelines. Additionally, he highlighted the absence of studies integrating prior knowledge, learning styles, and non-academic factors into the design of personalized models, underscoring the need to tackle new teaching challenges in the use of AI in university education.

Complementarily, Rodríguez et al. (2024), through a systematic review, concluded that AI can personalize learning and enhance educational quality through tools that foster skills and student participation. The integration of intelligent tutoring systems offers personalized guidance; however, it is essential to evaluate their actual impact on teaching. They also warned about the need to carefully select AI tools to complement university education, addressing ethical challenges such as plagiarism and the generation of inauthentic content. In line with this,

Solano-Barliza et al. (2024) indicated that the inclusion of technologies like ChatGPT in the classroom significantly contributes to a better understanding of topics and creates new spaces for interaction and collective knowledge construction.

On the other hand, the findings are consistent with Benítez (2025), who emphasized that the effective incorporation of AI in higher education enhances the quality of learning, helps discriminate relevant information, and addresses ethical and social challenges, positively impacting professional training. He claimed that AI-enhanced education equips students to improve their competitiveness in the job market by developing advanced technological skills highly valued by employers, thus preparing more efficient and adaptable professionals to meet the changing demands of the workforce.

Similarly, Villao (2025) found that while AI-based technologies can promote autonomous learning, strengthen digital skills, and support teacher decision-making, they also pose challenges related to equity, privacy, algorithmic biases, and teacher training. He identified regulatory gaps and institutional deficiencies that hinder an ethical and effective integration of AI in universities. Finally, he emphasized that AI should not be viewed as a substitute for teachers but as a tool that enhances the quality of teaching without compromising the fundamental principles of higher education.

Likewise, Gavilanes et al. (2024) pointed out that incorporating AI in higher education offers opportunities to improve teaching quality and student experience, although its implementation faces obstacles related to staff training, curriculum updates, and ethical and legal aspects. Therefore, it is essential to define clear policies that regulate its ethical use and ensure its inclusive, innovative, and sustainable application in educational contexts.

Ultimately, the use of artificial intelligence presents challenges for higher education, such as closing the digital divide, teacher training, privacy and security, quality and validity, bias and equity, regulation and governance, workforce impact, and ethics and responsibility. These aspects must be managed carefully through the development of clear policies and practices that ensure safety and privacy, promote dialogue and collaboration among governments, universities, and independent experts, and, above all, support ongoing training for teachers to integrate AI into their pedagogical activities.

Conclusions

The study confirmed a strong and significant relationship between artificial intelligence and pedagogy in a private university in Peru, reflected in a correlation coefficient of 0.859 and a statistical significance of 0.000. This indicates that when artificial intelligence is used appropriately, it has the potential to significantly strengthen pedagogy, thereby substantially optimizing the teaching-learning process.

Regarding the main challenges in higher education, the closing of the digital divide, the protection of privacy and security, and ethical commitment and responsibility in the use of these technologies are particularly emphasized. To address these aspects, careful management is essential, involving the design of clear policies and practical guidelines, close collaboration between universities and experts, and, importantly, ongoing training and support for teachers to effectively integrate artificial intelligence into their pedagogical practice

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