Seminars in Medical Writing and Education. 2025; 4:433
doi: 10.56294/mw2025433

ORIGINAL

University Education 5.0: Artificial Intelligence and Emerging Technologies for Innovation in Higher Education

Enseñanza Universitaria 5.0: Inteligencia Artificial y Tecnologías Emergentes para la Innovación en la Educación Superior

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Citar como: Rodríguez Castillo NE, Posada González J, Amores Campaña FA, Yacchirema Jiménez MG, Yacchirema Jiménez SA, Balseca Guzmán CE. University education 5.0: artificial intelligence and emerging technologies for innovation in higher education. Seminars in Medical Writing and Education. 2025; 4:433. https://doi.org/10.56294/mw2025433

Enviado: 03-01-2025 **Revisado:** 15-04-2025 **Aceptado:** 15-09-2025 **Publicado:** 16-09-2025

Editor: PhD. Prof. Estela Morales Peralta

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ABSTRACT

Artificial Intelligence (AI) has become a key driver in the transformation of higher education, introducing new approaches to teaching, learning, and academic management. This study analysed its impact on university teaching through a multinational comparative approach involving Ecuador, Peru, and Colombia, with the aim of identifying benefits, challenges, and opportunities from the perspectives of both lecturers and students. A mixed-methods design was employed, combining a systematic review of 15 articles published between 2019 and 2024 with a structured survey administered to 450 participants (150 in each country). Quantitative data analysis was conducted to measure perceptions and trends, while the documentary review provided further contrast and enrichment of the findings. Results revealed that AI is perceived as a positive driver of educational innovation, particularly in personalised learning, the use of virtual assistants for feedback, and the optimisation of teaching time. However, concerns persist regarding algorithmic bias, transparency in automated assessment, and inequity in access to technological infrastructure. Moreover, Ecuador exhibited the highest levels of acceptance, while Peru and Colombia displayed more neutral attitudes, reflecting contextual barriers to its implementation. In conclusion, AI holds significant potential to transform higher education in the Andean region, provided its incorporation is supported by robust ethical frameworks, inclusive institutional policies, and continuous teacher training programmes that ensure sustainable adoption.

Keywords: Artificial Intelligence; Higher Education; Personalised Learning; Automated Assessment; Latin America; Ecuador; Peru; Colombia.

RESUMEN

La Inteligencia Artificial (IA) se ha consolidado como un factor clave en la transformación de la educación superior, al introducir nuevas formas de enseñanza, aprendizaje y gestión académica. Este estudio analizó su impacto en la docencia universitaria mediante un enfoque comparativo multinacional que incluyó a Ecuador, Perú y Colombia, con el objetivo de identificar beneficios, desafíos y oportunidades desde la perspectiva de docentes y estudiantes. Se empleó una metodología de métodos mixtos

que combinó una revisión sistemática de 15 artículos publicados entre 2019 y 2024 con la aplicación de una encuesta estructurada a 450 participantes (150 en cada país). Los datos se procesaron cuantitativamente para medir percepciones y tendencias, mientras que la revisión documental permitió contrastar y enriquecer los hallazgos. Los resultados mostraron que la IA es percibida como un motor positivo de innovación educativa, especialmente en el aprendizaje personalizado, el uso de asistentes virtuales para retroalimentación y la optimización del tiempo docente. Sin embargo, persisten preocupaciones relacionadas con el sesgo algorítmico, la transparencia en la evaluación automatizada y la inequidad en el acceso a la infraestructura tecnológica. Se evidenció además que Ecuador presentó los niveles más altos de aceptación, mientras que Perú y Colombia mostraron actitudes más neutrales, reflejando barreras contextuales para su implementación. En conclusión, la IA tiene un alto potencial para transformar la educación superior en la región andina, siempre que su incorporación se acompañe de marcos éticos sólidos, políticas institucionales inclusivas y programas de capacitación docente continua que garanticen una adopción sostenible.

Palabras clave: Inteligencia Artificial; Educación Superior; Aprendizaje Personalizado; Evaluación Automatizada; América Latina; Ecuador; Perú; Colombia.

INTRODUCTION

The digital revolution has transformed many aspects of society, and higher education is no exception. In recent years, artificial intelligence (AI) has emerged as one of the most disruptive technologies in education, redefining teaching and learning practices. From automated tutoring systems to adaptive learning platforms and intelligent assessment tools, AI plays a fundamental role in personalizing higher education, allowing teachers and students to access innovative resources and methodologies that improve the educational process.[1]

In this context, this study is developed within a multinational comparative framework covering higher education institutions in Ecuador, Peru, and Colombia, with the aim of analyzing how AI is impacting different Latin American academic environments. This multi-country approach allows us to identify common trends and distinct challenges based on the socio-educational contexts of each nation, offering a broader view of the transformations in university education in the region.[2]

The development of these technologies has brought with it a series of opportunities and challenges. On the one hand, AI offers the possibility of designing highly personalized learning experiences, adapting content and teaching methods to the needs and learning styles of each student. This not only improves the efficiency and effectiveness of the teaching- ssessment process, but also encourages greater student autonomy by providing them with tools for self-assessment and continuous monitoring of their academic performance. In addition, the automation of administrative tasks allows teachers to focus their time on guiding and supporting students, thus strengthening the human dimension of education.[3]

On the other hand, the integration of AI in higher education poses significant challenges. One of the main challenges is training teachers in the use of these technologies. Many lack sufficient preparation and do not know how to adapt methodologies that effectively exploit their capabilities. Likewise, the implementation of these tools requires a robust technological infrastructure, which represents an obstacle for many higher education institutions, especially in developing countries. This technological gap can accentuate inequalities in access to quality education, leading to exclusion in sectors with fewer resources.[4]

In addition, AI raises ethical and regulatory issues that must be addressed urgently. The privacy of student data, transparency in the functioning of algorithms, and the risk of bias in automated assessment are crucial issues that require a robust regulatory framework. Without adequate regulation, the use of AI in education could lead to the perpetuation of inequalities and the violation of fundamental rights.[5]

Another point of debate is the balance between technology and human interaction in the classroom. While AI offers powerful tools to enhance learning, its excessive or improper use can depersonalize teaching and weaken the relationship between teachers and students. Education involves not only the acquisition of knowledge, but also the development of social-emotional skills, creativity, and critical thinking, aspects that are unlikely to be replaced by automation.[6]

From an institutional perspective, universities need to establish clear strategies for integrating AI into their academic programs. This involves creating policies for the ethical use of AI, investing in appropriate technological infrastructure, and strengthening teacher training in digital skills. It is also essential to consider how AI can complement pedagogical work rather than replace it, promoting a hybrid model where technology and traditional teaching are articulated in a complementary manner.[7]

Within this framework, this article aims to analyze the impact of artificial intelligence on university teaching in Ecuador, Peru, and Colombia, exploring its applications, advantages, and limitations. Through a mixed methodology, combining a review of recent studies and surveys of teachers and students at higher education institutions in the three countries, we seek to identify the main trends, opportunities, and challenges in the adoption of AI in the academic sphere. The objective is to provide a regional overview of the role of artificial intelligence in higher education and propose strategies for its effective implementation in the classroom.

METHOD

This study adopts a mixed-methods approach, integrating qualitative and quantitative techniques with the aim of providing a comprehensive understanding of the impact of artificial intelligence (AI) on higher education. The combination of these methodologies allows us to examine both the perceptions and opinions of teachers and students and quantifiable data on meaningful learning and the use of digital technologies.[6]

Qualitative approach: Document review

A systematic literature review was conducted based on 15 studies indexed in academic databases such as Scopus and SciELO, published between 2019 and 2024. The documents were selected based on their relevance to the implementation of AI in higher education. A content analysis was applied to identify key trends, benefits, and challenges in the adoption of AI in university settings.[7]

Quantitative approach: Comparative surveys

A structured questionnaire with closed-ended questions and five-point Likert scales was designed to measure perceptions of AI integration in university teaching. The instrument was validated by education and technology experts from the three countries studied.

The survey was administered to a total sample of 450 participants (150 per country: 75 teachers and 75 students in Ecuador; 75 teachers and 75 students in Peru; and 75 teachers and 75 students in Colombia), selected through convenience sampling in public and private universities. This distribution allowed for a regional comparative analysis, identifying similarities and differences between national contexts.

Procedure

1. Document review: Recent articles on the integration of AI in higher education in Latin America and globally were identified and analyzed.
2. Questionnaire design and validation: The measurement instrument was constructed based on the reviewed literature and adjusted according to the recommendations of international experts in digital pedagogy.[8]
3. Survey application: The questionnaire was administered digitally in Ecuador, Peru, and Colombia, ensuring anonymity and confidentiality of the data.
4. Data analysis: Descriptive statistical techniques (frequencies, percentages, and means) were used for the quantitative results, while the qualitative results were analyzed using thematic coding derived from the document review.[9]

Limitations

Among the main limitations of this study is the non-probabilistic sampling, which reduces the level of generalization of the findings. In addition, the perceptions gathered may be influenced by the participants' level of familiarity with AI. However, the combination of qualitative and quantitative sources and the multi-country approach provide a comprehensive and comparative view of the impact of AI on university education in the Andean region.[10]

RESULTS

The analysis of the data obtained through the document review and surveys of higher education teachers and students in Ecuador, Peru, and Colombia identified the most relevant trends in the incorporation of artificial intelligence in the academic field. The findings show that AI is mainly used to promote personalized learning, strengthen formative assessment, and automate various pedagogical and administrative tasks. However, perceptions of its impact vary, highlighting both the benefits it offers and the challenges posed by its implementation. This section presents the most significant results, organized around the applications of AI in university education, its contributions to the learning process, and the difficulties that must be addressed to ensure the equitable and effective integration of this technology in institutions in the region.

Table 1 . Document Review Matrix

#	Author(s)	Article title	Year	Abstract	Link
1	Acosta B, Ballesteros M, Vilcapoma C, Huamaní O, Martín J, Martel R, Arbulu C, Arbulú J	AI in academia: how do social influence, self-efficacy, and integrity play a role?[11] Does it influence researchers' use of AI models?[12]	2025	The integration of artificial intelligence models in academic environments has shown remarkable growth in recent years.	https://doi.org/10.1016/j.ssaho.2025.101274
2	Akgun S, Greenhow C	Institutional integration of artificial intelligence in higher education: the moderating effect of ethical considerations.[13]	2021	Examines the impact of institutional AI implementation on student academic performance, considering the role of ethical considerations.	https://doi.org/10.1177/10567879241247551
3	Yuk Chan C, Zhou W	Deconstructing students' perceptions of generative AI (GenAI) through an expected value theory (EVT)-based instrument[14]	2023	Studies the relationship between student perceptions and intention to use generative AI in higher education.	https://doi.org/10.48550/arXiv.2305.01186
4	Tingjang P, Lijuan J	Technology-enhanced learning: evaluation of general education in vocational schools through the integration of technology.[15]	2024	Analyzes the role of general education in the development of comprehensive skills and its evaluation in vocational settings.	—
5	Mustofa R, Gigih T, Atmono D, Dwi H, Sukirman	Extension of the technology acceptance model: the role of subjective norms, ethics, and trust in the adoption of AI tools among students.[16]	2024	Extends the Technology Acceptance Model (TAM) by incorporating ethical and trust variables in AI adoption.	https://doi.org/10.1016/j.caeai.2025.100379
6	Yuk Chan C, Hu W	Student voices on generative AI: perceptions, benefits, and challenges at higher levels.[17]	2023	Explores students' perceptions of generative AI such as ChatGPT in higher education.	https://doi.org/10.1186/s41239-023-00411-8
7	Rani A, Nischith T, Saksham G	Enhanced learning based on GenAI.[18]	2024	Presents an innovative strategy for improving learning through generative AI.	https://doi.org/10.1109/IDCIoT59759.2024.10467943
8	Kit D, Chi Chan E, Kwan C	Opportunities, challenges, and school strategies for integrating generative AI into education.[19]	2025	Discusses the growing accessibility of GenAI and its adoption in educational contexts.	https://doi.org/10.1016/j.caeai.2025.100373
9	Cooper G	Examining science teaching in ChatGPT: an exploratory study of generative artificial intelligence.[20]	2023	Explores the use of ChatGPT in science education and reflects on its pedagogical application.	https://doi.org/10.1007/s10956-023-10039-y
10	Guerra C, Tass B	Practical applications of generative artificial intelligence in teaching: The case of multimedia design engineering.[21]	2024	Analyzes the impact of generative AI on teaching and student productivity in the field of multimedia design.	https://doi.org/10.1007/s10956-023-10039-y
11	Flores C, Olivares S, Dávila C, Arévalo J, Morales G, Trinidad N, Caycho B	[A] bibliometric review of studies on the acceptance of artificial intelligence, teaching, and learning in higher education.[22]	2024	Identifies indicators that allow the impact of AI on teaching and learning to be evaluated.	https://doi.org/10.31637/epsir-2024-816
12	Sánchez M, Carbajal E	Generative artificial intelligence and university education: has the genie been let out of the bottle?[23]	2023	Provides elements for discussing the educational potential of GAI and analyzes its advantages and disadvantages.	https://doi.org/10.22201/iisue.24486167e.2023.Especial.61692
13	Solano A, Ojeda A, Aáron M	Quantitative analysis of the perception of the use of ChatGPT artificial intelligence in the teaching and learning of undergraduate students in the Caribbean Colombian.[24]	2024	Studies the perception of the use of AI in the teaching and learning processes of Colombian students.	http://dx.doi.org/10.4067/S0718-50062024000300129

Table 1 . Document Review Matrix

#	Author(s)	Article title	Year	Abstract	Link
14	Torres E, López M, Torres F, Tipo J, Torres J, Supo J, Basurco T, Coyla L, Mamani O	Impact of artificial intelligence on university education.[25]	2023	Presents a solid methodological analysis of the effects of AI on higher education.	https://dx.doi.org/10.37885/230513147
15	García JP, Alor L, Cisneros Y	Virtual tutors' perceptions of the impact of artificial intelligence on university education.[26]	2023	Analyze how virtual tutors perceive the influence of AI on the teaching-learning process.	https://rabida.uhu.es/dspace/handle/10272/22374

To examine the impact of artificial intelligence on university teaching, a survey was conducted among teachers and students at higher education institutions **in** Ecuador, Peru, and Colombia**.** The purpose was to understand their perceptions regarding the implementation and effectiveness of AI tools in teaching and learning processes, as well as to identify the main challenges and opportunities that these technologies represent in different Latin American academic contexts.

The findings reveal the level of familiarity and use of AI-based tools, including adaptive learning platforms, educational chatbots, virtual assistants, and automated assessment systems. Their contribution to the personalization of learning, the optimization of teaching time, and the improvement of the quality of academic feedback was also assessed**.**

Below is a table with the main results of the comparative survey, organized by key dimensions of analysis in the three countries.

Table 2. Comparative survey results (Ecuador, Peru, and Colombia)

Dimension	Country	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
AI improves learning personalization	Ecuador	45	40	10	4	1
AI improves learning personalization	Peru	40	38	15	5	2
AI improves learning personalization	Colombia	35	42	15	6	2
Virtual assistants facilitate feedback	Ecuador	42	38	12	6	2
Virtual assistants facilitate feedback	Peru	38	36	15	7	4
Virtual assistants facilitate feedback	Colombia	35	34	18	8	5
AI helps optimize teaching time	Ecuador	44	35	12	5	4
AI helps optimize teaching time	Peru	40	36	14	6	4
AI helps optimize teaching time	Colombia	38	32	20	6	4
Automated evaluation improves objectivity	Ecuador	40	35	15	7	3
Automated evaluation improves objectivity	Peru	38	34	18	6	4
Automated evaluation improves objectivity	Colombia	35	33	20	8	4
AI implementation has been effective	Ecuador	35	37	15	8	5
AI implementation has been effective	Peru	32	35	18	9	6
AI implementation has been effective	Colombia	30	33	20	10	7

Summary of comparative results

1. AI and learning personalization

In all three countries, there is a clear trend toward positive perceptions of the impact of artificial intelligence on personalized learning, with a majority of responses in the *Strongly Agree* and *Agree* categories. In Ecuador (85 %) and Peru (78 %), there is greater consensus regarding AI's ability to adapt teaching processes to students' needs, while in Colombia, although the level of agreement is also high, there are more neutral responses, indicating a lower degree of conviction regarding this benefit.

2. Virtual assistants and feedback

The results show that in both Ecuador (80 %) and Peru (74 %), virtual assistants are widely recognized as tools that improve the quality and speed of academic feedback. However, in Colombia, although 69 % of respondents value this contribution positively, there is a higher proportion of neutral and disagree responses, suggesting some resistance to the use of these tools or less familiarity with their implementation in the classroom.

3. Optimization of teaching time

The perception that AI helps optimize teachers' time is most positive in Ecuador (79 %), followed by Peru (76 %) and finally Colombia (70 %). In the latter country, there is a greater tendency toward neutral responses,

which shows more limited confidence in the potential of AI to reduce administrative workload and free up time for teaching activities.

4. Automated assessment and objectivity

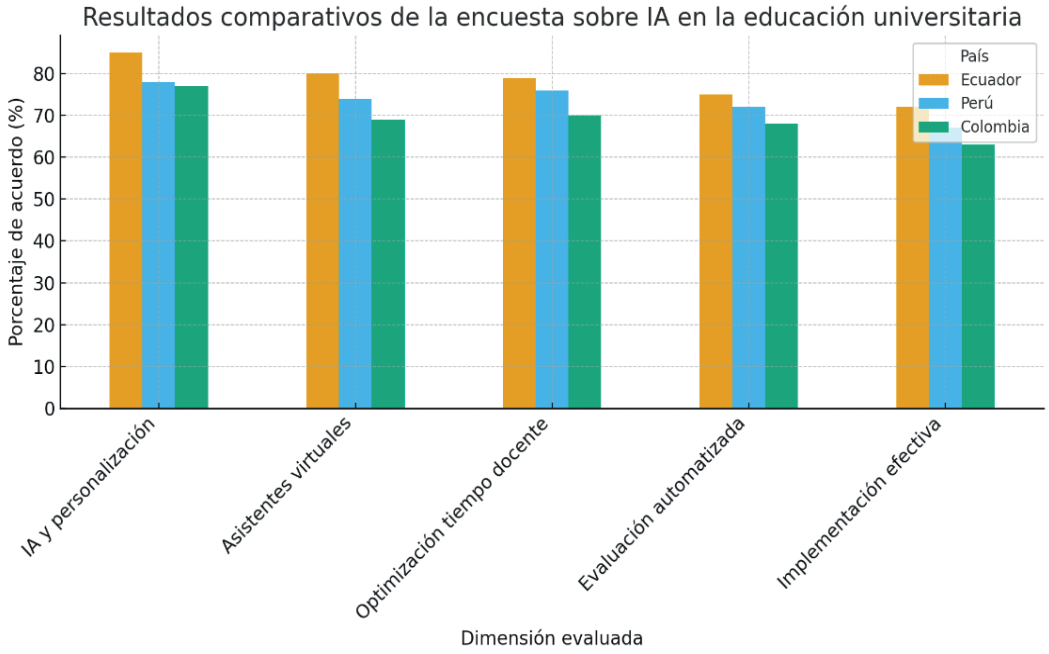
In all three countries, artificial intelligence is recognized as strengthening objectivity in assessment processes: Ecuador with 75 %, Peru with 72 %, and Colombia with 68 %. However, some reservations remain among respondents, mainly related to algorithmic bias and transparency in the criteria used by automated systems to grade student performance, showing that doubts still exist about the reliability of these tools.

5. Effective implementation of AI

In terms of the effectiveness of institutional implementation of AI, Ecuador reflects the most favorable perception with 72 % acceptance. In contrast, Peru (67 %) and Colombia (63 %) show higher levels of neutral and disagree responses, revealing that, although the reception is generally positive, significant limitations remain in terms of technological infrastructure and teacher training, especially outside the Ecuadorian context.

In summary, the results show a mostly positive perception in all three countries regarding the impact of artificial intelligence on higher education, with Ecuador leading in acceptance, followed by Peru and Colombia. However, levels of neutrality and disagreement are more noticeable in Colombia, reflecting significant challenges in teacher training, trust in technology, and institutional infrastructure.

The following figure shows that Ecuador leads in all dimensions, followed by Peru and finally Colombia. The most marked difference is in the dimension of effective implementation, where Ecuador achieves 72 % acceptance compared to 67 % in Peru and 63 % in Colombia. These results suggest that, although the overall perception of AI in university education is positive, there are regional differences mainly related to technological infrastructure, teacher training, and the degree of familiarity of participants with these digital tools.



Note. Comparative trends in levels of agreement on the integration of artificial intelligence in university education in Ecuador, Peru, and Colombia. Prepared by the author based on survey results (2024).

Figure 1. Comparative results of the survey on AI in university education

The survey conducted in Ecuador, Peru, and Colombia identified different perceptions of the integration of artificial intelligence in university teaching. The results were organized around five dimensions: personalization of learning, use of virtual assistants for feedback, optimization of teaching time, objectivity of automated assessment, and institutional implementation of AI.

Figure 1 presents the comparative results in a bar chart. The data show that positive responses (*Strongly agree* and *Agree*) predominate in all three countries across all dimensions analyzed. Ecuador consistently ranks highest in terms of acceptance, standing out in the perception that AI improves the personalization of learning (85 %) and optimizes teaching time (79 %). In Peru, the percentages are also high, especially in personalization (78 %) and feedback (74 %). Colombia, although maintaining similar trends, shows lower percentages in all dimensions, with a greater number of neutral responses, suggesting a certain degree of caution regarding the

impact of AI.

Overall, the findings reflect that AI is recognized as a resource with high potential to transform university teaching in all three countries, although its full adoption still faces structural and cultural limitations, particularly in contexts such as Colombia.

DISCUSSION

The findings show that perceptions of artificial intelligence in university education are mostly positive in the three countries analyzed. However, significant differences between contexts were identified. In Ecuador, acceptance levels are higher in all dimensions, which shows a greater degree of institutional appropriation of these technologies. Similar results were reported by García-Peñalvo et al.[26], who point out that the integration of AI in Latin American universities depends largely on institutional policies and technological investment.

In Peru, although the perception is also favorable, the percentages are slightly lower, especially in relation to institutional implementation. This coincides with the findings of Flores et al.[7], who highlight that the adoption of AI in the Peruvian university sphere faces limitations associated with a lack of teacher training and unequal access to digital infrastructure.

Colombia shows a similar trend, but with a higher number of neutral responses, suggesting a more cautious attitude toward the incorporation of AI. These results reflect the findings of Solano et al.[10], who show that although Colombian students recognize the value of tools such as ChatGPT in teaching, doubts remain about their reliability and pedagogical relevance.

In terms of specific dimensions, the personalization of learning was the most highly valued in all three countries, confirming the findings of Sánchez and Carbajal[27], who argue that AI facilitates the adaptation of content and methodologies to the individual characteristics of students. Likewise, feedback through virtual assistants was perceived as a useful tool, especially in Ecuador and Peru, which coincides with the contributions of Mustofa et al.[8], who highlight the potential of AI to strengthen student-teacher interaction through digital channels.

Automated assessment was recognized as a resource that improves the objectivity of grading processes, albeit with reservations related to algorithmic bias. This concern has been raised by Mendiola and Degante[4], who warn of the need to develop regulatory frameworks that ensure transparency and fairness in the use of educational algorithms. Finally, the effective implementation of AI showed the greatest differences between countries, confirming the importance of considering the institutional and socioeconomic contexts in which this technology is inserted, as pointed out by Kit et al.[9]

In summary, the multinational comparison suggests that the acceptance of AI in higher education does not depend solely on its perceived benefits, but also on structural, cultural, and regulatory factors. Therefore, it is necessary for universities in Ecuador, Peru, and Colombia to strengthen teacher training programs, invest in digital infrastructure, and promote clear policies to ensure the ethical and equitable use of these technologies.

CONCLUSIONS

This study showed that artificial intelligence is emerging as a strategic tool for the transformation of higher education in Ecuador, Peru, and Colombia. The survey results and document analysis confirmed that AI is perceived mostly positively by teachers and students, highlighting its ability to personalize learning, optimize feedback, and strengthen the objectivity of assessment processes.

Although Ecuador leads in terms of acceptance in all dimensions, followed by Peru and then Colombia, all three contexts recognize the relevance of AI as a support for university teaching. However, limitations that condition its effective implementation were also identified, such as insufficient technological infrastructure, lack of teacher training in digital skills, and ethical concerns about transparency and algorithmic bias.

The multinational comparison leads to the conclusion that the integration of AI in higher education does not depend solely on perceived benefits, but also on structural, regulatory, and cultural factors that vary between countries. Therefore, it is recommended that universities in the region move forward with the formulation of clear policies, teacher training programs, and digital inclusion strategies, ensuring equitable access to these tools.

In summary, artificial intelligence has the potential to become a catalyst for strengthening educational quality in Latin America, provided that its implementation is carried out with an ethical, inclusive, and pedagogically grounded approach. This study provides empirical evidence to guide future research and institutional decisions regarding the role of AI in the transformation of university education in the Andean region.

BIBLIOGRAPHICAL REFERENCES

1. Holmes W, Bialik M, Fadel C. Artificial intelligence in education: promises and implications for teaching and learning. Boston: Center for Curriculum Redesign; 2019.

2. UNESCO. Artificial intelligence in education: challenges and opportunities for sustainable development.

París: UNESCO; 2021.

3. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence unleashed: an argument for AI in education. Londres: Pearson; 2016.

4. Selwyn N. Should robots replace teachers? AI and the future of education. Cambridge: Polity Press; 2019.

5. Mhlanga D. Artificial intelligence in higher education: applications, implications, and opportunities. Int J High Educ. 2022;11(2):1-15. doi:10.5430/ijhe.v11n2p1

6. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – where are the educators? Int J Educ Technol High Educ. 2019;16:39. doi:10.1186/s41239-019-0171-0

7. Chen L, Chen P, Lin Z. Artificial intelligence in education: a review. IEEE Access. 2020;8:75264-78. doi:10.1109/ACCESS.2020.2988510

8. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 3rd ed. Thousand Oaks: SAGE; 2018.

9. Flick U. An introduction to qualitative research. 6th ed. Londres: SAGE; 2018.

10. Hernández-Sampieri R, Mendoza Torres CP. Metodología de la investigación: las rutas cuantitativa, cualitativa y mixta. 7.ª ed. México DF: McGraw-Hill; 2021.

11. Acosta B, Ballesteros M, Vilcapoma C, Huamaní O, Martín J, Martel R, et al. IA en el mundo académico: influencia social, autoeficiencia e integridad en el uso de modelos de IA por investigadores. Soc Sci Humanit Open. 2025;101274. doi:10.1016/j.ssaho.2025.101274

12. Akgun S, Greenhow C. Integración institucional de la inteligencia artificial en la educación superior: el efecto moderador de la consideración ética. J Educ Comput Res. 2021;59(7). doi:10.1177/10567879241247551

13. Yuk Chan C, Zhou W. Deconstrucción de las percepciones de los estudiantes sobre la IA generativa a través de un instrumento basado en la teoría del valor esperado. arXiv. 2023. doi:10.48550/arXiv.2305.01186

14. Tingjang P, Lijuan J. Aprendizaje mejorado con tecnología: evaluación de la educación general en escuelas vocacionales mediante integración tecnológica. Educ Voc Tech. 2024.

15. Mustofa R, Gigih T, Atmono D, Dwi H, Sukirman. Ampliación del modelo de aceptación de la tecnología: normas subjetivas, ética y confianza en la adopción de herramientas de IA entre estudiantes. Comput Appl Eng Educ. 2024;100379. doi:10.1016/j.caeai.2025.100379

16. Yuk Chan C, Hu W. Voces de estudiantes sobre la IA generativa: percepciones, beneficios y desafíos en niveles superiores. Int J Educ Technol High Educ. 2023;20(1):18. doi:10.1186/s41239-023-00411-8

17. Rani A, Nischith T, Saksham G. Aprendizaje mejorado basado en GenAI. IEEE Conf Indust IoT. 2024. doi:10.1109/IDCIoT59759.2024.10467943

18. Kit D, Chi Chan E, Kwan C. Oportunidades, desafíos y estrategias escolares para integrar la IA generativa en la educación. Comput Appl Eng Educ. 2025;100373. doi:10.1016/j.caeai.2025.100373

19. Cooper G. Examinar la enseñanza de las ciencias en ChatGPT: un estudio exploratorio de la inteligencia artificial generativa. J Sci Educ Technol. 2023;32:1039-55. doi:10.1007/s10956-023-10039-y

20. Guerra C, Tass B. Aplicaciones prácticas de la inteligencia artificial generativa en la labor docente: el caso de la ingeniería en Diseño Multimedia. J Sci Educ Technol. 2024. doi:10.1007/s10956-023-10039-y

21. Flores C, Olivares S, Dávila C, Arévalo J, Morales G, Trinidad N, et al. Revisión bibliométrica sobre aceptación de la inteligencia artificial, enseñanza y aprendizaje en educación superior. Educ Policy Strateg Res.

2024;816. doi:10.31637/epsir-2024-816

22. Sánchez M, Carbajal E. La inteligencia artificial generativa y la educación universitaria: ¿salió el genio de la lámpara? Rev Mex Invest Educ. 2023;Especial:61692. doi:10.22201/iisue.24486167e.2023.Especial.61692

23. Solano A, Ojeda A, Aáron M. Análisis cuantitativo de la percepción del uso de inteligencia artificial ChatGPT en la enseñanza y aprendizaje en estudiantes de pregrado del Caribe colombiano. Form Univ. 2024;17(3):129-45. doi:10.4067/S0718-50062024000300129

24. Torres E, López M, Torres F, Tipo J, Torres J, Supo J, et al. Impacto de la inteligencia artificial en la educación universitaria. Int J Innov Educ Res. 2023. doi:10.37885/230513147

25. García JP, Alor L, Cisneros Y. Percepción de los tutores virtuales sobre el impacto de la inteligencia artificial en la educación universitaria. Rev Educ Huelva. 2023. Disponible en: https://rabida.uhu.es/dspace/handle/10272/22374

26. García-Peñalvo FJ, Corell A, Abella V, Conde MÁ. Integración de la inteligencia artificial en universidades latinoamericanas: políticas institucionales e inversión tecnológica. Educ Knowl Soc. 2022;23:e25784. doi:10.14201/eks.25784

FUNDING

The authors did not receive funding for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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https://doi.org/10.56294/mw2025433 ISSN: 3008-8127